EIAR Addendum Report

For Development at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare.

on behalf of Glenveagh Homes Ltd

October 2025

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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Contents

1. Introduction

On behalf of the applicant, Glenveagh Homes Ltd, this report provides a review of the Environmental Impact Assessment Report (EIAR) completed for the Large Scale Residential Development (LRD) application at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare, in the context of the changes made as part of the Further Information Response.

The LRD application was submitted to Clare County Council on the 30th June 2025 and a request for further information was issued by the Council on the 22nd August 2025.

As part of the response to the further information request, each consultant reviewed the EIAR chapters they completed and advised of any material changes to the content, conclusions, or mitigation measures associated with the chapter. This report is an addendum to the submitted EIAR that accompanied the LRD and has been completed to address the further information request and provides an overview of the changes and should be read in conjunction with the full EIAR completed with the application.

The completed EIAR included 18 no. chapters, completed by various relevant consultants as listed in the table below.

	Chapter	Consultant
1.	Introduction	McCutcheon Halley
2.	Project Description	McCutcheon Halley
3.	Alternatives Considered	McCutcheon Halley
4.	Population and Human Health	McCutcheon Halley
5.	Landscape and Visual	Jane McCorkell Design
6.	Material Assets: Traffic and Transport	TOBIN
7.	Material Assets: Built Services	TOBIN
8.	Material Assets: Waste	AWN Consulting
9.	Land & Soils	TOBIN
10.	Water and Hydrology	TOBIN
11.	Biodiversity	Altemar
12.	Noise and Vibration	AWN Consulting
13.	Air Quality	AWN Consulting
14.	Climate	AWN Consulting
15.	Cultural Heritage	John Cronin and Associates
16.	Risk of Major Accidents and Disasters	AWN Consulting
17.	Interactions	McCutcheon Halley

	Chapter	Consultant
18.	Summary of Mitigation Measures	McCutcheon Halley

2. Review of EIAR Chapters – Volume 2 Main Statement

2.1 Chapter 1 - Introduction

There is no material change to this chapter resulting from the further information response.

2.2 Chapter 2 - Project Description

The proposed unit types have been amended as part of the further information response. In addition, 11 no. visitor car parking spaces have been added to the layout.

As a result, Table 2.1, Section 2.4.2 and Section 2.4.5.1 and of the completed Project Description Chapter has been amended. These changes are shown in bold below.

Table 2.1 Development Overview

Development Statistics	
Gross Site Area	11.3ha
Net Site Area	8.57ha
No. Residential Units	300 no. residential units
Creche	400.7sqm, 80 no. childcare spaces
Density	35uph
Building Height	1 to 3 storeys
Unit Mix Summary	14 no. 1 beds (4.7%), 91 no. 2 beds (30.3%), 164 no. 3 beds (54.7%), 31 no. 4 beds (10.3%)
Car Parking	**547**
Bicycle Parking	202 no. cycle parking spaces
Public Open Space	15%
Plot Ratio	0.361 (net site area)
Site Coverage	22.2% (net site area)

Section 2.4.2 Residential

The proposed layout provides a total of 300 no. residential units comprising **11** no. detached houses (**3.7**%), **126** no. semi-detached houses (**42**%), **143** no. townhouses (**47.6**%), and 20 no. accessible bungalows (6.7%).

The **11** no. detached houses, and 20 no. bungalows have been included following feedback form Clare County Council to cater for an increased variety of households.

The 20 no. bungalows are designed as accessible, step-down units, around a central communal courtyard area.

These houses are organised into 3 no. character areas to provide three distinct areas within the scheme. Each area is distinguished by the design and materials used in the proposed houses.

Section 2.4.5.1 Car Parking

A total of **547** no. car parking spaces are provided within the scheme. 1 no. car parking space is provided for the 1 bed and 2 bed houses and 2 no. car parking spaces are provided for the 3 bed and 4 bed houses. This equates to a total of 495 no. car parking spaces allocated to the residential units. In addition, there are 11 no. car parking spaces provided for the creche (including 1 no. accessible and 2 no. electric vehicle) and 2 no. drop-off spaces.

There are also **41** no. visitor car parking spaces provided. The majority of the residential car parking is provided as in-curtilage parking where residents will be able to add electric vehicle charging points as required. In order to cater for the EV charging needs of residents without in-curtilage parking, and for visitors, 10 no. EV spaces are provided in two EV charging hubs. This will allow the easy maintenance of the chargers and the provision of additional chargers into the future.

2.3 Chapter 3 - Alternatives Considered

There is no material change to this chapter resulting from the further information response.

2.4 Chapter 4 - Population and Human Health

There is no material change to this chapter resulting from the further information response.

2.5 Chapter 5 Landscape and Visual

Jane McCorkell Landscape Architect has reviewed this chapter and confirmed there is no material change to this chapter resulting from the further information response.

The photomontages have been updated to reflect the additional planting and screening along the boundary with the N85. This has not materially impacted the conclusions of the Landscape and Visual chapter.

2.6 Chapter 6 - Material Assets: Traffic and Transport

This chapter describes the material assets from a traffic and transport perspectives that could potentially be impacted by the Proposed Project. Following a further information request the following changes shall be noted.

Section 6.3.1 Discusses the provision of parking infrastructure. The maximum parking provisions at the site have been calculated in accordance with the parking Guidelines set out in the following:

- Clare County Development Plan (CCDP) 2023 - 2029

The required and provided car parking breakdown for the proposed development (300 units), post the RFI has increased from total parking provision of 536 to 547.

Car Parking	CCDP	No of Units/Staff and Children	Maximum Allowable	Parking Proposed
1 & 2 bed houses	Table A3 – 1 space per Unit + 1 Visitor space per 3 units	105	140	536
≥ 3 bed houses	Table A3 – 2 spaces per Unit + 1 Visitor space per 3 units	195	455	
Creche (80 child capacity)	Table A3 – 1 per employee + 1 per 4 children	5/80	25	11
Totals			620	547

The provided parking infrastructures still remains below the maximum allowable figure of 620.

A Stage 1 Road Safety Audit was carried out as part of the final application and recommendations of the audit have been addressed and incorporated into the scheme.

As part of Section 6.4.1 with further reflection and addressment of Sections 6.8.2 and 6.9.2, consultations have been opened with the local authorities to address the potential of vehicular parking along the hard shoulder of the M85 and using the pedestrian connectivity route as an access to the development. Post consultations, the recommendations and the agreed protocol to mitigate this risk will be incorporated into the final scheme design.

2.7 Chapter 7 - Material Assets: Built Services

This chapter describes the material assets from services/utilities perspectives that could potentially be impacted by the proposed development. Upon request for further information,the Construction Environmental Management Plan (CEMP) has been updated to include revised mitigation measures for in-stream activities and works near the Claureen River. These updates aim to prevent contamination, minimize pollution, and reduce disruption to the surrounding environment. The details are as follows:

- Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse.
- Instream machine works will be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.
- Instream earthworks must be executed so as to minimise the suspension of solids
- Only clean, inert crushed stone will be used in the construction of the outfall trench to prevent any risk of contamination or pollution of receiving waters. The material will be free from fines, silt, or other potential contaminants. All stone used will either:
    - Originate from quarries with valid planning permission; or
    - Be sourced from materials approved as by-products in accordance with the EPA's criteria under Article 27(1) of the European Communities (Waste Directive) Regulations, 2011.
- Any excavated material, from swale development, to be stored behind silt fencing and at a safe radial distance, advised by the project ecologist, from the Claureen River.
- Excavation and seeding of the swale shall be carried out during optimal seasonal windows, specified by landscapers, to ensure germination and establishment prior to major rainfall events.

- Regular inspections will be carried out during construction to ensure compliance with environmental controls, and any accidental discharges or pollution incidents will be reported and addressed immediately in accordance with the site's incident response plan.

2.8 Chapter 8 - Material Assets: Waste

AWN Consulting completed this Material Assets: Waste chapter and reviewed their chapter in the context of the further information response. They provided the below information as an addendum to their chapter.

This EIAR Chapter examined the impact on the waste management for the site both during the construction and operational phases.

Any impacts could be managed by appropriate standard construction/ operational management practices and recommended mitigation measures where appropriate. The EIAR confirms that the potential residual impacts are as follows:

Waste Management: Residual Effects

During the construction phase, typical construction waste materials will be generated which will be source segregated on-site into appropriate skips/containers, where practical and removed from site by suitably permitted waste contractors to authorised waste facilities. Where possible, materials will be reused on-site to minimise raw material consumption. Source segregation of waste materials will improve the re-use opportunities of recyclable materials off-site. There will be soil, stones and clay excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (Tobin) have estimated that c. 15,000 m3 of material will need to be excavated to do so. It is currently envisaged that c. 13,500 m3 of excavated will be retained on site for reuse as fill and/or landscaping purposes while the remaining c. 1,500 m3 of excavated material will be removed off site to a licenced facility for reuse, recycling or disposal, as appropriate. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers or the environment.

A carefully planned approach to waste management and adherence to the site-specific Resource and Waste Management Plan (Appendix 8.1) during the construction phase will ensure that the effect on the environment will be short-term, neutral and imperceptible.

During the operational phase, waste will be generated by the residents as well as the crèche tenant. Dedicated individual waste storage areas (WSAs) or space in backyards (where there is external access to the rear yards) have been allocated throughout the development for residents. The residential WSAs have been appropriately sized to accommodate the estimated waste

arisings in residential units. The crèche tenants have a commercial WSA allocated separately from the individual residential WSAs.

The WSAs have been allocated to ensure a convenient and efficient management strategy with source segregation a priority. Waste will be collected from the designated waste staging/collection areas by permitted waste contractors and removed off-site for re-use, recycling, recovery and/or disposal.

An Operational Waste Management Plan has been prepared by AWN Consulting which provides a strategy for segregation (at source), storage and collection of wastes generated within the development during the operational phase including dry mixed recyclables, organic waste, mixed non-recyclable waste and glass as well as providing a strategy for management of waste batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil, furniture and abandoned bicycles (Appendix 8.2). The plan complies with all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the development.

Provided the mitigation measures outlined in the Operational Waste Management Plan (Appendix 8.2) are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be long term, neutral and imperceptible.

Proposed Amended Development

The proposed amendments do not materially alter the impacts of the development of the material assets strategy or environment. Consequently, there will be no additional impacts on servicing of the site, transportation or waste management as result of the amendments, and no additional mitigation or monitoring measures are required.

2.9 Chapter 9 - Land & Soils

No elements of the request for further information have affected Chapter 09 Land & Soils and therefore it remains unchanged.

2.10 Chapter 10 - Water and Hydrology

Further to construction phase mitigation measures outlined in Section 10.5.2, the in stream works in and along the vicinity of the Claureen River to avoid contamination, pollution and disruption have been further elaborated on and updated in the CEMP as follows:

- Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse.

- Instream machine works will be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.
- Instream earthworks must be executed so as to minimise the suspension of solids
- Only clean, inert crushed stone will be used in the construction of the outfall trench to prevent any risk of contamination or pollution of receiving waters. The material will be free from fines, silt, or other potential contaminants. All stone used will either:
  - Originate from quarries with valid planning permission; or
  - Be sourced from materials approved as by-products in accordance with the EPA's criteria under Article 27(1) of the European Communities (Waste Directive) Regulations, 2011.
- Any excavated material, from swale development, to be stored behind silt fencing and at a safe radial distance, advised by the project ecologist, from the Claureen River.
- Excavation and seeding of the swale shall be carried out during optimal seasonal windows, specified by landscapers, to ensure germination and establishment prior to major rainfall events.
- Regular inspections will be carried out during construction to ensure compliance with environmental controls, and any accidental discharges or pollution incidents will be reported and addressed immediately in accordance with the site's incident response plan.

2.11 Chapter 11 - Biodiversity

As part of the response to further information, Altemar carried out additional bat surveys on site including emergent/detector surveys on the 15th and 22nd September and a static surveillance bat survey from the 15th to the 22nd September.

In addition, an assessment of the potential in combination effects of permitted and currently undergoing planning within the catchment of the Ennis North WwTP was carried out. The total volume for developments assessed for potential in combination effects within Ennis North Wastewater Plant is 167m^3/day. The proposed development 147 m^3/day. This gives a combined figure of 314 m^3/day. This makes up approximately 7% of the remaining hydraulic headroom, and <5% of the remaining P.E headroom.

As a result, the development is unlikely to give rise to potential in - combination effects in relation to the Ennis North Wastewater Treatment Plant. The WwTP is operating within capacity, and it should be noted that a confirmation of feasibility from Uisce Eireann was received for each of the developments above.

The mitigation measures have been amended slightly as part of this further information response. The updated measures are shown below with new text shown in bold and removed text shown with a strikethrough.

- *11.10.1 Mitigation by Design* **The proposed new linear planting incorporated as part of the RFI results in a net gain of 714 m in linear habitat connectivity on site.**
- Approximately ~~344~~ **400** trees, including species such as oak, ash, and beech, will be planted across the site. These will be arranged in structured treelines, with additional woodland planting areas integrated into the overall landscape design strategy. This planting scheme is intended to support and enhance bat foraging activity on site.

11.10.2 Construction Phase Mitigation

- Works within 50m of the Claureen River will only be carried out subject to the approval of the project ecologist. Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse. ~~A pre-cast headwall will be used.~~

11.10.3 Operational Phase Mitigation

Lighting

A warm white spectrum **(<2700 Kelvins)** ~~(i.e. 2200 Kelvins)~~ will be used to reduce the blue light component of the LED spectrum).

Landscape Design

It should be noted that the proposed development has increased the level of hedgerow planting to include more linear woodland planting across the boundary of the site which includes oak. This will result in taller treelines in the long term than the granted development which would provide superior foraging corridors and greater light spill containment. **It should be noted that, following a Request for Further Information, a native hedgerow has been incorporated into the landscape strategy along the entirety of the western boundary, in addition to further woodland tree planting.**

Altemar have reviewed the Biodiversity EIAR chapter and provided updates which are shown in appendix 1 of this report.

2.12 Chapter 12 - Noise and Vibration

AWN Consulting have reviewed the noise and vibration chapter and included additional detail on rock breaking. Please see enclosed the amended chapter, with the changed highlighted in yellow, in Appendix 2 of this report.

The amended chapter includes the following updated construction phase mitigation measures to address rock breaking. The phasing referenced in this section refers to the construction phasing.

There is potential for the Construction Noise Threshold value to be exceeded due to rock breaking and rock crushing activities during Phases 1 and 2. During Phase 1, exceedances are predicted at all NSLs (1, 2, 3, and 4). In Phase 2, exceedances are expected only at NSLs 2 and 3. These works will be temporary in duration and are scheduled to occur during periods considered least disruptive to surrounding stakeholders — such as mid-morning to mid-afternoon on weekdays, when the majority of nearby residents are likely to be at work or school. During Phase 3, predicted noise levels are not expected to exceed the threshold at any NSL, and therefore no significant noise effects are anticipated for that phase.

In the case of rock breaking the following time periods shall be adhered to and confirmed at construction stage:

- *Monday to Friday: 08:15 – 17:45hrs*
- *Saturday/Sunday/Bank Holidays – No rock breaking*

The contractor may additionally consider scheduling rock-breaking activities during periods considered least disruptive to surrounding stakeholders, such as mid-morning to mid-afternoon hours on weekdays (when the majority of nearby residents may be at work or school).

The amended chapter identifies the residual impact in Section 12.10 of the EIAR from rock breaking as follows:

*During rock breaking and crushing activities, the residual noise effect is predicted to be **negative, significant to very significant, and temporary** at distances up to 60m from the works, assuming all plant items operate simultaneously adjacent to the closest site boundary. This applies to all NSLs during Phase 1, and to NSL 3 during Phase 2, where exceedances of the Construction Noise Threshold (CNT) are predicted.*

*At distances of 60m and greater, the CNT is not expected to be exceeded at any NSLs, and the residual significance of effect is considered **negative, slight to moderate, and temporary.***

During Phase 3, noise levels are predicted to remain below the CNT at all NSLs, and therefore no significant residual noise effects are anticipated.

2.13 Chapter 13 - Air Quality

The air quality chapter determined the impacts to air quality during both the construction and operational phases of the proposed development. The primary impacts to air quality as a result of the proposed amended

development are the same as those previously assessed and include dust soiling and dust-related human health effects as a result of construction dust emissions as well as increases in traffic pollutants as a result of increased vehicle movements on the local road network.

The amendments to the proposed development following the request for further information are not significant in relation to air quality will not alter the conclusions of the previous assessment.

The request for further information requires the air quality assessment to include the proposed rock breaking activities within the assessment.

Section 13.8.1.1 of Chapter 13 of the EIAR contained an assessment of the potential construction dust impacts as a result of the proposed development in the context of dust soiling and dust-related human health effects. The assessment was undertaken using the Institute of Air Quality Management (IAQM) guidance document Guidance on the Assessment of Dust from Demolition and Construction (2024). This assessed the risk of dust impacts under the four distinct categories of demolition, earthworks, construction and trackout.

Rock breaking is not a specific activity within the IAQM guidance, however, it can be considered under the category of earthworks for the purposes of this assessment. The dust emission magnitude has been previously assessed as 'large' under the earthworks category and results in a potential high risk of dust soiling impacts and a low risk of dust-related human health impacts when combined with the sensitivity of the surrounding area. This assessment remains appropriate when considering proposed rock breaking activities and ensures the maximum potential impact is captured.

There is an overall high-risk of dust soiling impacts associated with the proposed development, and this conclusion remains valid for the amended development, including rock breaking activities. Therefore, the previously specified mitigation measures in relation to high-risk sites remain appropriate.

The following mitigation measures specific to rock breaking activities, in addition to the general mitigation measures set out in Section 13.9.1 of Chapter 13, shall be implemented on site, these are also specified within the Construction Environmental Management Plan (CEMP) for the proposed development.

- Install fixed and mobile water spraying systems on crushers, screens, and rock breaking areas to suppress dust emissions continuously during operations.
- Rock breaking will be limited to Monday – Friday only, no rock breaking activities to occur on weekends.
- The contractor may additionally consider scheduling rock-breaking activities during periods considered least disruptive to surrounding stakeholders, such as mid-morning to mid-afternoon hours on weekdays (when the majority of nearby residents may be at work or school).

The amendments to the proposed development following the request for further information are not significant in relation to air quality do not alter the conclusions of the previous assessment. The previous conclusions of the air quality impact assessment remain valid. The proposed amended development will result in a **short-term, direct, negative, localised** and **not significant** impact to air quality during the construction phase and a **direct, long-term, neutral, imperceptible**, and **not significant** impact during the operational phase.

2.14 Chapter 14 - Climate

The amendments to the proposed development are not significant in relation to the climate impact assessment. The conclusion of the previous assessment remains valid and there are no changes to the climate assessment as a result of the further information response.

2.15 Chapter 15 - Cultural Heritage

John Cronin and Associates have confirmed there are no material changes to the content or conclusions of this EIAR as a result of the further information response.

2.16 Chapter 16 - Risk of Major Accidents and Disasters

There is no material change to this chapter resulting from the further information response.

2.17 Chapter 17 - Interactions

There is no material change to this chapter resulting from the further information response.

2.18 Chapter 18 - Summary of Mitigation Measures

The following mitigation measures, as detailed in the previous sections, should be implemented, in addition to the mitigation measures outlined in chapter 18 of the EIAR submitted with the application.

Built Services and Water and Hydrology

- Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse.

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Noise and Vibration

There is potential for the Construction Noise Threshold value to be exceeded due to rock breaking and rock crushing activities during Phases 1 and 2. During Phase 1, exceedances are predicted at all NSLs (1, 2, 3, and 4). In Phase 2, exceedances are expected only at NSLs 2 and 3. These works will be temporary in duration and are scheduled to occur during periods considered least disruptive to surrounding stakeholders — such as mid-morning to mid-afternoon on weekdays, when the majority of nearby residents are likely to be at work or school. During Phase 3, predicted noise levels are not expected to exceed the threshold at any NSL, and therefore no significant noise effects are anticipated for that phase.

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Air Quality

- Install fixed and mobile water spraying systems on crushers, screens, and rock breaking areas to suppress dust emissions continuously during operations.
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- The contractor may additionally consider scheduling rock-breaking activities during periods considered least disruptive to surrounding stakeholders, such as mid-morning to mid-afternoon hours on weekdays (when the majority of nearby residents may be at work or school).

Biodiversity

New text is shown below in bold and removed text is shown with a strikethrough.

Mitigation by Design

- **The proposed new linear planting incorporated as part of the RFI results in a net gain of 714 m in linear habitat connectivity on site.**
- Approximately ~~344~~ **400** trees, including species such as oak, ash, and beech, will be planted across the site. These will be arranged in structured treelines, with additional woodland planting areas integrated into the overall landscape design strategy. This planting scheme is intended to support and enhance bat foraging activity on site.

Construction Phase Mitigation

- Works within 50m of the Claureen River will only be carried out subject to the approval of the project ecologist. Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse. ~~A pre-cast headwall will be used.~~

Operational Phase Mitigation

- Lighting
  A warm white spectrum **(<2700 Kelvins)** ~~(i.e. 2200 Kelvins)~~ will be used to reduce the blue light component of the LED spectrum).
- Landscape Design

It should be noted that the proposed development has increased the level of hedgerow planting to include more linear woodland planting across the boundary of the site which includes oak. This will result in taller treelines in the long term than the granted development which would provide superior foraging corridors and greater light spill containment. **It should be noted that, following a Request for Further Information, a native hedgerow has been incorporated into the landscape strategy along the entirety of the western boundary, in addition to further woodland tree planting.**

3. Conclusion

This report has outlined the changes to the EIAR submitted with the LRD application at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare, as a result of the council's request for further information.

Appendix 1 Biodiversity EIAR Chapter

11 Biodiversity

11.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the ecology of the surrounding area and within the potential zone of influence (ZOI).

This Chapter should be read in conjunction with:

- Chapter 2 (Project Description)
- Chapter 6 (Material Assets- Traffic & Transport)
- Chapter 9 (Land & Soils)
- Chapter 10 (Water & Hydrology)
- Chapter 12 (Noise & Vibration)
- Chapter 13 (Air Quality)

The programme of work in relation to biodiversity aspects of the EIAR has been designed to identify and describe the existing ecology of the proposed development site and outline the habitats or species of conservation interest that may be present on site. It also assesses the significance of the likely impacts of the scheme on the biodiversity elements including designated conservation sites and designs mitigation measures to alleviate identified impacts. Mitigation measures and the phasing of the project are contained in the accompanying Outline Construction Environmental Management Plan (CEMP), which has been prepared by TOBIN.

Standard construction and operational phase control measures, in addition to monitoring measures will be carried out to minimise potential impacts and to improve the biodiversity potential of the proposed development site.

11.2 Expertise & Qualifications

This chapter has been prepared by Bryan Deegan (MCIEEM) of Altemar Ltd. Bryan is an environmental scientist and marine biologist with 30 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. Bryan Deegan a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

The 2025 surveys for this site were undertaken by Bryan Deegan, Jack Doyle, Frank Spellman, Emma Peters and Gayle O'Farrell of Altemar Ltd.

Frank Spellman (BSc Zoology, MSc Zoology).

Frank Spellman has extensive experience in carrying out a wide range of fauna surveys as both a sub-contractor and employee for environmental consultancies and organisations in Ireland and the US. These include both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, breeding/wintering bird surveys, and freshwater ecology surveys. Frank has been lead ornithologist on numerous development projects within Ireland carrying out full wintering bird and breeding bird assessments.

Emma Peters (BSc Environmental Science)

Emma Peters (BSc) of Altemar Ltd. Emma has carried out a range of wintering and breeding ornithological surveys in Ireland. Emma has experience in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland. She is also skilled in habitat identification, native and non-native species identification and terrestrial mammal surveys.

Gayle O'Farrell (BSc Agri-Environmental Sciences)

Gayle O'Farrell (BSc) is skilled in bat detection through static detector surveys, dusk emergence, and down re-entry surveys. She is also skilled in habitat assessment and has undertaken flora/invasive species surveys, breeding/wintering bird surveys and terrestrial mammal surveys to produce numerous ecological assessments on a range of residential, industrial and commercial projects.

Jack Doyle (MSc Sustainable Environments)

Jack Doyle (MSc) has previous experience in carrying out a wide range of fauna surveys, including both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, and breeding/wintering bird surveys.

11.3 Proposed Development

The proposed Large Scale Residential Development (LRD) includes the construction of 300 no. residential units, a creche facility, and all associated site development works at Ballymacaula, Drumbiggle, Circular Road, Ennis, Co. Clare. A full description is provided in Chapter 2 of this EIAR and in the statutory notices.

11.4 Methodology

11.4.1 Relevant Legislation & Guidance

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Guidelines for Ecological Impact Assessment in the UK and Ireland, (Chartered Institute of Ecology and Environmental Management) (CIEEM, 2018),
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guide to Habitats in Ireland (Fossitt, 2000).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2 (National Roads Authority, 2009).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).
- Bat Mitigation Guidelines for Ireland (Marnell, Kelleher & Mullen, 2022).
- Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011).

11.4.2 Desk Study

A pre-survey biodiversity data search was carried out in October 2024 and updated in April 2025. This included examining records and data from the National Parks and Wildlife Service (NPWS), National Biological Data Centre (NBDC) and the Environmental Protection Agency (EPA), in addition to aerial, 6-inch maps and satellite imagery.

Desk studies were carried out to obtain relevant existing biodiversity information within the Zone of Influence (ZOI). As outlined in Office of the Planning Regulator (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)." The proposed development site is a greenfield site located adjacent between Ennis Golf Course and N85. The Inch River (also known as the Claureen River) is located at the northern site boundary. After consultation with TOBIN, surface water drainage from the site will discharge to the Claureen River, outfalling to the River Fergus and ultimately Shannon Estuary. It should be noted that extensive studies were also carried out for a successful planning application within the same site in 2022.

As a result, there is an indirect hydrological pathway from the proposed development to designated conservation sites located downstream of the proposed development, namely Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Additionally, given the excavation, the scale of the development and construction works are proposed in close proximity to the Claureen River there is the potential for dust and contaminated surface water to enter the watercourse and impact on downstream conservation sites and aquatic biodiversity. In addition, there is an indirect hydrogeological pathway to 14 European sites within 15km of the proposed development via groundwater flow.

In this case, the potential ZOI extends beyond the site, with the potential for impacts to extend beyond the proposed development area via the proposed construction works and the surface water network. Details of the proposed development are seen in Chapter 2 of this EIAR. The proposed project construction methodology, layout, drainage strategy, Construction Management Plan, Site Investigations, design and landscape design were reviewed to inform this assessment. Further, the other chapters within the EIAR were assessed.

11.4.3 Site Surveys

Habitat, flora, bat, mammal, breeding bird and wintering bird surveys were undertaken within the appropriate seasonal timeframes and in compliance with relevant guidelines. Field surveys were carried out as outlined in Table 11.1. All appropriate surveys were carried out in the appropriate seasons (Smith et al., 2011).

Table 11-1 Survey Details

Survey Type	Surveyors	Survey Dates
Field Survey (habitat, flora)	Emma Peters (Altemar)	25th April 2025
Field Survey (habitat, flora)	Shannen O'Brien (Enviroguide)	11th of June 2021, 19th of May 2022, & 8th of June 2022
Mammal Survey	Frank Spellman & Jack Doyle (Altemar)	14th March & 27th March 2025
Bat Survey	Bryan Deegan (MCIEEM), Emma Peters, Gayle O'Farrell & Jack Doyle (Altemar)	23rd May 2025, 5th June 2025 & 10th June 2025

Survey Type	Surveyors	Survey Dates
Bat Survey	Tina Aughney (Bat Eco Services)	6th & 7th August 2022
Bat Survey	Ash Ecology	7th September 2021
Bat Survey (RFI)	Bryan Deegan (MCIEEM) & Gayle O'Farrell (Altemar)	15th & 22nd September 2025
Static Surveillance Bat Survey (RFI)	Bryan Deegan (MCIEEM) & Gayle O'Farrell (Altemar)	15th September 2025 -22nd September 2025
Static Surveillance Bat Survey	Bryan Deegan (MCIEEM), Gayle O'Farrell (Altemar)	5th June 2025- 8th June 2025
Static Surveillance Bat Survey	Tina Aughney (Bat Eco Services)	1st August 2022-6th August 2022
Breeding Bird Surveys	Jack Doyle, Emma Peters & Gayle O'Farrell (Altemar)	25th May, 6th June, 9th June 2025
Breeding Bird Surveys	Brian McCluskey (Enviroguide)	11th of June 2021, 19th of May 2022 & 8th of June 2022
Wintering Bird Surveys	Jack Doyle & Emma Peters (Altemar)	20th January 2025, 13th February 2025, 26th February 2025, 14th March 2025, & 27th March 2025

11.4.4 Consultation

This chapter effectively addresses items set out by Clare County Council in the LRD Opinion in relation to biodiversity on site.

11.5 Difficulties Encountered

No difficulties were encountered in compiling this chapter. All ecological surveys were carried out within optimal survey seasons.

11.6 Baseline Environment

11.6.1 Designated Sites

As can be seen from Figures 11.1 – 11.6., the nearest Natura 2000 site is 932m away (Lower River Shannon SAC). There is an indirect hydrological pathway to the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA via the proposed surface water drainage strategy during the construction phase of the development. Out of an abundance of caution, it is considered that this indirect hydrological pathway has the potential to significantly affect the conservational objectives of nearby Natura 2000 sites.

In addition, the proposed development site is hydrogeologically connected via groundwater flow, to 14 European Sites located within a 15km radius. These include Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods and Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. Out of an abundance of caution it is considered that in the

absence of mitigation, there is a potential for pollutants to migrate through the aquifer and surface waterbodies into these European Sites.

The distance and details of the Natura 2000 sites (SAC & SPA) within 15km are set out in Table 11.2 and pNHAs & Ramsar sites within 15km of the proposed development are seen in Table. 11.3.

The proposed development site lies within the 2.5 km foraging range of Lesser Horseshoe Bat (*Rhinolophus hipposideros)* populations associated with both the Newhall and Edenvale Complex SAC and the Pouladatig Cave SAC, which are designated for the conservation of this species.

Table 11-2 Proximity to designated sites of conservation importance

Site Code	European Site	Distance (km)
Special Areas of Conservation		
IE002165	Lower River Shannon SAC	0.9 km
IE000037	Pouladatig Cave SAC	1.7 km
IE002091	Newhall and Edenvale Complex SAC	1.7 km
IE000014	Ballyallia Lake SAC	2.7 km
IE002247	Toonagh Estate SAC	4.8 km
IE000032	Dromore Woods and Loughs SAC	6.6 km
IE002318	Knockanira House SAC	6.7 km
IE002010	Old Domestic Building (Keevagh) SAC	7.7 km
IE002246	Ballycullinan, Old Domestic Building SAC	8.5 km
IE000016	Ballycullinan Lake SAC	8.5 km
IE001926	East Burren Complex SAC	9.5 km
IE000064	Poulnagordon Cave (Quin) SAC	10.1 km
IE000051	Lough Gash Turlough SAC	10.6 km
IE000057	Moyree River System SAC	11.2 km
IE002314	Old Domestic Buildings, Rylane SAC	12 km
IE002157	Newgrove House SAC	12.3 km
IE000019	Ballyogan Lough SAC	12.5 km
Special Protection Areas		
IE004041	Ballyallia Lough SPA	2.7 km
IE004077	River Shannon and River Fergus Estuaries SPA	3.6 km
IE004220	Corofin Wetlands SPA	10.8 km

Table 11-3 Proximity to NHAs, pNHAs and Ramsar sites

Designation	Site	Distance
NHAs		
	Oysterman's Marsh NHA	10.8 km
	Lough Acrow Bogs NHA	11.6 km
	Lough Naminna Bog NHA	14.4 km

Designation	Site	Distance
pNHA		
	Cahircalla Wood	655m
	Newhall And Edenvale Complex	1.7 km
	Pouladatig Cave	1.7 km
	Ballyallia Lake	2.5 km
	Lough Cleggan	2.8 km
	Newpark House (Ennis)	3.3 km
	Fergus Estuary And Inner Shannon, North Shore	3.6 km
	Dromore Woods And Loughs	6.6 km
	Old Domestic Building (Keevagh)	7.7 km
	Dromoland Lough	8.2 km
	Ballycullinan Lake	8.5 km
	Inchicronan Lough	9.3 km
	Durra Castle	9.3 km
	East Burren Complex	9.5 km
	Lough Gash Turlough	10.6 km
	Ballycar Lough	11.1 km
	Moyree River System	11.2 km
	Ballyogan Lough	12.5 km
	Fin Lough (Clare)	12.1 km
	Fort Fergus (Ballynacally)	12.1 km
	Rosroe Lough	13.6 km
Ramsar		
	Ballyallia Lough	2.6 km

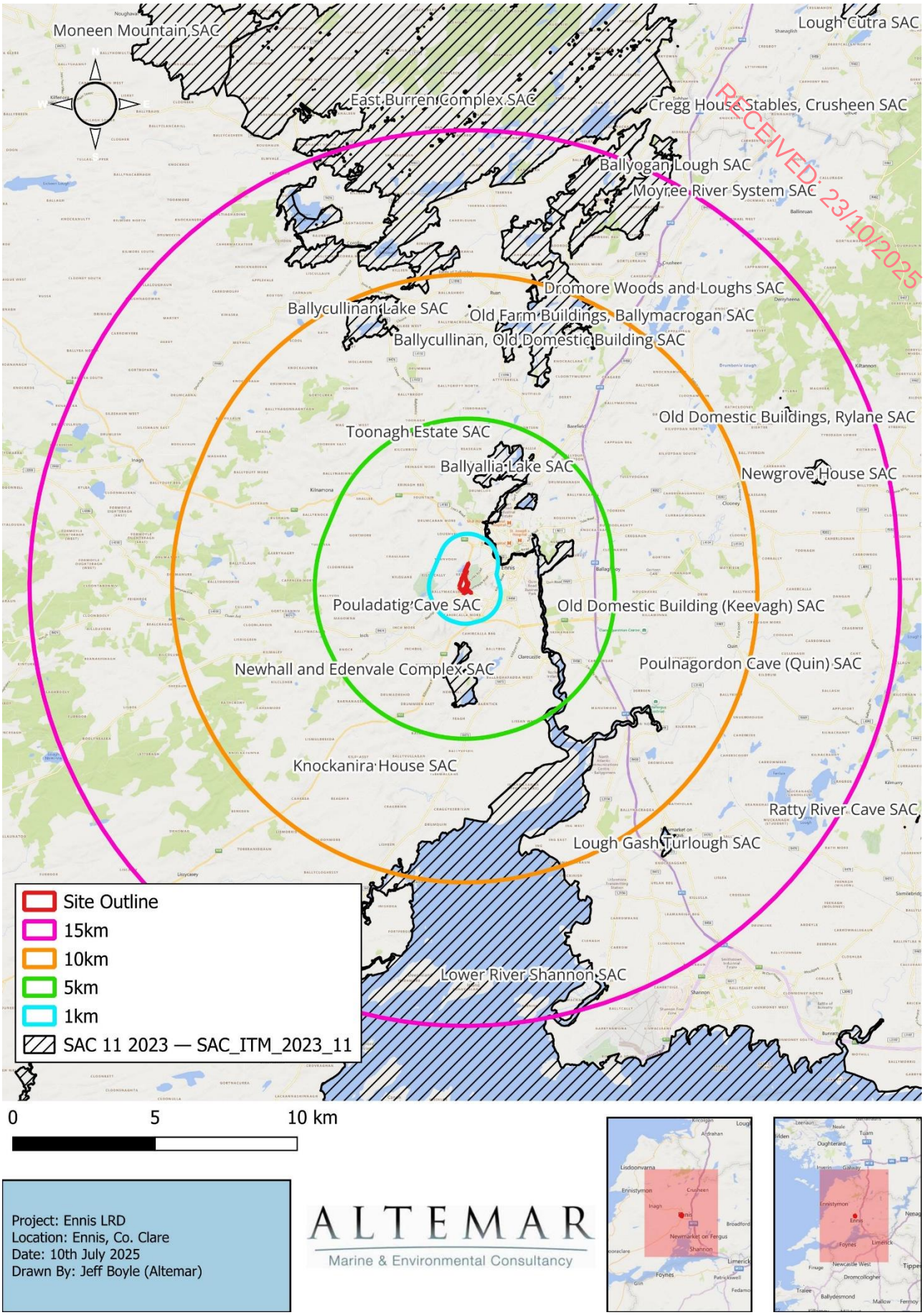


Figure 11.1 - Special Areas of Conservation (SAC) within 15km of subject site

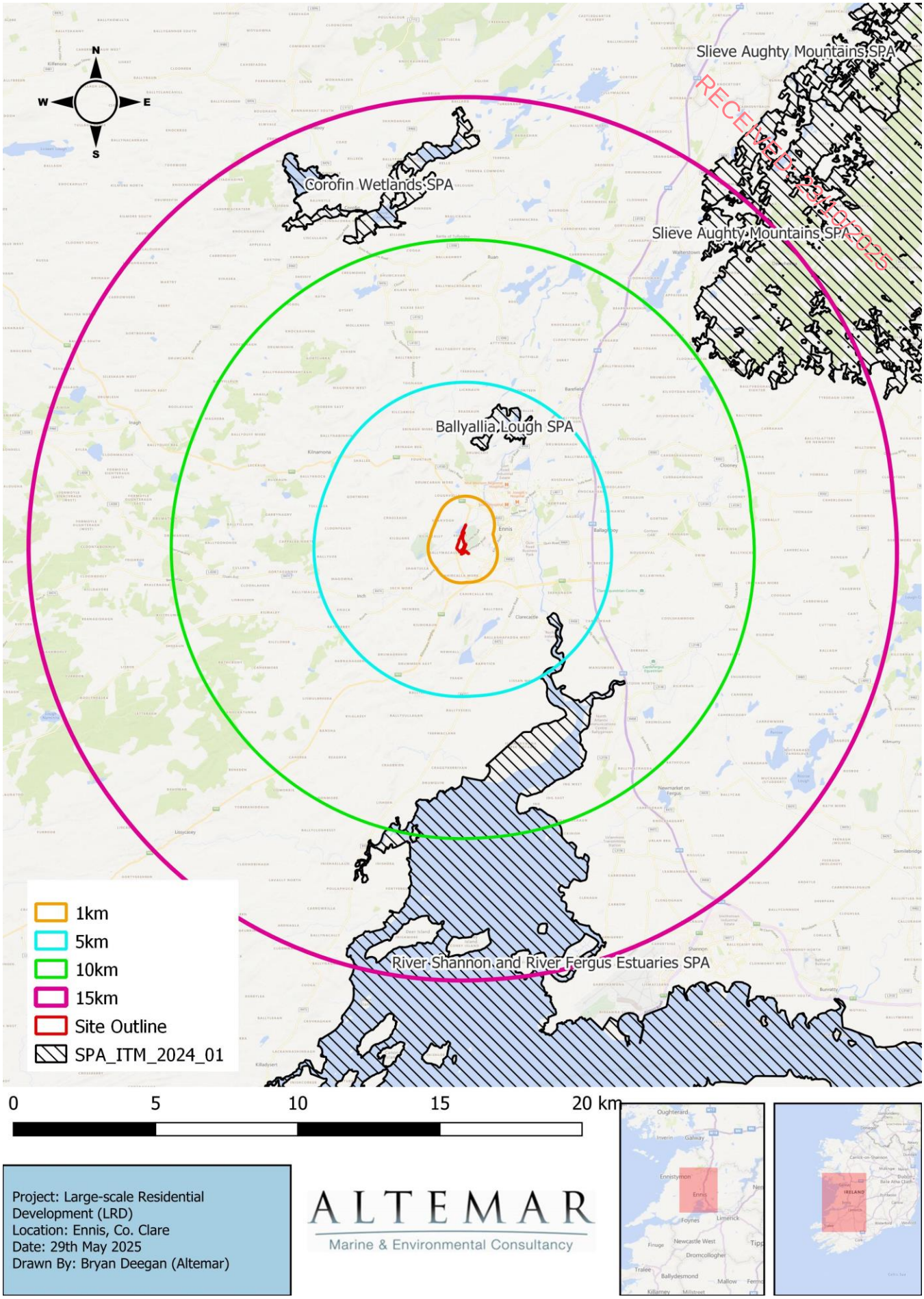


Figure 11.2 - Special Protection Areas (SPAs) within 15km of subject site

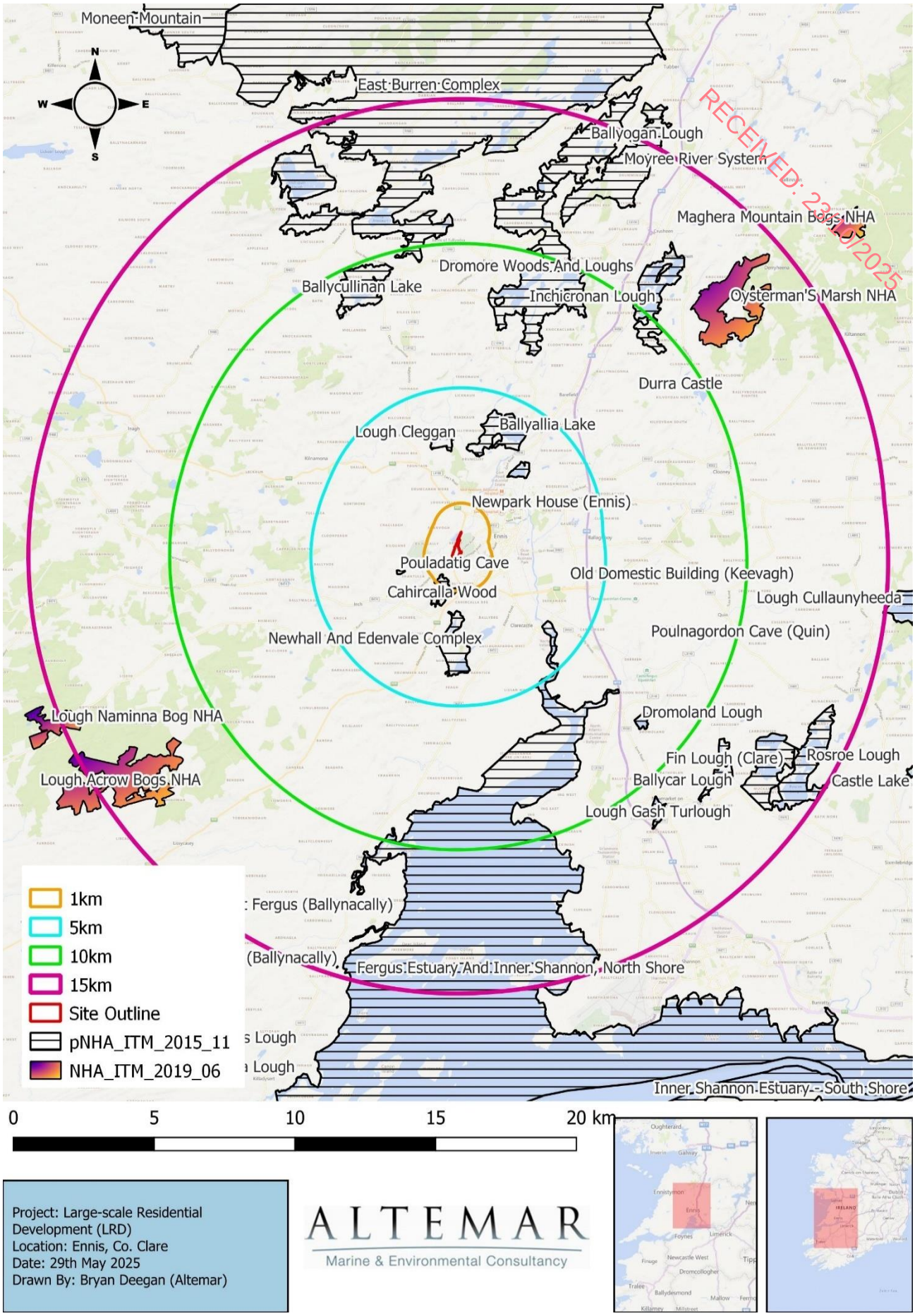


Figure 11.3 - National Heritage Areas (NHAs) and Proposed National Heritage Areas (pNHAs) within 15km of subject site

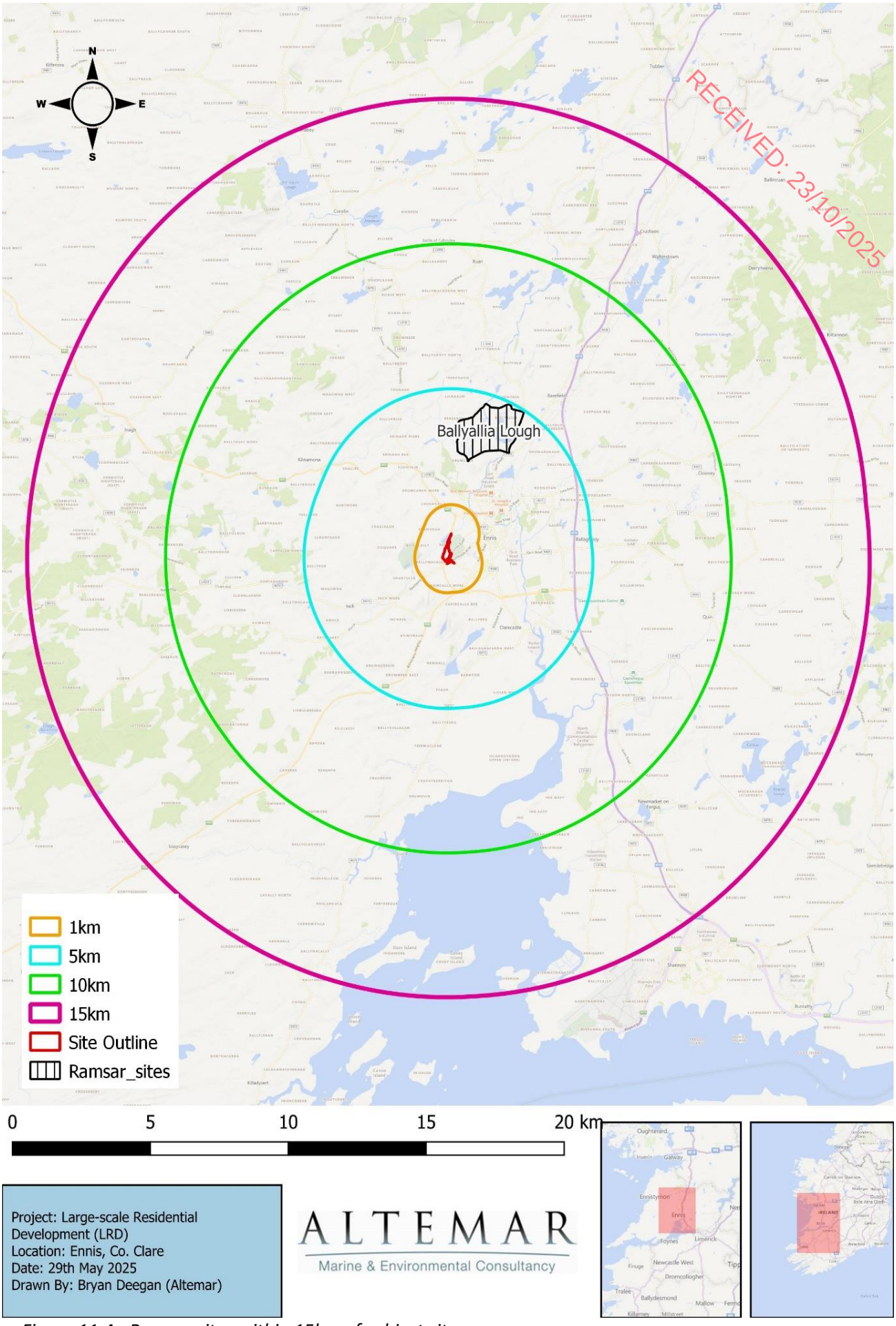
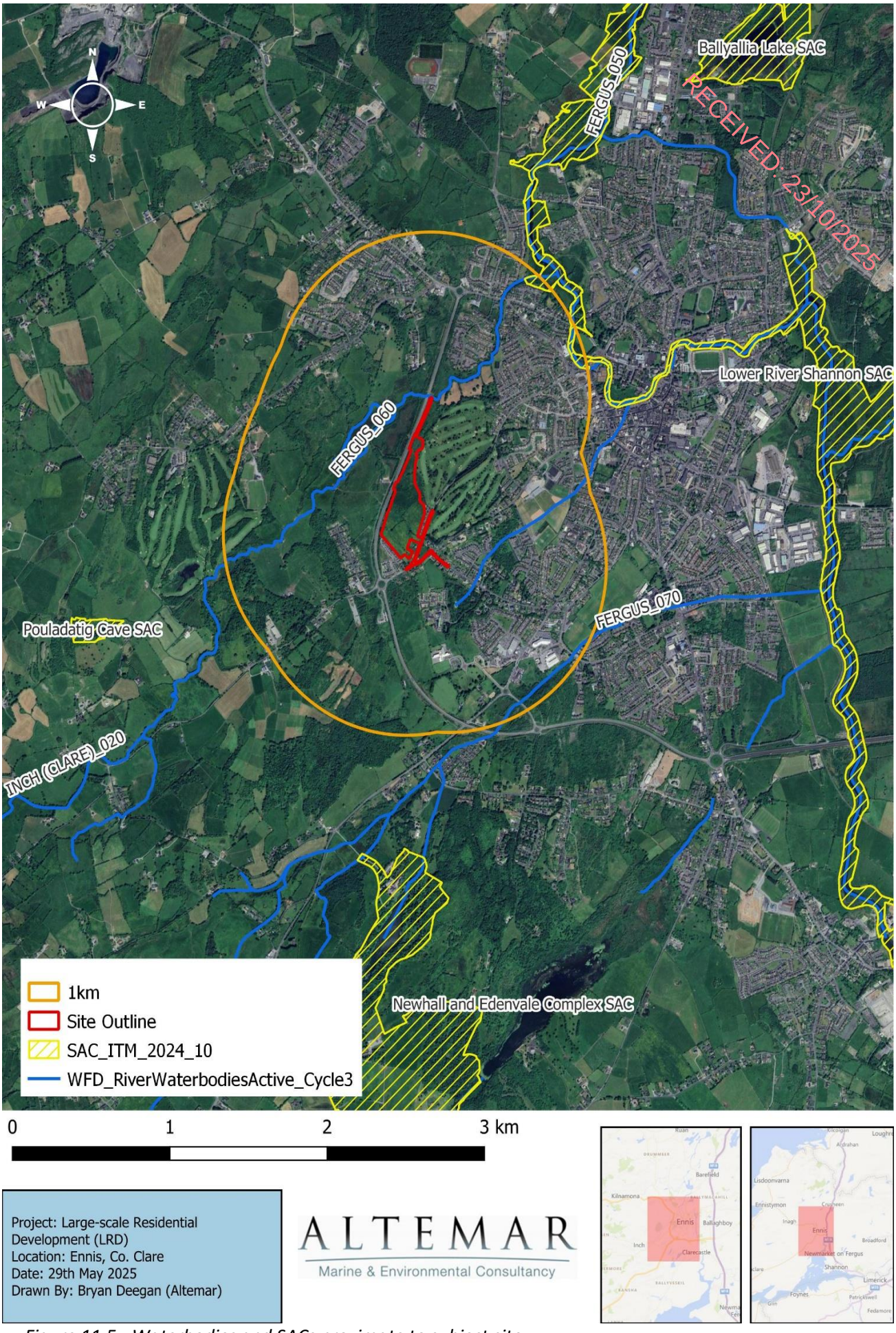


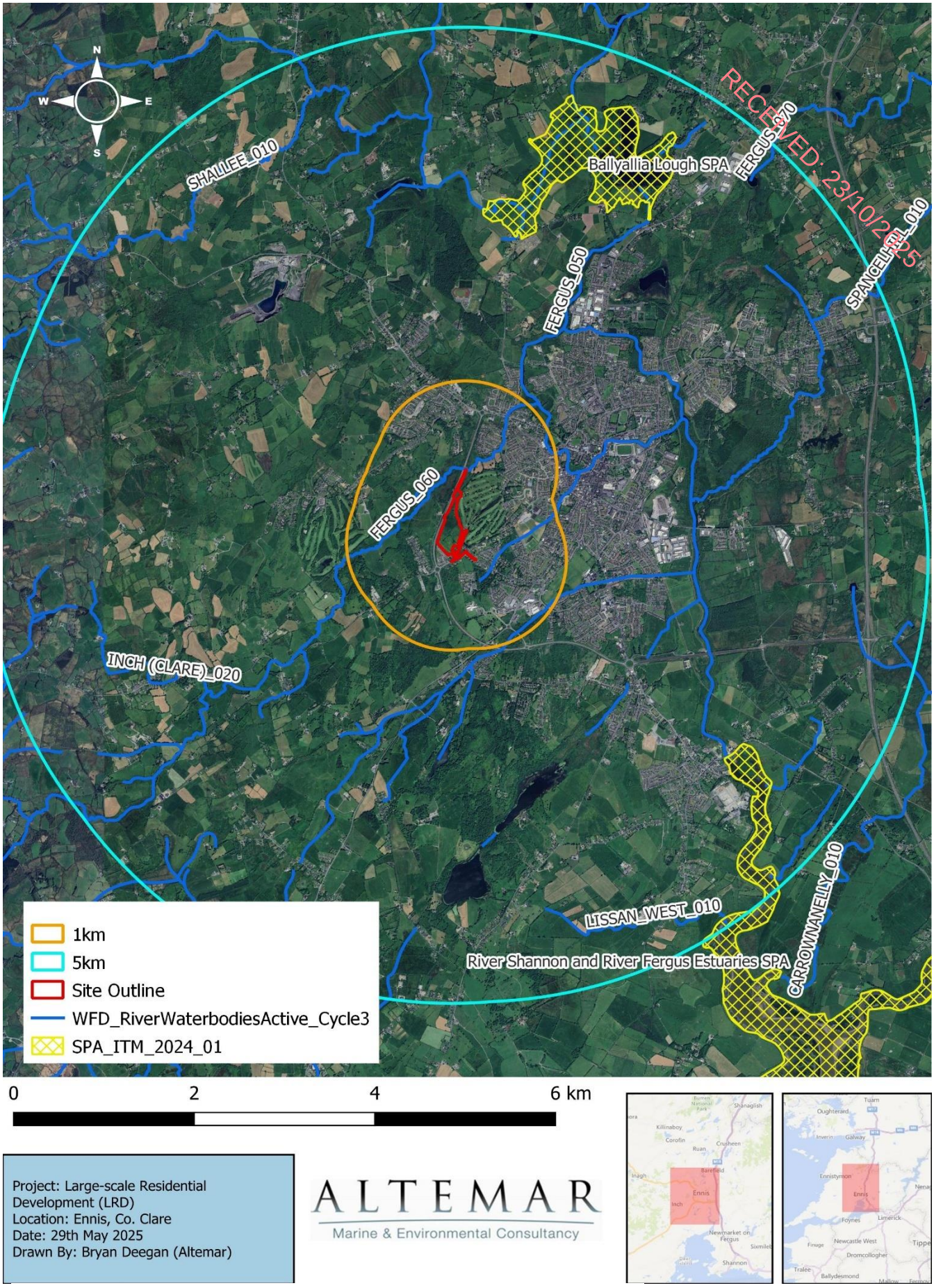
Figure 11.4 - Ramsar sites within 15km of subject site



Project: Large-scale Residential Development (LRD)
Location: Ennis, Co. Clare
Date: 29th May 2025
Drawn By: Bryan Deegan (Altemar)

ALTEMAR
Marine & Environmental Consultancy

Figure 11.5 - Waterbodies and SACs proximate to subject site



Project: Large-scale Residential Development (LRD)
Location: Ennis, Co. Clare
Date: 29th May 2025
Drawn By: Bryan Deegan (Altemar)

ALTEMAR
Marine & Environmental Consultancy

Figure 11.6 - Waterbodies and SPAs proximate to subject site

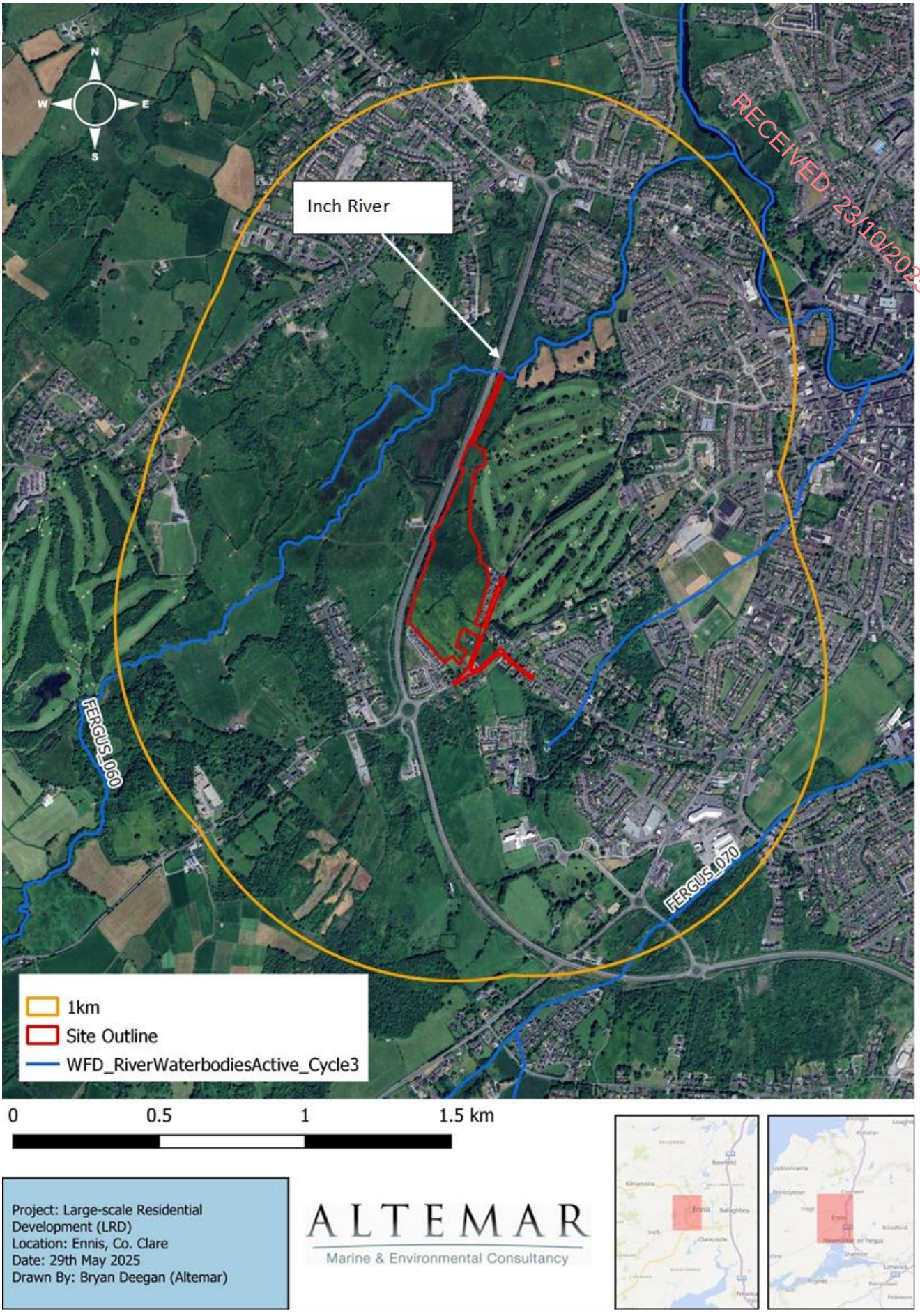


Figure 11.7 - Waterbodies within 1km of the proposed development

11.6.2 Species Data

The National Biodiversity Data Centre's online viewer was consulted to determine the extent of biodiversity and / or species of interest in the area. A desk-based assessment was carried out and it recorded no species of interest within the site area. Following this, a 2km^2 grid was assessed (R37I) Table. 11-4 provides a list of all species of interest recorded in the 2km^2 grid area.

Table. 11-4 Species of interest recorded in the 2km^2 grid area.

Species name	Date of last record	Title of dataset	Designation
Common Frog *(Rana temporaria)*	02/03/2003	Irish National Frog Database	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Black-headed Gull *(Chroicocephalus ridibundus)*	16/12/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Canada Goose *(Branta canadensis)*	23/04/2019	Birds of Ireland	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Common Gull *(Larus canus)*	21/05/2016	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Cormorant *(Phalacrocorax carbo)*	19/11/2015	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Herring Gull *(Larus argentatus)*	09/04/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin *(Delichon urbicum)*	08/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow *(Passer domesticus)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Kestrel *(Falco tinnunculus)*	17/11/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Kingfisher *(Alcedo atthis)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Lapwing *(Vanellus vanellus)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Linnet *(Linaria cannabina)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species:

Species name	Date of last record	Title of dataset	Designation
			Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard *(Anas platyrhynchos)*	08/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Mute Swan *(Cygnus olor)*	19/11/2015	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Pheasant *(Phasianus colchicus)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Rock Dove *(Columba livia)*	16/12/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Sand Martin *(Riparia riparia)*	04/07/2024	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Snipe *(Gallinago gallinago)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Starling *(Sturnus vulgaris)*	12/09/2017	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swallow *(Hirundo rustica)*	06/09/2023	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swift *(Apus apus)*	08/08/2023	Swifts of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Tree Sparrow *(Passer montanus)*	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Woodpigeon *(Columba palumbus)*	21/05/2016	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Japanese Knotweed *(Fallopia japonica)*	06/10/2017	National Invasive Species Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Japanese Rose *(Rosa rugosa)*	26/05/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Sycamore *(Acer pseudoplatanus)*	27/10/2006	Clare Biological Records Centre	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

Species name	Date of last record	Title of dataset	Designation
		Dataset 2004-2007	
Brown Long-eared Bat *(Plecotus auritus)*	07/08/2022	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat *(Myotis daubentonii)*	26/08/2019	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Hedgehog *(Erinaceus europaeus)*	27/07/2023	Hedgehogs of Ireland	Protected Species: Wildlife Acts
Leisler's Bat *(Nyctalus leisleri)*	07/08/2022	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Lesser Horseshoe Bat *(Rhinolophus hipposideros)*	06/08/2022	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Nathusius's Pipistrelle *(Pipistrellus nathusii)*	06/08/2022	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Otter *(Lutra lutra)*	15/09/2018	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	21/09/2010	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Red Squirrel *(Sciurus vulgaris)*	01/01/2023	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	07/08/2022	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

11.7 Habitats and Species

Habitat surveys were carried out on the 11th of June 2021, 19th of May 2022, 8th of June 2022, and updated on the 25th April 2025. Habitats were classified according to Fossitt, 2000 based on the 25th April 2025 site visit.

Figure 11.8.- Habitat map according to Fossitt (2000)

GA1- Agricultural Grassland

The majority of the surface area of the subject site was agricultural grassland with areas subject to periodic flooding **(GS4).** The fields were under use from grazing horses and dog walkers. The species noted within this habitat include dame's-violet (*Hesperis matronalis*), Kidney vetch (*Anthyllis vulneraria*), creeping buttercup (*Ranunculus repens*), daisy (*Bellis perennis*), broad-leafed dock (*Rumex obtusifolius*), hogweed (*Heracleum sphondylium*), meadow buttercup (*Ranunculus acris*), thistles (*Cirsium spp.*), dandelions (*Taraxacum officinale* agg.), ribwort plantain (*Plantago lanceolata*), greater plantain (*Plantago major*), Cuckoo-flower (*Cardamine pratensis*), lesser stitchwort (*Stellaria graminea*), cleavers (*Galium aparine*), nettle (*Urtica dioica*),), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), common sorrel (*Rumex acetosa*), hard rush (*Juncus inflexus*), common ragwort (*Jacobaea vulgaris*), lesser celandine (*Ficaria verna (Ranunculus ficaria)*), mouse-ear (*Cerastium fontanum*), meadow foxtail grass (*Alopecurus pratensis*), field bindweed *(Convolvulus arvensis),* compact rush (*Juncus conglomeratus*), silverweed (*Potentilla anserina*), common knapweed (*Centaurea nigra*), curled dock (*Rumex crispus ssp. crispus*), primrose (*Primula vulgaris*), meadowsweet (*Filipendula ulmaria*), cowslip (*Primula veris*), creeping cinquefoil *(Potentilla reptans*), ox-eye daisy (*Leucanthemum vulgare*), yarrow (*Achillea millefolium*), wood anemone (*Anemone nemorosa*), bluebell (*Hyacinthoides non-scripta*) and black medic (*Medicago lupulina*) and common spotted-orchid (*Dactylorhiza fuchsii subsp. Fuchsia).* Saplings of willow (*Salix sp.*), blackthorn (*Prunus spinosa*) and alder (*Alnus glutinosa*) grew throughout this habitat. The wildflowers within this habitat supported a variety of invertebrates such as the orange tip butterfly (*Anthocharis cardamines*), the drinker moth (*Euthrix potatoria*) and the multiple spider species.

Plate 1. Agricultural grassland

WL1- Hedgerow

Native mature hedgerows lined the fields within the subject site. The species included brambles (*Rubus fruticosus agg*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), willow (*Salix sp.*), alder (*Alnus glutinosa*), rose-hip (*Rosa canina* agg.), ash (*Fraxinus excelsior*) and hazel (*Corylus avellana*). The ground layer consisted of greater stitchwort (*Stellaria holostea*), nettle (*Urtica dioica*), bracken (*Pteridium aquilinum*), Atlantic ivy (*Hedera hibernica*), winter heliotrope (*Petasites pyrenaicus*), bluebell (*Hyacinthoides non-scripta*), *Clematis spp.* Mature and young trees were also in this habitat including species such as ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*) and sycamore (*Acer pseudoplatanus*). Within the hedgerows were **BL1- Stones wall**'s which had become the overgrown with the hedgerow species.

Plate 2. Hedgerow habitat.

BL1- Stones wall

The majority of stone walls on site are featured within the hedgerow field boundaries and are covered by the overgrown hedgerow.

Plate 3. Stone wall

WS1 -Scrub

Scrub was managed and divided by the paths the horses had created. Bramble (*Rubus fruticosus agg*), and blackthorn (*Prunus spinosa*) encroached from the perimeter of the subject site and in areas ungrazed by horses. Additional species in this habitat include hawthorn (*Crataegus monogyna*), willow (*Salix sp.*), hedge bindweed (*Calystegia sepium),* cowslip (*Primula veris*), Lords and ladies (*Arum maculatum*), ivy (*Hedera helix*), Atlantic ivy (*Hedera hibernica*) and gorse (*Ulex europaus*).

Plate 4. Scrub habitat.

Discussion of habitats.

The subject site is a greenfield site on the outskirts of the townlands of Ennis. The site is predominantly unmanaged grassland habitats (GA1/GS4) with each field bordered by hedgerows (WL1), scrub (WS1) and low stone walls (BL1).

Plant Species

The plant species encountered at the various locations on site are detailed above. No plant species protected under Irish or international legislation were noted on site. Records of rare and threatened species from NBDC and NPWS were examined. No rare or threatened plant species were recorded within the proposed development site.

Invasive Plant species

No invasive species, that are listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) which makes it an offence under Regulation 49 to plant, disperse, allow or cause to grow these plants, were noted on site.

Terrestrial mammals

A mammal survey was undertaken on the 14th March 2025 & 27th March 2025 by Frank Spellman and Jack Doyle of Altemar Ltd. that covered the site and the immediate surrounding areas including the Inch River to the north of the site. All areas of the site were accessible. Full survey coverage of the site was possible and there are no limitations. The surveys were supported by the use of trail cameras. The survey revealed one active badger sett within the lands of Ennis Golf Course to the east of the site approximately 20

metres from the site boundary. The layout of the development was altered to provide a 30m exclusion zone at this sett. A disused badger sett was noted in the centre scrub area of the site which is currently being utilised by foxes. Otters (*Lutra lutra*) were not observed during the survey, but evidence was recorded of otter along the bank of the Inch River (prints and spraint). No active otter holts were noted during the survey along the Inch River. A series of burrows were noted within the floodzone (surrounding vegetation was coated in silt) to the east of the site. Camera traps revealed no otter activity at the burrows. No evidence of deer was noted on site. No hedgehogs (*Erinaceus erinaceus)* were seen during the site visit but may be present on site.

Bat Fauna

Emergent detector surveys were carried out by Emma Peters on the 23rd May 2025 and Bryan Deegan (MCIEEM) & Gayle O'Farrell on the 5th of June 2025. A dawn re-entry survey was carried out by Jack Doyle on the 10th June 2025. In addition, a static detector survey was carried out between the 5th June -10th June 2025.

Further surveys were conduced in response to the RFI. This included emergent/detector surveys carried out by Bryan Deegan & Gayle O'Farrell on the 15th September 2025 and 22nd September. An additional static detector survey was also carried out between the 15th-22nd September 2025.

As outlined in Bat Fauna Impact Assessment (Appendix 11.1), the following bat species were noted on site:

- Common Pipistrelle *(Pipistrellus pipistrellus sensu lato)*
- Soprano Pipistrelle *(Pipistrellus pygmaeus)*
- Leisler Bat *(Lesser Noctule (Nyctalus leisleri))*
- Lesser Horseshoe Bat *(Rhinolophus hipposideros)*
- Nathusius' Pipistrelle *(Pipistrellus nathusii)*
- Brown Long-eared Bat *(Plecotus auritus)*

Common Pipistrelle *(Pipistrellus pipistrellus sensu lato)*, Soprano Pipistrelle *(Pipistrellus pygmaeus)* and Leisler Bat *(Lesser Noctule (Nyctalus leisleri))* were recorded during the emergent and dawn re-entry surveys as well as the static detector survey. Lesser Horseshoe Bat *(Rhinolophus hipposideros)*, Nathusius' Pipistrelle *(Pipistrellus nathusii)* and Brown Long-eared Bat *(Plecotus auritus)* were only recorded during the static detector survey. No confirmed bat roosts were noted on site, however a number of trees of moderate bat roosting potential are located on site.

It should be noted that the site is utilised by Lesser Horseshoe Bat *(Rhinolophus hipposideros)* which is an Annex II species and a Qualifying Interest of the nearby Pouladatig Cave SAC and the Newhall and Edenvale Complex SAC. It is assumed that this species commutes to the site via the Claureen River to the north of the site and enters the site along the eastern site boundary which adjoins Ennis Golf Course. This site is considered a suitable foraging habitat for this species due to the absence of artificial lighting or light spill on site and the presence of substantial treeline, scrub and hedgerow habitats.

Previous bat surveys

Previous bat surveys on site have similar findings. A preliminary bat survey for the site was carried out on the 7th September 2021 by Ash Ecology. Six bat species were recorded during the survey, namely common pipistrelle, soprano pipistrelle, Leisler's bat, lesser horseshoe bat, Natterer's bat and brown long-eared bat.

In addition, dusk, dawn and walking transect bat surveys were carried out by Dr. Tina Aughney (Bat Eco Services) on the 6th and 7th August 2022. A static detector survey was also carried out on the 1st to 6th August 2022. As outlined in the bat assessment report (Appendix 11.2), '*Six species of bat was recorded within the survey area: Leisler's bat, soprano pipistrelle, common pipistrelle, lesser horseshoe bat, Natterer's bat and brown long-eared bat. The first three species were recorded during bat detector surveys and static surveillance bat activity levels were indicative of commuting and foraging individuals. The latter three bat species were recorded at a lower level of bat passes, which is to be expected as these three bat species are less common*.

Overall, the survey results demonstrate that bats commuted to the proposed development site from an easterly, westerly and northerly direction and foraged, primarily along the boundary habitats. The eastern boundary, with Ennis Golf Course, is particularly important for foraging local bat populations and this may be due to the mature hedgerow and the fact that there is no outdoor lighting in this area.

A medium level of bat activity common and more light-tolerant bat species were recorded along the boundary with the N85, where outdoor lighting is present. None of the three light sensitive bat species (lesser horseshoe bat, brown long-eared bat and Natterer's bat) were recorded along this boundary. All bat species were generally recorded at a Low level of bat activity during the static surveillance.

However, due to the quiet echolocation calls of lesser horseshoe bats, Natterer's bats and brown long-eared bats, their presence is significant. There are no recorded bat roosts within the proposed development site but there are four trees recorded as Potential Bat Roosts (PBRs) are proposed to be felled. The majority of the internal network of hedgerows and the scrub habitat will be removed as part of the proposed development.'

Breeding Birds

Three breeding bird surveys were carried out by Altemar during the bird nesting season in 2025. Surveys were carried out on the 25th April, 5th June and 10th June 2025, which covered the entire site area. The dense scrub and hedgerows were areas on site of high breeding potential. Bird activity was especially high in the central dense scrub area of the site throughout the surveys.

In total, 28 species of bird were recorded within, adjacent and over the survey area: 20 green listed, six amber, and two red-listed Birds of Conservation Concern in Ireland (BoCCI) (Table 11-5). Of these species, eight were confirmed breeding within the outline of the proposed development, of which six are green listed BoCCI (blackbird, blackcap, blue tit, robin, woodpigeon & wren) and remaining two breeding species were amber-listed BoCCI (goldcrest & house sparrow). No red-listed species were recorded breeding within the proposed site outline.

Table 11-5. Bird species recorded on site

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Bullfinch	BF	*Pyrrhula pyrrhula*	Green
Chiffchaff	CC	*Phylloscopus collybita*	Green
Dunnock	D.	*Prunella modularis*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Goldfinch	GO	*Carduelis carduelis*	Green
Great Tit	GT	*Parus major*	Green

Common name	BTO	Latin name	BoCCI
Hooded Crow	HC	*Corvus cornix*	Green
House Martin	HM	*Delichon urbicum*	Amber
House Sparrow	HS	*Passer domesticus*	Amber
Jackdaw	JD	*Corvus monedula*	Green
Jacksnipe	JS	*Naoscach bhídeach*	Green
Long-eared Owl	LE	*Asio otus*	Green
Long-tailed Tit	LT	*Aegithalus caudatus*	Green
Magpie	MG	*Pica pica*	Green
Meadow Pipit	MP	*Anthus pratensis*	Red
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Song Thrush	ST	*Turdus philomelos*	Green
SpottedFlycatcher	SF	*Musciapa striata*	Amber
Starling	SG	*Sturnus vulgaris*	Amber
Swift	SI	*Apus apus*	Red
Whitethroat	WH	*Sylvia communis*	Green
Whopper Swan	WS	*Cygnus cygnus*	Amber
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green

Table 11-6. Bird species confirmed breeding on site.

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Goldcrest	GC	*Regulus regulus*	Amber
House Sparrow	HS	*Passer domesticus*	Amber
Robin	R.	*Erithacus rubecula*	Green
Wren	WR	*Troglodytes troglodytes*	Green
Woodpigeon	WP	*Columba palumbus*	Green

In addition, breeding bird surveys were carried out on the 11th of June 2021, 19th of May 2022, and 8th of June 2022, by Enviroguide Ornithologist Brian McCluskey, with further surveys carried out on the 1st of July 2022 and 12th of July 2022.

As outlined in the Chapter 09 Biodiversity of the EIAR prepared by Enviroguide (2022) (Appendix 11-3),

'Breeding bird surveys were carried out on Site on the 1st of July 2022 and 12th of July 2022. Five transects were done through the site to record all the species that were present. A final zig-zag walk through the site was done at the end of each survey to ensure no additional species were missed. ***26*** *species were recorded on the Breeding Bird Survey on the 1st of July 2022 and* ***28*** *species were recorded on the Breeding Bird Survey on the 12th July 2022. These species are listed in the table below.*

Methodology: Each transect was divided up into four parts (all a similar distance) and the transect was walked with all species noted at each side of the ecologist. Distance brackets were also used, however, due to the lack of suitable habitat outside of the site, the majority of species were recorded inside the site boundary and within 50 meters each side of the surveyor on each transect.

Meadow Pipit was the only red listed species recorded.'

Table 11-7. Birds recorded during the breeding bird surveys on the 1st of July and 12th of July 2022 (Source: EIAR, Chap 09 Biodiversity, Enviroguide, 2022)

Species	BoCCI Status	BBS Survey 1 & 2 or 1/2	Breeding Activity
Blackbird *Turdus merula*	Green	1 & 2	Confirmed. Recently fledged young.
Blackcap *Sylvia atricapilla*	Green	1 & 2	
Bullfinch *Pyrrhula pyrrhula*	Green	1 & 2	
Blue Tit *Cyanistes caeruleus*	Green	1 & 2	Confirmed. Recently fledged young
Chaffinch *Fringilla coelebs*	Green	1 & 2	
Chiffchaff *Phylloscopus collybita*	Green	1 only	
Collared Dove *Streptopelia decaocto*	Green	2 only	
Dunnock *Prunella modularis*	Green	1 & 2	Confirmed. Recently fledged young
Goldcrest *Regulus regulus*	Amber	1 & 2	Confirmed. Recently fledged young
Goldfinch *Carduelis carduelis*	Green	1 & 2	Confirmed. Recently fledged young
Great Tit *Parus major*	Green	2 only	
Hooded Crow *Corvus cornix*	Green	1 & 2	
House Martin *Delichon urbicum*	Amber	1 & 2	
House Sparrow *Passer domesticus*	Amber	1 & 2	Confirmed. Recently fledged young.
Lesser Redpoll *Acanthis flammea*	Green	1 & 2	
Linnet *Linaria cannabina*	Amber	1 & 2	
Meadow Pipit *Anthus pratensis*	Red	1 & 2	Confirmed. Carrying food + recently fledged young present
Pied Wagtail *Motacilla alba yarrelli*	Green	1 & 2	
Reed Bunting *Emberiza schoeniclus*	Green	1 & 2	Confirmed. Recently fledged young
Robin *Erithacus rubecula*	Green	1 & 2	Confirmed. Recently fledged young.
Rook *Corvus frugilegus*	Green	1 & 2	
Siskin *Spinus spinus*	Green	2 only	
Stonechat *Sturnus vulgaris*	Amber	1 & 2	Confirmed. Recently fledged young
Swallow *Hirundo rustica*	Amber	1 & 2	
Song Thrush *Turdus philomelos*	Green	1 & 2	Confirmed. Recently fledged young
Whitethroat *Sylvia communis*	Green	1 & 2	Confirmed. Recently fledged young
Woodpigeon *Columba palumbus*	Green	1 & 2	
Wren *Troglodytes troglodytes*	Green	1 & 2	Confirmed. Recently fledged young
Willow Warbler *Phylloscopus trochilus*	Amber	1 & 2	Confirmed. Recently fledged young

Wintering Birds

A desk and ground level wintering bird habitat assessment were carried and used to examine the structures, features and vegetation on site that could provide wintering bird habitat. Potential features associated with foraging/roosting include agricultural fields, improved/amenity grassland, scrub, watercourses, ponds and drainage ditches, estuaries and intertidal zones. All open areas and vegetated areas were assessed for wintering bird potential.

The grassland on site is considered of low to moderate foraging potential for wintering birds given the unmanaged nature of the grass. The survey area is located between a number of known wintering bird foraging and roosting areas, including a number of SPAs, and so there is a high potential for birds of various species to fly over the site.

Five wintering bird surveys were carried out on site on the 20th January 2025, 13th February 2025, within optimal survey season by Emma Peters & Jack Doyle (Altemar). A total of 19 species were recorded within and above the survey area across 5 surveys. 14 green, four amber and one red listed species of conservation concern were recorded on site. The red-listed meadow pipit was using the site and displaying foraging behaviour consistently throughout the surveys. Other notable species recorded above the site include a Whopper Swan and Black-headed Gull which are Qualifying Interests of the nearby SPA. (River Shannon and River Estuaries SPA). However, only one observation of an individual Whopper Swan was made transiting over the site, and five observations of individual black-headed gulls were recorded transiting over the site across the five surveys. The activity of qualifying interests of SPA's during the wintering bird assessments is seen in 11.9-11.13. Results from the surveys suggest that the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's).

11-8. Bird species recorded in the vicinity of the site during the wintering bird surveys

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Black-headed Gull	BH	*Larus ridibundus*	Amber
Blue Tit	BT	*Cyanistes caeruleus*	Green
Bullfinch	BF	*Pyrrhula pyrrhula*	Green
Dunnock	D.	*Prunella modularis*	Green
Goldfinch	GO	*Carduelis carduelis*	Green
Great Tit	GT	*Parus major*	Green
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
Jackdaw	JD	*Corvus monedula*	Green
Jacksnipe	JS	*Naoscach bhídeach*	Green
Magpie	MG	*Pica pica*	Green
Meadow Pipit	MP	*Anthus pratensis*	Red
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Starling	SG	*Sturnus vulgaris*	Amber
Whopper Swan	WS	*Cygnus cygnus*	Amber
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green

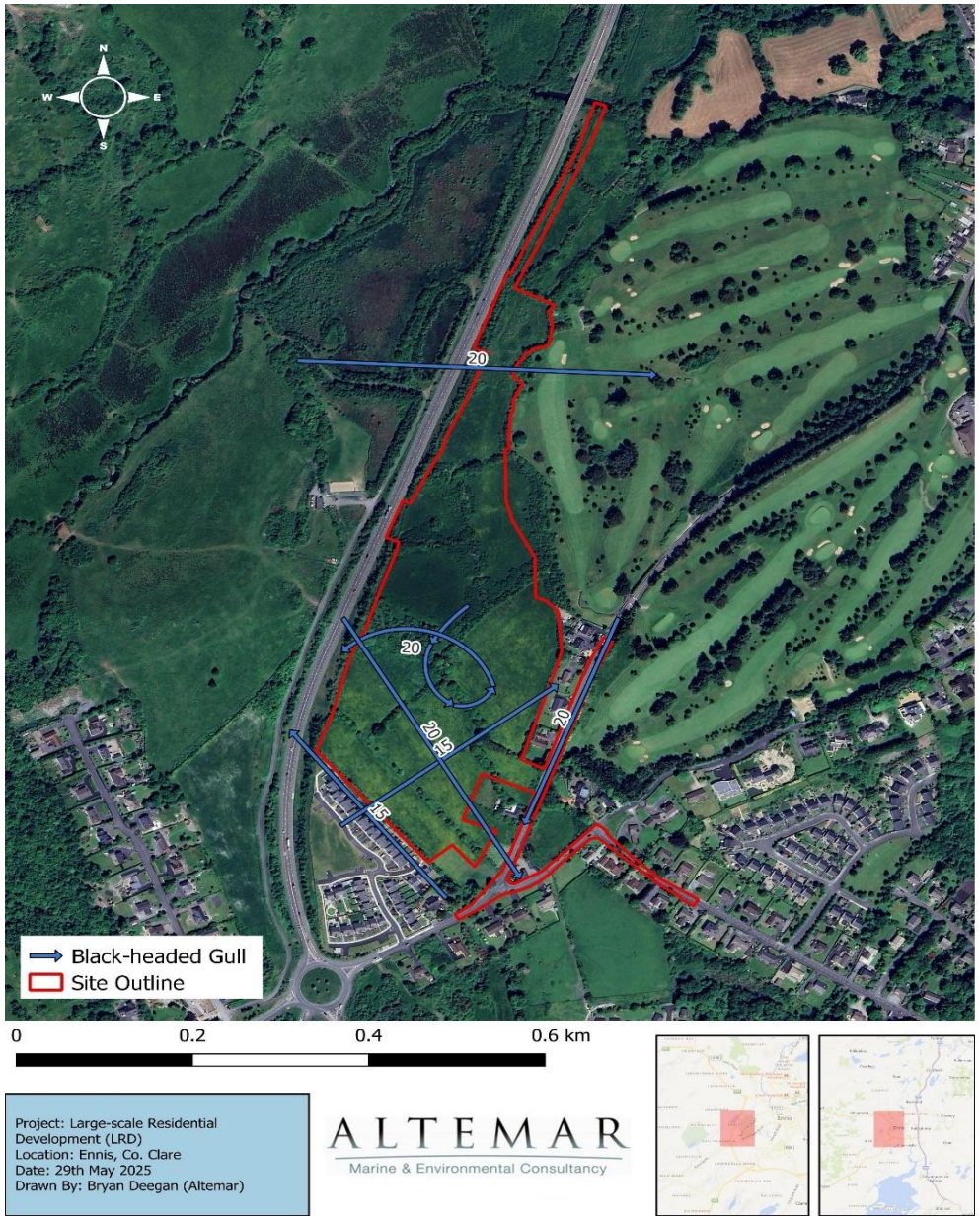


Figure 11.9.- Black-headed Gull recorded on site (number denotes the height)

Figure 11.10- Herring Gull recorded on site (number denotes the height)

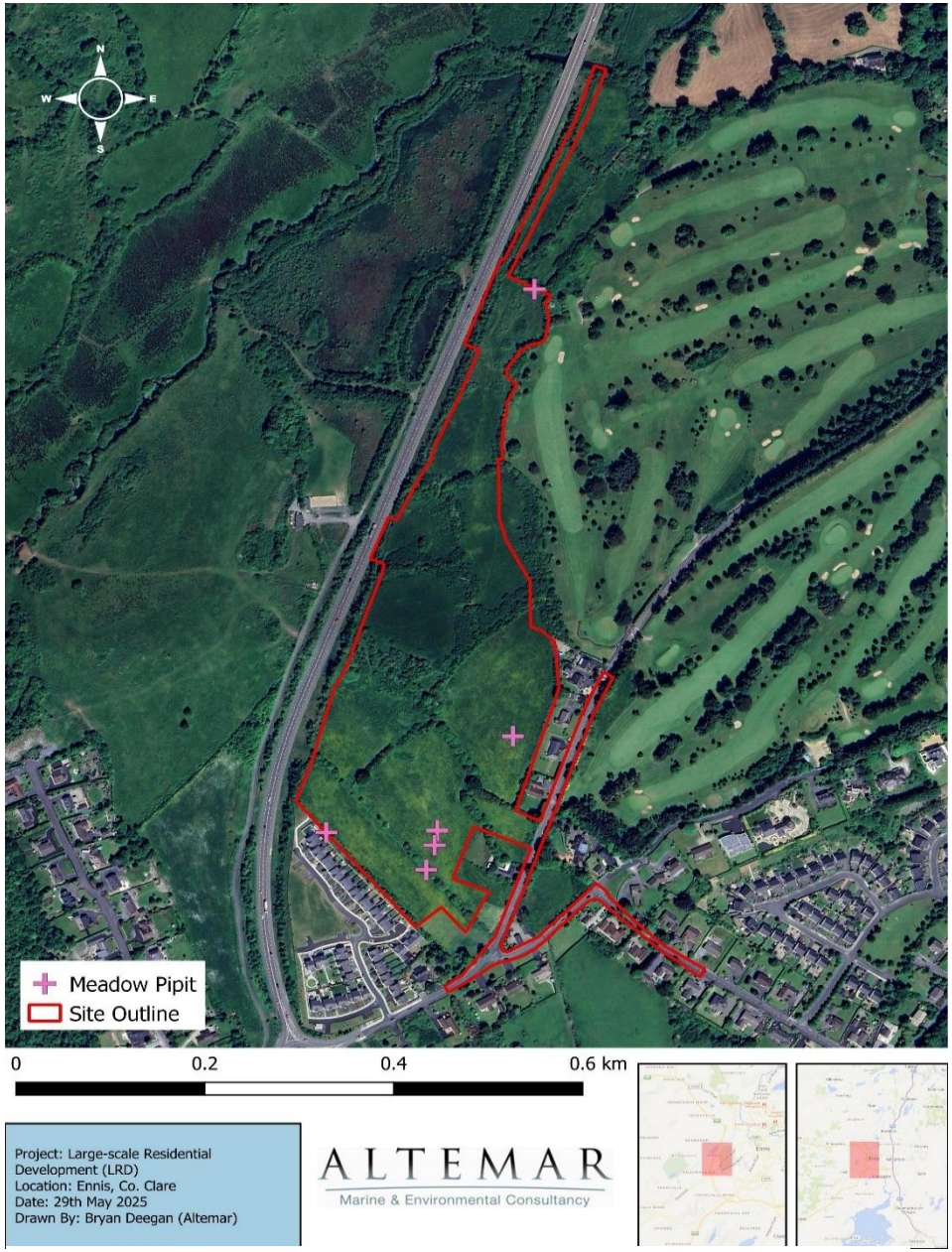


Figure 11.11- Meadow Pipit recorded on site

Figure 11.12- Jacksnipe recorded on site

Figure 11.13- Whooper Swan recorded on site (number denotes the recorded height)

11.8 The 'Do Nothing' Scenario

Due to the zoning of the subject site, it would be expected that in the absence of this subject proposal a development of similar scale and nature would be progressed. Under this scenario, in the absence of specific development details, it is likely that the effect would be similar to this proposal as outlined below. However, in the absence of any development on the site it would be expected that the hedgerow, scrub and treeline habitats would continue to be utilised by local bird, mammal and bat populations.

11.9 Potential Significant Effects

This section of the EIAR examines the potential causes of impact that could result in positive or negative effects arising on the species and habitats that occur within the ZOI of the proposed development. The following assessment of potential impacts is based on the EPA EIAR Guidelines 2022 (the EIAR Guidelines). These impacts could arise during either the construction or operational phases of the project. The following terms are derived from the EPA EIAR Guidelines and are used to describe the likely significant effects on the ecological receptors arising from the construction and operation of the proposed development.

Table 11-7a. Magnitude of effect and typical descriptions

Magnitude of effect (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Table 11-7b. Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Table 11-7c. Quality of Effects

Quality of Effects	Effect Description
Negative /Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Table 11-7dSignificance of Effects

Significance of Effect	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Table 11-7e. Duration and Frequency of Effects

Duration and Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Table 11-7f. Describing the Probability of Effects

Describing the Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

11.9.1 Construction Phase

In the absence of mitigation, the overall development of the site is likely to have direct negative impacts upon the existing habitats, fauna and flora. Direct negative effects will be manifested in terms of the removal of the site's internal habitats. The removal of these habitats will result in a loss of species of low biodiversity importance. However, the scrub and hedgerows do provide a substantial nesting foraging resource for birds and foraging area for bats. These construction effects however would include effects that may arise during the site clearance, re-profiling of the site and the building phases of the Proposed Development. Potential impacts are assessed below for each of the ecological components:

11.9.1.1 Designated Natura 2000 sites within 15km

The proposed development is not within a designated conservation site. It should be noted that surface water drainage will discharge to the Claureen River to the north of the site, which in turn outfalls to the River Fergus. There is, therefore, an indirect hydrological pathway to the Lower River Shannon SAC and River Fergus Estuaries SPA located downstream of the proposed development. Given the scale of the proposed development and proximity of the Claureen River, it is considered that there is an indirect hydrological pathway to these conservation sites. In the absence of mitigation, runoff during site clearance, re-profiling, the construction and operation of project elements could impact on the Claureen River with water quality or downstream impacts on designated sites.

In addition, the proposed development site is hydrogeologically connected via groundwater flow, to 14 European Sites located within a 15km radius. These include Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. Out of an abundance of caution it is considered that in the absence of mitigation, there is a potential for pollutants to migrate through the aquifer and surface waterbodies into these European Sites.

The proposed development site lies within the 2.5 km foraging range of Lesser Horseshoe Bat (*Rhinolophus hipposideros)* populations associated with both the Newhall and Edenvale Complex SAC and the Pouladatig Cave SAC, which are designated for the conservation of this species. As the majority of vegetation on site is to be removed to facilitate the proposed development, there is a potential loss of foraging and commuting habitat for this species. Furthermore, increased lighting levels during the construction phase may have the potential to disrupt foraging activity, particularly as Lesser Horseshoe Bat is recognised as a light-sensitive species.

The presence of the indirect hydrological and hydrogeological pathways to a number of SACs and SPAs, as well as the site's location within the foraging range of Lesser Horseshoe Bat gives rise to potential for significant effects on European Sites in the absence of mitigation.

Impacts in the absence of mitigation: negative; moderate adverse, site, permanent. Mitigation is required.

11.9.1.2 Habitats, Botany and Avian Ecology

No flora or habitats of conservation importance were noted during the surveys. During the site visits no bird species of conservation importance as listed on Annex I of the EU Birds Directive were recorded. Localised disturbance due to noise on site is foreseen. Site clearance will result in a reduction in the vegetation cover including dense scrub and hedgerows, and removal of the mature

and immature trees which would result in a nesting and foraging resource loss for the bird species noted on site. Clearance works on site during bird nesting season could impact on bird population within the proposed development site. Dust from reprofiling works could potentially impact on vegetation and nesting birds on site within the remaining hedgerows.

Impacts in the absence of mitigation: negative; moderate adverse, site, short term, not significant. Mitigation is required.

11.9.1.3 Protected Terrestrial Mammals

The protected species badger *(Meles meles)* was not observed within the site boundary. Evidence of badgers utilising the site was noted, including snuffle holes. An active badger sett was identified proximate to the eastern site boundary, within the lands of Ennis Golf Course. Consultation took place between Altemar and then design team to ensure no works are proposed within 30 m of the sett. This exclusion zone will help ensure that the badger sett remains undisturbed and adequately shielded from any potential disturbances that could arise due to construction activities, such as noise, vibration, or physical disruption. It is standard best practice to make special provisions for badgers affected by development. Mitigation is required during construction in relation to badgers on site.

No otters *(lutra lutra)* or otter holts were noted on site or proximate to the development site. However, evidence that otters are using the Claureen River was recorded (prints & spraints). Standard mitigation measures will be implemented to ensure runoff during site clearance, re-profiling, the construction and operation of project elements could impact on the Inch River and surface water network. The contamination the Inch River and downstream SAC (Lower River Shannon SAC) in which otter is a Qualifying Interest, could potentially impact negatively on otters within the watercourses.

Impacts in the absence of mitigation: negative; moderate adverse, site, short term, not significant. Mitigation is required. A pre-construction survey for protected mammal species will be carried out.

11.9.1.4 Bat Fauna

No bat roosts were recorded on site; however, several trees of bat roosting potential are proposed for felling. The removal of vegetation on site will reduce bat foraging habitat for the six species recorded on site. The site is currently characterised by low illumination, with minimal light spill from surrounding areas. Lighting during construction has the potential to impact on foraging of bats on site in the absence of mitigation. Mitigation measures will be implemented to minimize light spill and protect retained bat foraging areas, particularly along the eastern site boundary adjacent to Ennis Golf Course. This area is considered a likely important commuting corridor for Lesser Horseshoe Bat populations associated with nearby SACs.

In the absence of mitigation, the proposed development would be seen to have a negative, moderate adverse, short term, not significant, international and likely effect on bat fauna during construction. Mitigation is required.

11.9.1.5 Aquatic Ecology

The Inch River traverses along the northern boundary of the proposed development site. Standard mitigation measures will be implemented to ensure runoff during site clearance, re-profiling, the construction and operation of project elements could impact on the Inch River and surface water network, with water quality within these watercourses with potential downstream impacts aquatic ecology within this watercourse network and the downstream watercourse (River Fergus). No instream works are proposed. Works carried out adjacent to the Inch River will be carried out in dry weather with no cement works within 20m of the watercourse.

The contamination of watercourses and surfaces water networks could potentially impact negatively on the biodiversity within the watercourses and within the shallow marine environment.

Impacts in the absence of mitigation: negative; moderate adverse, short term, not significant. Mitigation is required.

11.9.2 Operational Phase

Once constructed all onsite drainage will be connected to separate foul and surface water systems. Surface water runoff will comply with SUDS. The biodiversity value of the site would be expected to improve as the landscaping matures.

11.9.2.1 Designated Sites

During operation, surface water runoff from the development will enter the Claureen River, which will outfall to the River Fergus and ultimately the Shannon Estuary. In the absence of mitigation, pollutants, silt laden run off or dust which enter the surface water network will be dispersed or diluted within the Claureen River, to negligible levels, prior to reaching any European sites.

Petrochemical runoff from the site could potentially negatively directly or indirectly impact the aquatic ecology within the Claureen River. However, runoff from the housing development will comply with standard County Council drainage requirements and will require petrochemical interception which will be attenuated and discharged at greenfield rates to the surface water network.

The proposed development site lies within the 2.5 km foraging range of Lesser Horseshoe Bat (*Rhinolophus hipposideros)* populations associated with both the Newhall and Edenvale Complex SAC and the Pouladatig Cave SAC, which are designated for the conservation of this species. As the majority of vegetation on site is to be removed to facilitate the proposed development, there is a potential loss of foraging and commuting habitat for this species. Furthermore, proposed lighting during the operational phase may have the potential to disrupt foraging activity, particularly as Lesser Horseshoe Bat is recognised as a light-sensitive species.

In the absence of mitigation, the proposed development would be seen to have a negative, moderate adverse, permanent, not significant, international and likely effect on designated sites during operation.

11.9.2.2 Habitats, Botany and Avian Ecology

During the operational phase of the development there will be an increase in disturbance including noise and light that could potentially impact on birds on site. As the landscaping elements improve with maturity it would be expected that the biodiversity value of the site to birds and flora would also increase. Light spill on site will increase from the current baseline which would have a negative effect on biodiversity. Landscape, light spill and habitat management will be important to overall impact of the operational phase.

11.9.2.3 Aquatic Ecology

Petrochemical runoff from the site could potentially negatively directly or indirectly impact the aquatic ecology. Runoff from the development and roads will have to comply with County Council drainage requirements and will require petrochemical interception and which will be attenuated and discharged at greenfield rates to the surface water network. The drainage connections and the installations in relation to petrochemical interception will be inspected by the project ecologist.

In the absence of mitigation, the proposed development would be seen to have a negative, minor adverse, long term, not significant, local and likely effect on aquatic ecology during operation. *Standard mitigation is required in relation to petrochemical interception.*

11.9.2.4 Protected Terrestrial Mammals

Badger *(meles meles)* was noted on site. An active badger sett was confirmed via camera traps within the lands of Ennis Golf Course to the east of the site, outside the site boundary. The badger is a Red Data Book species. It is standard best practice to make special provisions for badgers affected by development. Lighting and increased human presence/disturbance may impact badgers on site and reduce their foraging areas. Otter presence was noted along the river at the northern end of the site. This area would not be seen to have significant increase in human activity.

Impacts in the absence of mitigation: negative; slight, site, long term, not significant. Mitigation is required.

11.9.2.5 Bat Fauna

The removal of trees and hedgerows on site will result in a loss of foraging areas for bats. Loss of foraging sites and commuting habitat may temporarily displace certain species. There is potential for bat foraging to be impacted by the artificial lighting on site, and in particular foraging and commuting of lesser horseshoe bat, given they are considered a 'Light Sensitive' species. The proposed lighting strategy has been discussed and modified to reduce the potential impact of the development on bats. This has included only lighting areas where required and not lighting public open spaces unless necessary. Warm white LED lighting (2700K) with full cut-off optics is proposed to minimise impacts on bat foraging and reduce light spill towards treelines and hedgerow boundaries. Compensatory planting for removal of linear and scrub habitats has been incorporated into the landscape strategy. It should be noted that large linear lengths of woodland planting will be placed on site. These will provide tall linear corridors to provide bat foraging areas. Additionally, in response to the RFI, native hedgerows and additional woodland tree planting has been included to the landscape strategy, providing further foraging and commuting habitats for bats on site.

Impacts in the absence of mitigation: negative, moderate adverse, international, permanent, not significant. *Mitigation is required including consultation with the project ecologist in relation to lighting and a post lighting inspection by the ecologist.*

11.9.3 Cumulative Effects

There are several proposed developments located in the area immediately surrounding the subject site. The following is a list of planning applications in close proximity to the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal[1],:list of planning applications in close proximity to the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal[2],:

[1] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

[2] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

Reference	Development Description	Decision	Distance to Site
24/60086	for a development comprising 48 no. residential units, (32 no. semi-detached houses, 8 no. terrace houses and 8 no. duplex apartments), ancillary surface car parking, vehicular & pedestrian access to the proposed development including a new road, footpath and cyclepath extensions from the existing development to serve the new units, connection to existing public water supply; foul water drainage services by way of a new foul pumping station including the provision of surface water attenuation outfalling to the west via a headwall and reedbed and all associated site development and landscape works. The planning application is accompanied by an NIS (Natura Impact Statement)	Granted 25th September 2024	3.7km
24/122	to Extend the Appropriate Period of Planning Permission for P17/977 for 51 No. residential units, comprising of 2 No. 2 bedroom detached dwellings; 1 No. 3 bedroom detached dwelling; 42 No. 3 bedroom semi-detached; 6 No. 4 bedroom semi-detached dwellings, all including connection to water supply, public sewer, storm water sewer and all ancillary site services	Granted 10th June 2024	1.5km
24/60652	for a development comprising 74 no. residential units, (3 no. detached houses, 36 no. semi-detached houses, 23 no. terrace houses, 12 no. duplex units), ancillary surface car parking, vehicular & pedestrian access to the proposed development from the Tobarteascáin Road, pedestrian access into both Abbey Ville estate and Abbey Court estate to the south, connection to existing public water supply; foul water drainage services including the provision of surface water attenuation and all associated site development works including the raising of land, and landscape works. The planning application is accompanied by a Natura Impact Statement (NIS).	Lodged 19th December 2024 FI requested 21st Feb 2025	2.1km
25/60265	for a development comprising 54no. residential units, (4no. detached houses, 8no. semi-detached houses, 18no. Terrace houses and 24no. Duplex units), ancillary surface car parking, vehicular & pedestrian access to the proposed development including a new road from the Oakleigh Wood road to join to the Ballycorey road, new footpath along the Oakleigh Wood road, widening of the Ballycorey road, connection to existing public water supply; foul water drainage services including the provision of surface water attenuation outfalling to the North via a headwall and reedbed and all associated site development and landscape works. The planning application is accompanied by an NIS (Natura Impact Statement).	Lodged 14th May 2025 ~~Decision due~~FI Requested 7~~8~~th July 2025	3.3 km

In relation to **Planning Reference. 24/60086,**[3] a Natura Impact Statement (NIS) was carried out by Openfield and concluded the following: ''*In the light of the conclusions of the assessment of the implications for the site, in view of the conservation objectives of the site and in view of best scientific knowledge the project, alone or in combination with other projects, will not adversely affect the integrity of the Ballyallia Lake SAC.*''

In relation to **Planning Reference 24/60652**[4]**,** a Natura Impact Statement (NIS) was carried out by Openfield and concluded the following: ''*Following the Screening for AA, it was concluded that significant effects to the Lower River Shannon SAC and River Shannon & River Fergus Estuaries SPA could not be ruled out. Specifically, this may arise from pollution during the construction phase. Arising from this assessment, mitigation has been proposed. With the implementation of these measures adverse effects to the integrity of these Natura 2000 sites will not occur. This conclusion is based on best scientific knowledge.*''

In relation to **Planning Reference 25/60265**[5]**,** a Natura Impact Statement (NIS) was carried out by Openfield and concluded the following: ''*Following the Screening for AA, it was concluded that significant effects to the Ballyallia Lake and Lower River Shannon SAC could not be ruled out. Specifically, this may arise from the impact of the spread of alien invasive species and pollution during the construction phase. Arising from this assessment, mitigation has been proposed. With the implementation of these measures adverse effects to the integrity of the Natura 2000 sites will not occur. This conclusion is based on best scientific knowledge. In the light of the conclusions of the assessment of the implications for the sites, in view of the conservation objectives of the sites and in view of best scientific knowledge the project, alone or in combination with other projects, will not adversely affect the integrity of any Natura 2000 site.*''

In combination effects in relation to the WwTP

An assessment of the potential in combination effects of permitted and currently undergoing planning within the catchment of the Ennis North WwTP was carried out. Below is a list of large-scale developments granted since 2023 within the catchment of the Ennis North WwTP.

Developments assessed for potential in combination effects within Ennis North Wastewater Plant.

Planning Reference	Description	Decision Date	Daily load
21757	a permission of 10 years in duration is sought. The application site has a total of c. 60 hectares with a nett area for development of c. 45 hectares, and is bound to the south by R352 (Tulla Road), to the east and the north by agriculture land, to the west by the M18. The development will consist of: the demolition of an existing single storey	Granted (Conditional) – 8th August 2022	25.1m^3/day

[3] https://www.eplanning.ie/ClareCC/AppFileRefDetails/2460086/0

[4] https://www.eplanning.ie/ClareCC/AppFileRefDetails/2460652/0

[5] https://www.eplanning.ie/ClareCC/AppFileRefDetails/2560265/0

Planning Reference	Description	Decision Date	Daily load
	with pitched roof farm dwelling house together with 8 No. farm outbuildings on the overall site. The construction of 6 No. two storey data centre buildings with three storey plant/office levels and associated ancillary development that will have a combined gross floor area of 118,740 sqm. These data halls are maximum 19m high and will consist of the data halls and air handling units and offices and ancillary plant and support. Each of the six data centre buildings will include data halls, associated electrical and mechanical plant rooms, loading bays, maintenance and storage spaces, office administration areas, pump rooms, water storage tanks, and plant, as well as backup (standby) generators (11 No. per building) for emergency use only situated along one elevation of each building. The standby diesel generators will have associated 8 m high flues. Each generator will also include local diesel storage tanks with a single refuelling area to serve the proposed emergency generators. A gas powered energy centre and Above Ground Installation (AGI)4,674 sqm in size . The energy centre will primarily comprise 18 no. lean-burn natural gas engines, 2 No. pump rooms, and fuel storage compound. Each generator will have its own flue of 25m height. The energy centre and buildings within the compound will be 12 m high, single storey with mezzanine level. The buildings will house ancillary office, welfare facilities and associated parking. A two storey Vertical Farm Building. The vertical farm will be c. 2,430 sqm and 12m high. It will comprise c. service area of 1,444 sqm, handling area of 844 sqm and ancillary areas. Please see newspaper notice for full development description		
24/60652	for a development comprising 74 no. residential units, (3 no. detached houses, 36 no. semi-detached houses, 23 no. terrace houses, 12 no. duplex units), ancillary surface car parking, vehicular & pedestrian access to the proposed	Lodged 19th December 2024 FI requested 21st Feb 2025	48.6 m^3/day

Planning Reference	Description	Decision Date	Daily load
	development from the Tobarteascáin Road, pedestrian access into both Abbey Ville estate and Abbey Court estate to the south, connection to existing public water supply; foul water drainage services including the provision of surface water attenuation and all associated site development works including the raising of land, and landscape works. The planning application is accompanied by a Natura Impact Statement (NIS).		
25/60265	for a development comprising 54no. residential units, (4no. detached houses, 8no. semi-detached houses, 18no. Terrace houses and 24no. Duplex units), ancillary surface car parking, vehicular & pedestrian access to the proposed development including a new road from the Oakleigh Wood road to join to the Ballycorey road, new footpath along the Oakleigh Wood road, widening of the Ballycorey road, connection to existing public water supply; foul water drainage services including the provision of surface water attenuation outfalling to the North via a headwall and reedbed and all associated site development and landscape works. The planning application is accompanied by an NIS (Natura Impact Statement).	Lodged 14th May 2025 F.I Requested 7th July 2025	No relevant data. Approx 40 m^3/day
2233 **ABP Case reference: PL03.316029**	For development on lands at the junction of Clare Road (R458) and Toberteascain Road, Ennis, Co Clare. The proposed development consists of 1) Building A: The provision of a 2,214 sq m single storey discount foodstore including off licence use as well as roof mounted plant and solar panels. (Net retail area: 1,200 sq.m) 2) Building B: 3 no. storey building comprising 2 no. retail units at ground floor (Retail Unit 1 - 167.5 sq.m, Retail Unit 2 - 246 sq.m), plant and boiler rooms, residents and retail bin store, and apartment entrance lobby. 14 no. apartments over first and second floor comprising 6 no. 1 bed apartments 6 no 2 bed apartments and 2 no. 3 bed apartments. 3) Building C: 3 no. storey building comprising 168.9 sq.m cafe and external seating area (including	Final Grant: 27th February 2025	Approx. 17.6 m^3/day

Planning Reference	Description	Decision Date	Daily load
	associated changing, WC and office), plant room, 65.5sq.m residents communal area at ground floor as well as residents entrance lobby. 6 no. apartments over first and second floor comprising 2 no. 1 bed apartments and 4 no. 2 bed apartments. 4) Provision of signage for Buildings A, B & C (91.65sq.m. 5) Provision of public realm area, pedestrian and vehicular access, residents' communal open space, landscaping and boundary treatments, street furniture, ESB substation (24 sq.m playground, 142 no car parking space including 6 no. disabled bays and 6 no. family bays 89 no. cycle spaces, bin stores and all other site development works and services ancillary to the proposed development. 6) Demolition of existing structures on site including three residential units, office block and ancillary buildings (Gross Floor Area of demolition: 1,817sq.m) A Natura Impact Statement will be submitted to the planning authority with the application		
2460086	for a development comprising 48 no. residential units, (32 no. semi-detached houses, 8 no. terrace houses and 8 no. duplex apartments), ancillary surface car parking, vehicular & pedestrian access to the proposed development including a new road, footpath and cyclepath extensions from the existing development to serve the new units, connection to existing public water supply; foul water drainage services by way of a new foul pumping station including the provision of surface water attenuation outfalling to the west via a headwall and reedbed and all associated site development and landscape works. The planning application is accompanied by an NIS (Natura Impact Statement)	Final Grant Date: 25th September 2024	No relevant data. Approx 35 m^3/day

The total volume for developments assessed for potential in combination effects within Ennis North Wastewater Plant is 167m^3/day. The proposed development 147 m^3/day. This gives a combined figure of 314 m^3/day. This makes up approximately 7% of the remaining hydraulic headroom, and <5% of the remaining P.E headroom.

As a result, the development is unlikely to give rise to potential in -combination effects in relation to the Ennis North Wastewater Treatment Plant. The WwTP is operating within capacity, and it should

be noted that a confirmation of feasibility from Uisce Eireann was received for each of the developments above.

it is considered that in combination effects with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no significant effects on European sites will be seen as a result of the proposed development alone or combination with other projects.

11.9.4 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 11-8 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Pollution of watercourses and downstream designated sites from sediment runoff	Negative	Moderate	Local/county	Likely	Short-term	Indirect
Construction dust impact	Negative	Moderate	Site	Likely	Short-term	Direct
Habitat loss and Fragmentation	Negative	Moderate	Site	Likely	Permanent	Direct
Disruption to bat commuting routes (Lesser Horseshoe)	Negative	Moderate	Local	Unlikely	Permanent	Direct
Construction lighting Impacts	Negative	Low	Local	Likely	Short-term	Direct
Disturbance from construction noise and vibration	Negative	Low	Local	Likely	Short-term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 11-9 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Lighting impacts	Negative	Moderate	Local	Likely	Long-term	Direct
Habitat loss and Fragmentation	Negative	Moderate	Site	Likely	Long-term	Direct

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Pollution of watercourses from petrochemical runoff	Negative	Moderate	Local	Likely	Long-term	Direct

11.10 Mitigation Measures

Mitigation measures will be incorporated into the proposed development project to minimise the potential negative impacts on biodiversity within the ZOI. Mitigation measures are outlined within the Land & Soils (Chapter 9), Water & Hydrology (Chapter 10), Air Quality (Chapter 13) and Noise & Vibration (Chapter 12) of the EIAR. In addition to these mitigation measures mentioned elsewhere in the EIAR specific mitigation in relation to biodiversity need to be implemented having taken into account the measures outlined elsewhere in the EIAR.

11.10.1 Mitigation by Design

- Retention of 401 linear metres of native hedgerows within the site boundary. In addition, native hedgerows located along the western and eastern boundaries (outside the red line) are to be retained.
- The proposed new linear planting incorporated as part of the RFI results in a net gain of 714 m in linear habitat connectivity on site.
- Approximately ~~344~~ 400 trees, including species such as oak, ash, and beech, will be planted across the site. These will be arranged in structured treelines, with additional woodland planting areas integrated into the overall landscape design strategy. This planting scheme is intended to support and enhance bat foraging activity on site.

11.10.2 Construction Phase Mitigation

In addition to mitigation measures outlined elsewhere in the EIAR, the following measures will be implemented to protect biodiversity:

- A pre-construction survey for bats and terrestrial mammals will be carried out. This will include an inspection for resting and breeding places for both terrestrial mammals and bats. Given the nature of the dense scrub on site no machinery access to the site for construction will be allowed without consultation and approval of the project ecologist. The ecologist will oversee site clearance and will be on site during the removal of scrub and hedgerows. Should resting or breeding places be found a derogation licence will be acquired from NPWS and conditions followed prior to works commencing in the vicinity of the resting or breeding place.
- A 30m construction exclusion zone will be implemented around the active badger sett located proximate to the eastern site boundary. This is demonstrated in figure 11.14. No works will be carried out within this exclusion zone for the duration of the construction phase. Prior to machinery coming on site this exclusion zone will be put in place under the supervision of the project ecologist.

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas including birds, mammals including bats, badger and otter will not be significantly impacted.
- Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) in relation to the removal of trees and timing of nesting birds will be followed e.g. do not remove trees or shrubs during the nesting season (1st March to 31st August). If removal is required during this season the removal of woody material will be carried out under the supervision of an ecologist. If nesting birds are present NPWS will be contacted, and removal will be subject to conditions outlined by NPWS.
- Lighting during construction will be carried out in consultation with the project ecologist and treelines, boundary hedgerows or wooded areas will not be lit.
- Removal of deciduous trees. Should any mature broadleaved tree be scheduled for removal, it will first be surveyed for roosting potential and bat presence if required. If bats are found, an application for a derogation licence should be made to the National Parks and Wildlife Service to allow its legal removal. Such trees will be felled in the period late August to late October, or early November, in order to avoid disturbance of any roosting bats as per National Roads Authority guidelines (NRA 2006a and 2006b) and also to avoid the bird breeding seasons. Any tree felling will be completed by mid-November at the latest as bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Trees may be removed at other times but the likelihood of encountering bats during works will be higher. Trees with ivy-cover, once felled, will be left intact onsite for 24 hours prior to disposal to allow any bats beneath foliage to escape overnight.
- Works within 50m of the Claureen River will only be carried out subject to the approval of the project ecologist. Works to connect drainage to the Claureen River will be under the direct supervision of the project ecologist with mitigation in place to prevent silt and contaminated material from entering the watercourse. Works will be carried out in dry weather with no cement works within 20m of the watercourse. ~~A pre-cast headwall will be used.~~
- Trees to be retained. Where possible, treelines and mature trees that are located immediately adjacent to planned construction areas or are not directly impacted will be avoided and retained intact. Retained trees will be protected from root damage by machinery by an exclusion zone of at least 5 metres or equivalent to canopy height. Such protected trees will be fenced off by adequate temporary fencing prior to other works commencing.
- Lighting restrictions. In general, artificial light creates a barrier to bats so lighting will be avoided where possible. Where lighting is required, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill during construction. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only.

Figure 11-4. Badger sett location and construction works exclusion zone

11.10.3 Operational Phase Mitigation

The biodiversity value of the site would be expected to improve as the landscaping matures. The proposed development has a sustainable drainage strategy and detailed landscape strategy and mitigation during operation will be carried out as outlined elsewhere in the EIAR. The following operation mitigation measures will be carried out:

- Post construction an inspection of drainage connections to the watercourse network including petrochemical interception will be carried out by the project ecologist.
- 30 bird boxes to be placed on site in consultation with project ecologist.

Bats

In addition, the following measures in relation to bats, that have been extracted from the Bat Assessment Report (Bat Eco Services, 2022) from the approved scheme will be implemented into the design of the proposed development:

Lighting

"Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018). Consultation was undertaken with the lighting specialists to reduce the potential impact on local bat populations.

- *All luminaires used will lack UV/IR elements to reduce impact.*
- *LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.*
- *A warm white spectrum (<2700 Kelvins) ~~(i.e. 2200 Kelvins)~~ will be used to reduce the blue light component of the LED spectrum).*
- *Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.*
- *Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.*
- *Only luminaires with an upward light ratio of 0% and with good optical control will be used.*
- *Luminaires will be mounted on the horizontal, i.e. no upward tilt.*
- *Any external security lighting will be set on motion-sensors and short (1min) timers.*
- *As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.*

Any external lighting for the Proposed Development should strictly follow the above guidelines and these should be strictly implemented during Construction and Operation phase of the Proposed Development.

Additional measures were also recommended:

- *Removal of specific luminaires to prevent light spillage on the boundary with the golf course."*

Bat Box Scheme

"The total number of bat boxes required to mitigate for general conservation of local bat populations:

4 summer bat boxes (Schwegler Woodcrete 1FF bat box or equivalent – source www.nhbs.com or www.veldshop.nl) to be erected on mature trees within the Proposed Development site.

Bat boxes will be erected prior to construction works. The bat specialist will erect the bat boxes with assistance from the contractor. Some general points that will be follow include:

- *Straight limb trees (or telegraph pole) with no crowding branches or other obstructions for at least 1 metre above and below position of bat box.*
- *Diameter of tree should be wide and strong enough to hold the required number of boxes.*
- *Locate bat boxes in areas where bats are known to forage or adjacent to suitable foraging areas. Locations should be sheltered from prevailing winds.*
- *Bat boxes should be erected at a height of 4-5 metres to reduce the potential of vandalism and predation of roosting bats.*

Locations for bat boxes should be selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes. Therefore, the bat boxes are to be erected mature trees to the rear of the proposed development site and away from public street lighting."

Lesser Horseshoe Bat Conservation Measures

"Due to the presence of Lesser Horseshoe Bats within the survey area and the fact that the Proposed Development is within 2.5km radius of two SACs, it is important that additional measures are undertaken to conservation local Lesser Horseshoe Bat populations. These measures will entail the following:

- *Compensatory planting for the removal of linear habitats.*
- *Compensatory planting for the removal of scrub habitats.*
- *Specific measures to reduce lighting impacts.*
- *Lesser Horseshoe Bat conservation zone – zone of land along a linear strip to the north of the Proposed Development site and connected to the boundary of the Inch River. This area has been selected because it is outside the Lighting Plan zone and it is adjacent to the Inch River which is deemed as the likely commuting route for Lesser Horseshoe Bats to the Proposed Development area. This river also allows direction commuting to lands with the Ennis Golf Course where Lesser Horseshoe Bat activity was also recorded.*
- *This area is approximately 20m wide and 170m long and it is proposed that the following measures are undertaken: Erection of Day Roost."*

A Day Roost consists of a "*small structure building of concrete block (externally plastered) with a natural slate roof and bitumous felt. It is designed according to VWT Day Roost recommendations and full details of the plans are provided in the appendices*" of the Bat Assessment Report accompanying this application.

"*The provision of such features within the 2.5km radius of Lesser Horseshoe Bat SACs is considered by The Vincent Wildlife Trust (VWT) as an important component to the support network for maternity and hibernation roosts.*

- *Dark free zone connected to Inch River no lighting permitted withing this area.*
- *Landscaping in vicinity of Day Roost and Inch River.*
- *Approximately 200m of hedge planting (Hawthorn).*
- *Approximately 10 small trees (e.g. Rowan, Birch and Crab Apple).*

"It is recommended that native tree, shrub, and plant species are included in the landscaping plan. It is recommended that night-scented planting is also undertaken to encourage foraging areas for local bat populations. As such, night scented-floral species, including Honeysuckle *Lonicera periclymenum* and Star Jasmine *Trachelospermum jasminoides*, will be included within the proposed hedgerows and areas of ornamental planting on Site, as outlined within the Landscape Design Plan, to provide foraging habitat for local bats.

It is essential that the northern and eastern boundary with the Ennis Golf Course is protected. Any gaps or opportunity to undertaken planting to increase the height and width of this boundary should be undertaken and planting should be with native tree and shrub species. "The retention of the hedgerows along this boundary, along with the proposed compensatory woodland planting and native infilling to these hedgerows, as outlined in the Landscape Design Plan, will protect this ecological corridor.

It should be noted that the proposed development has increased the level of hedgerow planting to include more linear woodland planting across the boundary of the site which includes oak. This will result in taller treelines in the long term than the granted development which would provide superior foraging corridorees and greater light spill containment. It should be noted that, following a Request for Further Information, a native hedgerow has been incorporated into the landscape strategy along the entirety of the western boundary, in addition to further woodland tree planting.

11.11 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

11.11.1 Construction Phase

Based on the successful implementation of the construction phase controls and the works to be carried out in accordance with this EIAR and the accompanying AA Screening/NIS, it is likely that there will be no significant ecological impact arising from construction works proposed for the proposed project. Designated conservation sites will not be impacted by the proposed development during construction.

A robust series of standard construction phase control measures in addition to design measures have been outlined to ensure that the proposed project does not impact on species or habitats of conservation importance, conservation areas or watercourses during construction. It is essential that these measures are complied with to ensure that the proposed works do not have downstream environmental impacts. These measures are to protect the Inch/Claureen River and downstream Natura 2000 sites, which are potentially the primary vector of impacts from the site, are not impacted during construction and operational phases of the proposed development.

No significant environmental impacts are likely in relation to the construction of the proposed development.

Effects: Moderate / National / Negative effect / Not significant /short term/likely. Standard mitigation and enhanced planting of linear woodlands will be in place on site.

11.11.2 Operational Phase

Based on the successful implementation of the operational phase controls and the works to be carried out in accordance with this EIAR and the accompanying AA/NIS, it is likely that there will be no significant ecological impact arising from operation of the proposed project. Designated conservation sites will not be impacted by the proposed development.

Operational phase control measures have been outlined to ensure that the proposed project does not impact on species or habitats of conservation importance, conservation areas or watercourses. It is essential that these measures are complied with, to ensure that the proposed works do not have downstream environmental impacts. These measures are to protect the Inch/Claureen River and associated biodiversity, downstream Natura 2000 sites, and Lesser Horseshoe Bats which are potentially the primary vector of impacts from the site, is not impacted during operational phases of the proposed development. Light spill will be introduced into the area but these have been designed to have minimal impact on biodiversity. It would be expected that there would be no significant long-term impact on Lesser Horseshoe bats with the implementation of robust mitigation measures in relation to this species as outlined above.

11.11.3 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 11-2 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Pollution of watercourses and downstream designated sites from sediment runoff	Negative	Low adverse Not significant	Local/county	Likely	Short term	Direct
Construction dust impact from earthworks	Negative	Low adverse Not significant	Site	Likely	Short-term	Direct
Habitat loss and Fragmentation	Negative	Low adverse Not significant	Local	Likely	Long-term	Direct
Disruption to bat commuting routes	Negative	Low adverse Not significant	Local	Unlikely	Short-term	Direct
Construction lighting Impacts	Negative	Low adverse Not significant	Site	Likely	Short-term	Direct
Disturbance from construction noise and vibration	Negative	Low adverse Not significant	Local	Likely	Short-term	Direct

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 11-3 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Lighting impacts	Negative	Low adverse Not significant	Site	Likely	Permanent	Direct
Habitat fragmentation for species on site (presence of new buildings, infrastructure etc.)	Negative	Low adverse Not significant	Site	Likely	Short-term	Direct
Disturbance from increased human presence and traffic noise	Negative	Low adverse Not significant	Local	Likely	Long-term	Direct
Pollution of watercourses and downstream European sites from petrochemical runoff	Negative	Low adverse Not significant	International	Unlikely	Short-term	Direct

11.12 Risk of Major Accidents or Disasters

The nature, scale, and location of the proposed project do not give rise to a significant risk of major accidents or disasters that would result in significant adverse effects on the environment.

11.13 Worst Case Scenario

- Destruction or collapse of the badger sett located outside the site boundary during site works.
- Significant pollution event during construction (e.g. fuel or concrete spill) entering the adjacent Claureen River and potential adverse effects on downstream designated sites.

11.14 Interactions

The biodiversity elements of this EIAR have involved consultation with a wide section of the Project Team particularly in relation to the Construction Management, design, drainage, lighting and landscape elements of the proposed Project. There are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to the biodiversity chapter. The biodiversity chapter of the EIAR involves interactions with the Land & Soils, Water & Hydrology, Air Quality, Noise and Vibration, and Traffic and Transport. Following the implementation of mitigation measures outlined in the EIAR the following interactions are noted.

11.14.1 Lands & Soils

During the construction phase, excavated soil, stone, clay and made ground will be generated from the excavations required to facilitate site levelling and construction of the new foundations. It is estimated that 27,000m^3 of topsoil will be stripped, which is expected to be reused on site. In addition, 45,000m^3 of subsoil layers will be excavated, which is also expected to be reused on site. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. As such, there is the potential for impacts on local biodiversity via the proposed excavation and re-profiling works. There will be a loss of some vegetation on site, but this is not expected to impact significantly on surrounding areas Following the implementation of mitigation measures outlined in Chapter 9 and Chapter 11, the predicted effects on biodiversity are ***short to long term, imperceptible,*** and ***neutral.*** The biodiversity of the subject site is likely to improve following the completion of landscaping works

11.14.2 Water & Hydrology

During the construction and operational phases of development, there is the potential for downstream impacts on the proximate watercourses, and designated conservation sites via contaminated surface water runoff. Following the implementation of mitigation measures outlined in Chapter 10 and Chapter 11, the predicted effects on biodiversity are ***short term, imperceptible,*** and ***neutral.***

11.14.3 Air Quality

During the construction phase of development, given the nature and scale of the proposed works, there is the potential for dust and materials to enter the proximate watercourse during site clearance and re-profiling works with the potential for downstream impacts on biodiversity and designated conservation sites. Following the implementation of mitigation measures outlined in Chapter 11 and Chapter 13 the predicted effects on biodiversity are ***short term, imperceptible,*** and ***neutral.***

11.14.4 Noise and Vibration

During the construction and operational phases of the development, there will be an increase in disturbance including noise and vibration that could potentially impact on birds on site and mammals proximate to the site. Following the implementation of mitigation measures outlined in Chapter 11 and Chapter 12, the predicted effects are ***short term and minor adverse.***

11.14.5 Traffic and Transport

During the construction phase of development, heightened traffic within and immediately surrounding the subject site (resulting from the transport of construction materials and the commuting of workers to the site) has the potential to impact on local biodiversity through increased disturbance. Following the implementation of mitigation measures outlined in Chapter 6 and Chapter 11, the predicted effects on biodiversity are ***short and long term, imperceptible,*** and ***neutral.***

11.15 Monitoring

11.15.1 Construction Phase

A project ecologist will be appointed to oversee construction works on site. Pre-construction surveys will be carried out for terrestrial mammals and bats.

11.15.2 11.14.2 Operational Phase

Post-construction bat surveys and monitoring will be carried out by the project ecologist. Bat Eco Services recommend the following monitoring methods in relation to bats on site:

- *"Inspection of bat boxes within one year of erection of bat box scheme/rocket box. Register bat box scheme with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years.*
- *Monitoring of Day Roost: Monitoring should involve: Inspection of internal space for evidence of bat usage once per year for two years. Static surveillance for a minimum of 10 days/year to record any bat activity during the summer months in Year 2. Installation of a temperature data logger for 2 year surveillance.*
- *Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. A full summer bat survey is recommended post-works.*
- *Specific monitoring is recommended in relation to the proposed lighting scheme to determine that a level of <1 Lux is achieved along the boundaries of the Proposed Development site."*

11.16 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 11-4 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Disturbance or destruction of a badger sett	Pre-construction survey for badger setts and supervision of clearance due to nature of dense scrub on site.	N/A
Disturbance or destruction of bat roost	Pre-construction survey for bats and inspection of trees of bat roosting potential proposed for felling	N/A

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 11-5 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Reduction in bat foraging on site, in particular of Lesser Horseshoe bat	Inspection of bat boxes within one year of erection <1lux along boundaries of development site Post construction inspection of lighting by project ecologist.	Monitoring of day roost Monitoring of lighting scheme to determine if <1lux along boundaries of development site has been achieved.

Likely Significant Effect	Mitigation	Monitoring
	Inspection of woodland planting by the project ecologist.	All mitigation measures should be checked to determine that they were successful. Post construction bat surveys

11.17 Conclusion

The Biodiversity Chapter of the EIAR involved extensive surveys and interactions within the project team being carried out over several years. The flora, fauna and habitats within the proposed development area are outlined in detail and the potential impacts on biodiversity and designated sites were assessed. Detailed mitigation measures have been outlined and will be carried out during the construction and operational phases of the development including measures to ensure the protection of bats on site and badgers proximate to the site. In conclusion, the proposed development has satisfactorily addressed the potential impacts on biodiversity on site and within the potential zone of influence. It is considered that the overall impact on the biodiversity of the proposed development is a long term low adverse not significant residual impact on the existing biodiversity. However, the implementation of the proposed landscaping will provide significant on-site biodiversity enhancement features and provide long term positive benefits to the biodiversity on site.

11.18 References and Sources

Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities March 2010.

Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government 2009; http://www.npws.ie/publications/archive/NPWS_2009_AA_Guidance.pdf

Managing NATURA 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission 2000; http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/provision_of_art6_en.pdf

Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; http://ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf

Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC https://ec.europa.eu/environment/nature/natura2000/management/pdf/methodological-guidance_2021-10/EN.pdf

Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission;

http://ec.europa.eu/environment/nature/Natura2000/management/docs/art6/guidance_art6_4_en.pdf

Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging; http://ec.europa.eu/environment/nature/Natura2000/management/docs/guidance_doc.pdf

The Status of EU Protected Habitats and Species in Ireland. http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Conservation_Status_Report.pdf

Appendix 2 Noise and Vibration EIAR Chapter

12 Noise & Vibration

12.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development with respect to noise and vibration. The proposed development involves the construction of a Large Scale Residential Development (LRD) at Ballymacaula, Drumbiggle, Keelty, Circular Road, Ennis, Co. Clare. A full description of the development is available in Chapter 2. The assessment for noise and vibration is based on the most up to date applicable guidance and assessment documents available both nationally and internationally.

Noise and vibration will be considered in terms of two aspects. The first is the outward effect of the development on its surrounding environment, and the second is the inward effect of the existing noise sources in the surrounding environment on the development itself.

12.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Aoife Kelly (Senior Acoustic Consultant) with AWN Consulting Ltd. Aoife holds a BSc(Hons) in Environmental Health and a PhD in Occupational Noise. She has completed the Institute of Acoustics Diploma in Acoustics and Noise Control. Working in the area of acoustics since 2013, she has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, specialising in infrastructure, wind energy, industrial, commercial and residential.

This chapter of the EIAR was co-authored by Robert Holohan (Acoustic Consultant) has a BA(Hons) in Geography and Business Marketing from Maynooth University as well as an environmental science background from his MSc in Coastal and Marine Environments from the University of Galway. He has completed noise monitoring campaigns across numerous sites and holds a certificate from the Institute of Acoustics in environmental noise monitoring. He has also contributed to various residential, industrial and infrastructure projects across Ireland through surveying, noise modelling and impact assessment.

12.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 ‘Development Description’ of this EIAR.

For the purposes of this Chapter the Proposed Development is a Large Scale Residential Development (LRD,) which includes a mix of residential dwellings ranging over 1-3 storeys and will also include a creche to the north of the development.

12.3.1 Construction Stage

During the construction phase, the main site activities will include site clearance and bulk excavation, foundations, building construction, road works, and landscaping. This phase has the greatest potential noise and vibration impacts on its surrounding environment, however this phase will be of short-term impact e.g. more than 1 year. The construction impact assessment will consider the potential impacts on noise sensitive locations (NSLs) external to the Proposed Development.

NSLs include areas where people spend significant periods of time and where concentration, sleep, and amenity are important considerations. Examples of these sensitive locations include residential dwellings, schools and other educational establishments, hospitals and nursing homes, hotels and other short-term accommodation buildings, buildings of religious sensitivity, recreational and noise-sensitive amenity areas, and offices.

12.3.2 Operational Stage

During the operational phase of the development, no significant sources of noise or vibration are expected with the development. The primary source of outward noise in the operational context relates to any changes in traffic flows along the local road network and any operational plant noise used to serve the ancillary elements within the creche buildings and amenity spaces.

12.4 Methodology

The assessment has been undertaken using the following methodology:

- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- An environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest NSLs to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at NSLs surrounding the development site;
- An assessment has been completed of potential cumulative impacts that may arise as a result of the proposed development and other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and
- The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements, for additional noise mitigation, where required, to ensure a suitable internal noise environment for residential amenity.

12.4.1 Relevant Legislation & Guidance

The assessment of impacts has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter. In addition to specific guidance documents for the assessment of noise and vibration impacts which are discussed further in the relevant sections, the EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (May 2022) (EPA EIAR Guidelines) were considered and consulted for the purposes of this chapter.

12.4.2 Construction Phase Methodology

12.4.2.1 Criteria for Assessing Construction Phase - Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phases of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Noise.*

The approach adopted here calls for the designation of a NSL into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a Construction Noise Threshold (CNT) that, if exceeded, indicates a potential significant noise impact is associated with the construction activities, depending on context.

The table below sets out the values which, when exceeded, signify a potential significant effect at the façades of residential receptors, as recommended by BS 5228-1:2009+A1:2014.

Table 12-1: Example Threshold of Potential Significant Effect at Dwellings

Assessment Category and Threshold Value Period	Threshold value (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.

It should be noted that this assessment method is only valid for residential properties, and if applied to commercial premises without consideration of other factors, may result in an excessively onerous thresholds being set.

Proposed Threshold Levels for Noise

Taking into account the proposed document outlined above and making reference to the baseline noise environment monitored around the Proposed Development site (referred to in Section 12.6.1), CNTs are set using Category A for the closest NSLs to the proposed development.

Interpretation of the Construction Noise Levels (CNL)

In order to assist with interpretation of the significance of a CNL, includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is taken from the UK document Design Manual for Roads and Bridges (2020) LA 111 Sustainability & Environmental Appraisal. Noise and Vibration Rev 2 (DMRB: Noise and Vibration - UKHE 2020) and adapted to include the EPA 2022 EIAR Guidelines.

Table 12-2: Interpretation of CNL at Dwelling.

Impact Guidelines for Noise Impact Assessment Significance (Adapted from DMRB)	CNL per Period	EPA EIAR Guidelines	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on range of CNL, baseline noise level and duration
Minor	Above baseline and below or equal to CNT	Slight to Moderate	
Moderate	Above baseline and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 dB	Significant to Very Significant	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

12.4.2.2 Criteria for Assessing Construction Phase - Vibration Impacts

There are two aspects to the issue of vibration that are considered for this development: the risk of cosmetic or structural damage to buildings; and human response to vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human response are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

There is no published statutory Irish guidance relating to the maximum permissible vibration levels for either building response. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Vibration (BS 5228 – 2); and

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration (BS 7385-2).

Cosmetic or Structural Damage to Buildings

BS 5228-2 and BS 7385 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

The standard also notes that below 12.5mm/s PPV, the risk of damage tends to zero. Historically important buildings that are difficult to repair might require special consideration on a case by case basis, but buildings of historical importance should not be assumed to be more sensitive unless they are structurally unsound. If a building is in an unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance. The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed buildings, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. This is summarised in Table 12-3 below.

Table 12-3: Transient vibration guide values for cosmetic damage.

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Unsound or Vulnerable Structures	6mm/s	

Note 1: Values referred to are at the base of the building.

Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

Human Perception

Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern to building occupants. BS 5228-2:2009+A1:2014 notes that vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

Table 12-4 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014 and the DMRB Noise and Vibration (UKHE 2020) document and the associated EPA significant ratings.

Table 12-4: Guidance on Effects of Human Response to PPV Magnitudes.

Criteria	DMRB Impact Magnitude	EPA Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
<0.14 mm/s PPV	Very Low	Imperceptible to Not significant

12.4.2.3 Criteria for Assessing Construction Phase – Traffic

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: DMRB Noise and Vibration 2020 and the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 12-5 relates changes in traffic noise levels to impact on human perception based on the guidance contained in these documents.

Table 12-5: Classification of magnitude of noise impacts in the short-term.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

The DMRB guidance outlined will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely impacts during the construction stage.

For both construction noise and construction traffic, a significant effect is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months.

12.4.3 Operational Phase Methodology

12.4.3.1 Criteria for Assessing Operational Outward Noise Impacts

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads. There will also be an element of mechanical and electrical plant required to service creche buildings. The relevant guidance documents used to assess potential operational noise and vibration impacts on the surrounding environment are summarised in the following sections.

Change in Traffic Noise Levels

In the absence of any Irish guidelines or standards describing the effects associated with changes in road traffic noise levels, reference has been made to the DMRB Noise and Vibration (UKHE 2020) document. This document provides magnitude rating tables relating to changes in road traffic noise. For the operational phase of the development, changes in traffic noise are assessed against the long-term magnitude criteria for traffic flows along the surrounding road network. In summary, the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Table 12-6: Likely Impact Associated with Long-term Change in Traffic Noise Level (DMRB 2020).

Change in Noise Level (dB L_{A10})	DMRB Long-Term Term Magnitude	EPA Classification Magnitude of Impact
<0.1	Negligible	Imperceptible
0.1 – 2.9		Not significant
3 – 4.9	Minor	Slight to Moderate
5 – 9.9	Moderate	Moderate to Significant
10+	Major	Significant to Very Significant

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

Mechanical and Electrical Plant

The proposed development is largely residential in nature comprising a mixture of houses, duplex and apartments. There is one creche located to the east of the site in LRD Phase 1. There will be minimal mechanical and/ or electrical plant items required to service the development that will generate noise levels outside of the site boundary or at the developments buildings themselves. Plant contained within plant rooms has the least potential for impact, once consideration is given to appropriate design of the space.

The closest NSLs to any operational plant items are the residential dwellings within the proposed development. To ensure there is no adverse impact on the future inhabitants of the proposed development itself, it is appropriate to refer to internal noise targets derived from BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. The recommended indoor ambient noise levels and derived external noise levels are set out in Table 12-7 and are based on annual average data.

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233 (BSI 2014c), and represent the appropriate noise level at the external façade of the building. For mechanically ventilated buildings, higher external noise levels will achieve the same internal noise levels with closed windows.

Table 12-7: Internal Noise Design Range for Residential Buildings (BS 8233:2014).

Activity	Location	Internal Noise Design Range dB $L_{Aeq,\ T}$	Derived External Levels dB $L_{Aeq,\ T}$
Residential Day	Living room	35	50
	Dining room/area	40	55
	Bedroom	35	50
Residential Night	Living room	35	50
	Dining room/area	40	55
	Bedroom	30	45

12.4.3.2 Criteria for Assessing Inward Noise Impacts

Clare County Council Noise Action Plan (NAP) 2024-2028

The Clare County Council Noise Action Plan was revised in 2024 and states the following regarding suitable documents to assist with the assessment of new residential developments in relation to noise:

> *"Relevant standards and guidance for the consideration of noise where there is proposed new residential development near major transportation sources (roads and railways) include the Professional Planning Guidance on Planning & Noise: New Residential Development (ProPG, 2017), Acoustic Ventilation and Overheating, Residential Design Guide (AVO, 2021), BS 8233:2014 Guidance on sound Insulation and Noise Reduction for Buildings and ISO 19488:2021 Acoustics: Acoustic classification of dwellings".*

The NAP also states the following regarding the interaction between acoustic comfort and thermal requirements:

> *"The AVO guidelines provide an approach as to how the competing aspects of thermal and acoustic comfort can be managed, which is particularly important in situations where acoustic requirement may call for closed windows. BS 8233:2014 provides recommendations for the control of noise in and around buildings."*

To assist local authorities and in the absence of Irish planning guidance the Draft Interim National Guidance for the Consideration of Transportation Noise in the Design of New Residential Development was compiled in 2021 by the NIECE Local Authority Noise Subgroup with the express purpose:

> *"that good acoustic design should be implemented from the outset of the design of new residential developments and recommends the use of the ProPG approach to bringing people to noise and cognisance of BS 8233:2014 and the AVO guidelines."*

With reference to new residential developments located in close proximity to major roads the NAP states the following:

> *"All new applications for residential developments shall be assessed in accordance with and where there is the likelihood of an adverse noise impact near major roads. Guidance on Acoustic Design Statements can be accessed in 'Professional Practice Guidance on Planning and Noise: New Residential Developments' (ProPG) ."*

The BS 8233 criteria has been adopted in this assessment, as explained in the preceding section. The *Professional Practice Guidance on Planning & Noise* (ProPG) guidance has also been adopted to inform the inward impact of the assessment and is described in further detail below.

Professional Practice Guidance on Planning & Noise (ProPG 2017)

The *Professional Practice Guidance on Planning & Noise* (ProPG 2017)[1] has been generally considered best practice guidance adopted in Ireland, in the absence of equivalent Irish guidance for inward noise impact assessments.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows: -

- ***Stage 1:*** Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels.
- ***Stage 2:*** Involves a full detailed appraisal of the Proposed Development covering four "key elements" that include: -
    1. ***Element 1*** – Good Acoustic Design Process
    2. ***Element 2*** – Noise Level Guidelines
    3. ***Element 3*** – External Amenity Area Noise Assessment
    4. ***Element 4*** – Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk, based on the pre-existing noise environment. Figure 12-1 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and / or predicted on site.

[1] Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).

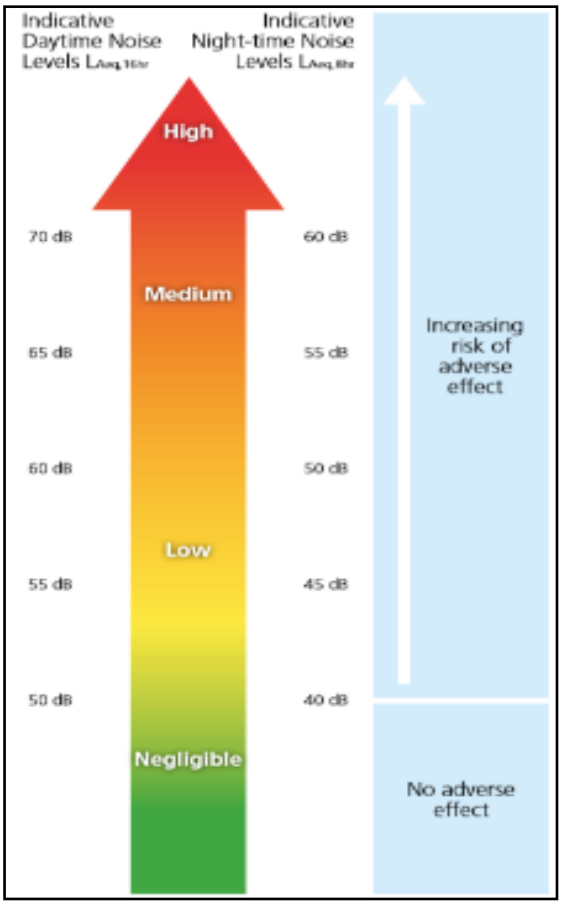


Figure 12-1: ProPG Stage 1 - Initial noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 no. L_{AFMax} events exceed 60 dB during the night period, and the site should be considered a high risk if the L_{AFMax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233: 2014. The recommended indoor ambient noise levels are set out in Table 12.7 previously and are based on annual average data.

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development: -

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Appendix 12.1 Acoustic Design Statement presents the ProPG assessment for the Proposed Development. Mitigation measures identified from the ProPG assessment are presented in Section 12.9.2.3 of this EIAR chapter. A glossary of acoustic terminology is available in Appendix 12.2.

12.4.3.3 Operational Phase – Vibration

The development is residential in nature and there are no vibration sources associated with the proposed development. Therefore, there will be no outward impacts associated with vibration for the operational phase, and accordingly such impacts have been scoped out.

12.5 Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

12.6 Baseline Environment

The Proposed Development LRD (Phases 1, 2 and 3) is a greenfield site located in Ennis, to the west of the Ennis Golf Club and to the east of the N85. For the Proposed Development the existing noise and vibration environments across the sites and in the vicinity of the nearest existing NSLs are dictated by transportation sources in the study area.

The receiving environment in terms of baseline noise and vibration is expected to be the same for the cumulative development and each individual Phase of the site within the development. Therefore, the baseline environment outlined in the following section does not differentiate between the Proposed Development or cumulative site of the development being assessed within this EIAR chapter.

12.6.1 Baseline Survey

12.6.1.1 Survey Locations and Periods

The monitoring locations for this survey are described below and illustrated in Table 12-8 and

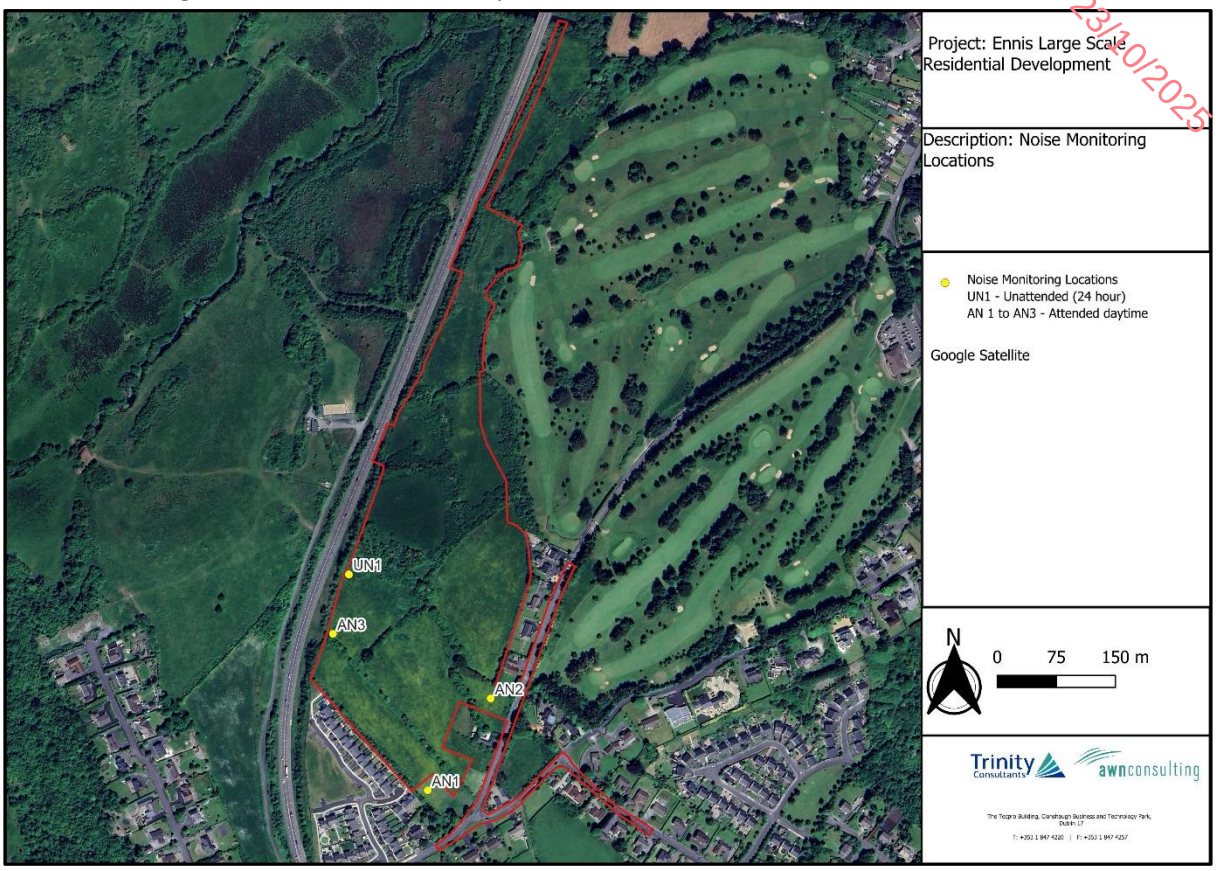


Figure 12-2

Table 12-8: Survey Locations and Periods

Ref	Description	Survey Period
UN1	Located on the western side on the development site near the N85 national road.	20 to 21 January 2025, logged over 15 minute intervals
AN1	Located at the south east boundary of the development site in close proximity to the Ballymacaula View residential estate, and the R474 roadway.	3 x 15 minute daytime attended measurements, 21 January 2024
AN2	Located at the eastern boundary of the development site in close proximity to nearby detached residential homes on the R474 roadway.	3 x 15 minute daytime attended measurements, 21 January 2024
AN3	Located on the western side on the development site near the N85 national road.	3 x 15 minute daytime attended measurements, 21 January 2024

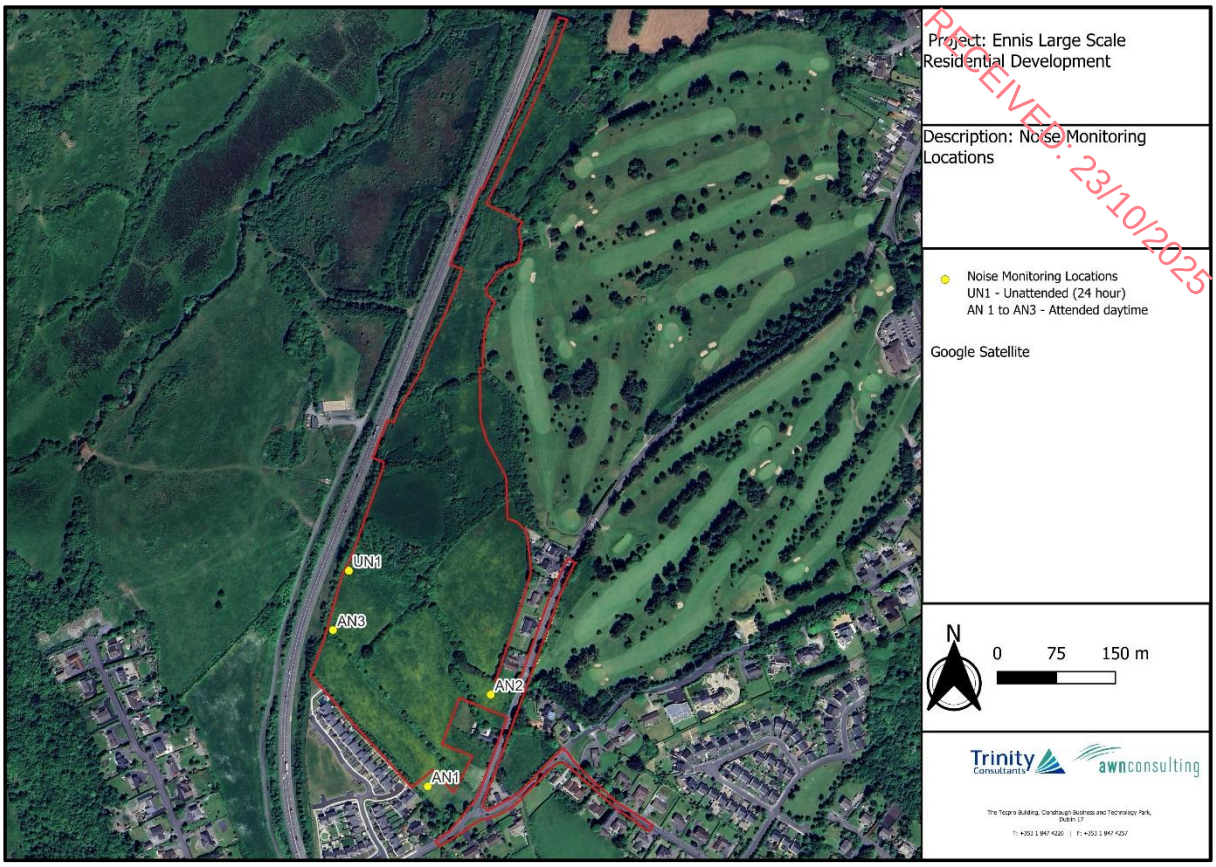


Figure 12-2: Noise Monitoring Locations

12.6.1.2 Survey Procedures

Baseline noise monitoring has been undertaken across the development site from 20 to 21 January 2025 to determine the range of noise levels at varying locations across the development site and to establish the existing noise climate the nearest existing noise sensitive locations as outlined in Table 12-8 and detailed further in Figure 12-3.

The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.*

12.6.1.3 Survey Equipment and Personal

The unattended and attended noise surveys were undertaken by AWN Consulting using Rion NL-52 sound level meter and a Larson Davis LxT1 sound level meter respectively and were calibrated using Bruel & Kjaer 4231 type calibrator.

Table 12-9: Noise Monitoring Equipment

Equipment	Serial Number	Calibration Date
Rion NL-52	186667	13/06/2023
Larson Davis LxT1	6122	29/03/2023
Bruel & Kjaer 4231	2394086	06/06/2024

12.6.1.4 Survey Parameters

The following measurement parameters were measured and are discussed within this chapter.

$L_{Aeq,T}$ is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value over the defined measurement period, T.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

$L_{A90,T}$ is the A-weighted sound level that is exceeded for 90% of the sample period; generally used to quantify background noise. The T is the sample period the parameter is measured over.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

12.6.1.5 Weather Conditions

Weather conditions during the unattended and attended surveys were calm and dry and did not adversely affect noise measurements.

12.6.1.6 Survey Results

Attended Survey Results

The survey results for the attended monitoring locations are presented in Table 12-10.

Table 12-10: Attended Noise Monitoring Results

Date	Location	Start Time	Measured Noise Levels (dB re.2x10-5Pa)		
			L_{Aeq}	L_{AMax}	L_{A90}
21 January 2025	AN1	09:58	52	64	45
		11:03	52	64	44
		12:03	53	64	44
	AN2	09:36	57	72	49
		10:43	56	68	43
		11:43	56	76	44
	AN3	10:19	55	72	49
		11:23	55	62	45
		12:23	55	64	46

The noise environment at location AN1 was dominated by road traffic noise on the R474. Road traffic on the R474 was intermittent in nature during the noise survey and during traffic lulls distant N85 road traffic became the dominant noise source in the environment. Other noise sources during the measurements included birdsong and trees rustling in a light breeze.

The noise environment at location AN2 was the similar to location AN1, dominated by road traffic noise on the R474 but the monitoring position was in closer proximity to the road side, representative of the rear facades of the existing NSLs facing on to the R474.

The noise environment at location AN3 was dominated by N85 road traffic noise. The traffic on this road was constant in nature and therefore for the duration of the measurements the N85 road traffic dominated the noise environment. Other audible noise in the environment were birdsong and foliage rustling in the light breeze.

12.6.1.6.1 Unattended Survey Results

Table 12-11 summarises the measured day, evening and night-time noise levels for location UN1. Subjective observations during the setup and removal of the monitoring equipment noted that the primary contributor to noise build-up was road traffic noise.

Table 12-11: Unattended Noise Monitoring Results

Date	Time	Measured Noise Levels (dB re.2x10-5Pa)		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
20 January 2025	Day (07:00 – 19:00)	64	73	52
	Eve (19:00 – 23:00)	61	72	44
	Night (23:00 – 07:00)	55	70	26
21 January 2025	Day (07:00 – 19:00)	65	74	55
Average	$L_{Aeq\ 16hr}$ (07:00-23:00)	64	-	51
	L_{night} (23:00 – 07:00)	55	-	26

12.7 The 'Do Nothing' Scenario

The Do Nothing scenario includes retention of the current site without the Proposed Development in place. In this scenario, noise levels at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

In the absence of the Proposed Development it is likely that a development of a similar nature would be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future even in the absence of the implementation of the development proposed in this EIAR.

12.8 Potential Significant Effects

The general commentary presented in the following sections are the same across the Proposed Development, unless otherwise indicated under the relevant headings.

12.8.1 Demolition Phase

It is understood that there is no demolition works taking place during the construction phase.

12.8.2 Construction Phase

12.8.2.1 Noise

A variety of items of plant will be in use for the purpose of site clearance and construction works. There will also be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise in the vicinity of existing NSLs. It is estimated that the overall duration of the three phase construction period will be approximately 36 months and hence impacts are temporary to short-term in nature at any one NSLs.

The proposed general construction hours are 08:00 to 18:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays.

As discussed in Section 12.4.2, the construction noise threshold (CNT)s are set using Category A from BS 8233-1 for the closest NSLs which sets the following threshold values.

- Daytime (07:00 – 19:00hrs weekdays) /Saturday AM: 65dB $L_{Aeq,12hr}$
- Evening and Weekends: 55dB $L_{Aeq,12hr}$

The main stages of construction will be progressed based on the following activities over the three construction stages (Phase 1,2,3). As the construction programme has been established in outline form only, construction noise associated with activities on site during this phase are reviewed for the purposes of determining the likely significant effects. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1:2009+A1:2014. This standard sets out sound power and sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels. However, it is not possible to conduct detailed accurate prediction calculations for the construction phase of a project due to the level of variability during different construction stages over short periods of time.

The following activities have been assessed to determine the likely potential noise impacts associate with the planned works across the three construction phases of the site.

<u>Site Clearance, Bulk Excavation, Foundations and Road Works</u>

For site clearance, bulk excavations and fill work, foundation and road works using excavators, loaders, dozers, concreting works, mobile cranes, generators, noise source levels are quoted in the range of 70 to 80 dB L_{Aeq} at distances of 10 m within BS 5228-1.

For ongoing construction activity associated with the above activities, a total construction noise level of 85 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations representing a variety of plant items and activities over this stage. This would include, for example two items of plant at 80 dB L_{Aeq} and three items of plant at 75 dB L_{Aeq} operating simultaneously within one work area resulting in a total noise level of 85 dB L_{Aeq}.

This scenario is a robust assumption made for a development of this size, on the basis that it is unlikely that more than 5 no. items of such plant/equipment would be operating simultaneously in such close

proximity to each other at all times. In reality items of construction plant and machinery will be operating at varying distances from any one NSL.

Superstructure and Landscaping Works

Given the nature of the proposed construction phases which will include standard residential house building techniques across the site, once the ground preparation and foundation works have been completed, a large portion of the work will involve manual labour and cranes with lower overall noise levels. For this phase of work, smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 78 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Rock Breaking and Crushing Works

For construction activities associated with rock breaking and rock crushing, excavators with rock breaking attachments, diggers, and HGVs are likely to be utilised. A total construction noise level of 92 dB $L_{Aeq,T}$ at 10m has been used for the purposes of indicative calculations, based on typical plant noise data from BS 5228-1:2009+A1:2014. This represents a worst-case scenario for simultaneous operation within one work area.

Indicative Construction Noise Calculations at Distance from Works

During Phase 1 of the construction works the closest NSLs (NSL 1 and 2) to the Proposed Development are residential dwellings to the south of the site between the N85 and R474, at distances ranging between 10m to 35m from the closest site works.

During Phase 2 of the construction works the closest NSLs (NSL 3) to the Proposed Development are residential dwellings to the east of the site along the R474, at distances ranging between 10m to 15m from the closest site works.

During Phase 3 of the construction works to the north of the site, the closest NSLs (NSL 3) to the southeast of the site are at 75m from the closest site works.

Further south east, the closest NSL (NSL 4) to the landscaping works along footpaths are along the Showgrounds Road approximately 10m from the closest site boundary.

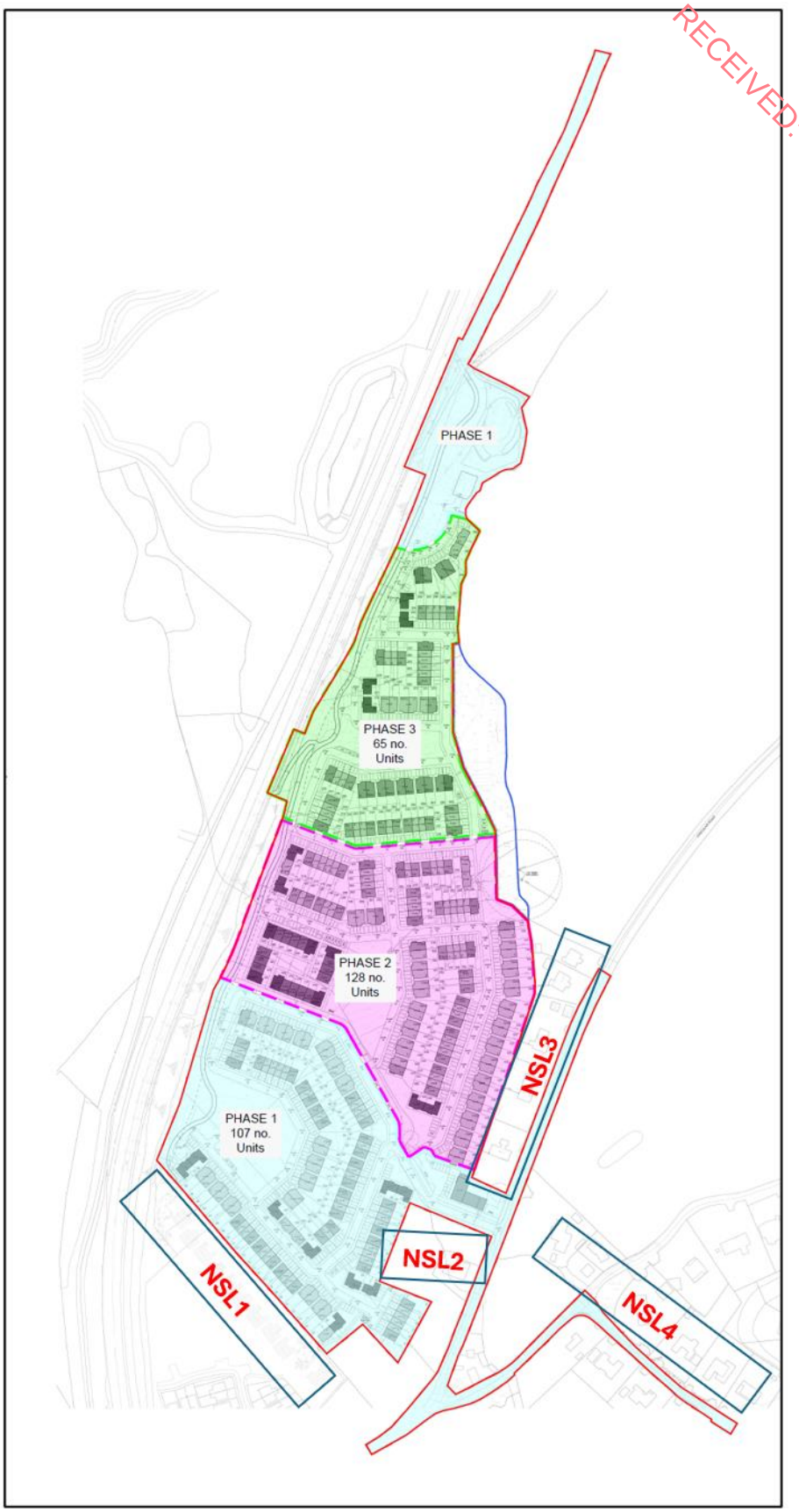


Figure 12-3: Closest NSLs to Proposed Development (Phases 1 -3)

Construction noise levels (CNL) have been calculated at the closest NSLs, assuming the construction noise activities and source noise levels discussed previously. The calculations assume that the equipment will operate for 66% of the working time. Table 12-12 summarises the result of this assessment.

Table 12-12: Indicative CNLs at Closest Distances

Construction phase	Sound pressure level at construction works, dB L_{Aeq}	Calculated noise levels at varying distances, dB $L_{Aeq,T}$						
		10m	15m	20m	35m	60m	75m	100m
Site Clearance, Bulk Excavation, Foundations, and Road Works	85	82	78	75	69	64	61	58
Superstructure, Compounds and Landscaping Works	78	75	71	68	62	57	54	51
Rock Breaking / Crushing	92	89	85	82	76	71	68	65

Site Clearance, Bulk Excavation and Foundations

The worst case predictions detailed in Table 12-12 indicate that construction activities can operate within the adopted construction noise thresholds of 65 dB $L_{Aeq,T}$ at the closest NSLs located at greater than 60m from building works with higher noise emissions associated with site clearance, excavations, road works etc, thus resulting in a negative, significant to very significant and temporary effect at NSLs immediately south and east of Phases 1 and 2 (NSL 1, 2 and 3). At all remaining NSLs the CNT will not be exceeded, thus resulting in a negative, not significant to slight and short-term effect at distances of 60m and beyond.

Superstructure and Landscaping Works

During the general construction working associated with house construction, compounds and landscaping works etc. the calculated noise levels in Table 12-12 indicate that construction activities can operate within the adopted construction noise thresholds of 65 dB $L_{Aeq,T}$ at distances greater than 25m from the general construction works. Therefore resulting in a negative, significant to very significant and temporary effect at NSLs immediately south and east of Phases 1 and 2 (NSL 1, 2, 3 and 4). At all remaining NSLs the CNT will not be exceeded, thus resulting in a negative, not significant to slight and short-term effect at distances of 25m and beyond.

The construction phase will be controlled through the use of construction noise threshold values which the contractor will be required to work within as much as is practicable. In this regard, the choice of plant, scheduling of works on site, provision of screening and other best practice control measures will be employed. Further discussion on construction noise and vibration control measures are included in Section 12.9.1.

Rock breaking and crushing

Worst-case predictions presented in Table 12-12 indicate that construction noise levels associated with rock breaking and crushing are likely to exceed the adopted threshold of 65 dB LAeq,T at all NSLs during Phase 1. These exceedances are expected to result in a negative, significant to very significant, and temporary effect at NSLs 1, 2, 3, and 4.

During Phase 2, exceedances of the threshold are predicted at NSLs 2 and 3 only, resulting in a negative, significant to very significant, and temporary effect at these locations. At the remaining NSLs, 1 and 4, the noise levels are predicted to remain below the adopted threshold, resulting in a negative, slight to moderate, and temporary effect.

Phase 3 rock breaking and crushing construction noise levels are predicted to remain below the adopted threshold, and as such, no significant noise effects are anticipated at any NSLs during this phase resulting in a negative, slight to moderate, and temporary effect.

12.8.2.2 Vibration

During site clearance and excavations activities, there is the potential for vibration to be generated through the ground. Empirical data for this activity is not provided in BS 5228–2, however the likely levels of vibration from this activity will be significantly below the vibration criteria for building damage based on monitoring data and experience from other sites. AWN Consulting has previously conducted vibration measurements under controlled conditions, during trial construction works on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances.

Peak vibration levels during staged activities using the 3 tonne breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 tonne breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

Whilst these measurements relate to a solid concrete slab, the range of values recorded provides some context in relation to typical ranges of vibration generated by general construction activity.

With respect to the potential vibration impact, the only significant source of vibration is expected to be due to rock breaking, excavations and foundation activities. The distance between the areas where these activities are to occur and the nearest NSLs are such that all vibration transmission would be orders of magnitude below recommended guideline criteria for building response in Table 12-3.

In terms of human response within buildings, there is potential for vibration magnitudes during breaking to be perceptible at low level at NSLs within 50m (NSLs 1, 2 and 3). Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, slight to moderate and temporary impact at the closest NSLs within 50m and a negative, not significant and temporary impact at NSLs at further distances.

Mitigation measures and recommended good practices have been outlined in Section 12.9.1.

12.8.2.3 Construction Traffic

Based on the information provided by Tobin Consulting Engineers it is anticipated that during the busiest period onsite, namely the groundworks element of the works, an estimated 12 no. HGV's will deliver to the site on a daily basis for the duration of this work element. Therefore it has been assumed that no more than 8 no. HGV peak vehicle movements will be carried out in a one hour period during the construction works. It is assumed that all of the HGVs will enter / exit the site via R474. The nearest NSL to the site entrance is at 10m (NSL2).

The noise level associated with an event of short duration, such as a passing vehicle movement, may be expressed in terms of its Sound Exposure Level (L_{AX}). The mean value of Sound Exposure Level (SEL) for a truck at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 85 dB L_{AX} at a distance of 10 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10Log_{10}(N) - 10Log_{10}(T) + 20Log_{10}\left(\frac{r_1}{r_2}\right) dB$$

where: -

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds).

L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB).

N is the number of events over the course of time period T.

r_1 is the distance at which L_{AX} is expressed.

r_2 is the distance to the assessment location.

The predicted noise level at the nearest residential NSLs (10m) is in the order of 58 dB $L_{Aeq,1hr}$ and is therefore below the CNT of 65 dB $L_{Aeq,1hr}$ at the closest residential NSLs along R474. This is comparable to the baseline monitoring results that were in the range between 56 to 57 dB $L_{Aeq,1hr}$ at 10m from the road side and remains below the CNT of 65 dB $L_{Aeq,1hr}$.

Therefore, it is expected in the absence of specific mitigation measures that there will be a negative, not significant and medium-term impact at the closest receptors.

No further mitigation measures would therefore be required.

12.8.3 Operational Phase

Once the proposed development is operational, the potential noise impacts to the surrounding environment are predicted to be minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing, etc.) and, hence, no significant impact are predicted in this regard.

The main potential noise impact associated with the proposed development is considered, therefore, to relate to the generation of additional traffic to and from the site as a result of the new residential buildings. Potential noise impacts from the Proposed Development also relate to operational plant serving the creche building.

Once operational, there are no noteworthy sources of vibration associated with the development site.

12.8.3.1 Additional Vehicular Traffic on Surrounding Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

A traffic impact assessment relating to the proposed development has been prepared by Tobin Consulting Engineers as part of this EIAR.

Traffic flows along the surrounding road network in terms of Annual Average Daily Traffic (AADT) for the Do Nothing (DN) and Do Something (DS) scenarios have been reviewed to calculate the change in traffic noise.

Table 12-13 summarises the AADT for the Proposed Development DN and DS scenarios across two links.

Table 12-13: Summary of Change in Noise Level, for Years 2026 and 2041

Link Road	DN AADT 2026	DS AADT 2026	Increase in noise level dB	DN AADT 2041	DS AADT 2041	Increase in noise level dB
N85	15878	16062	0.0	17752	17950	0.0
R474	6756	7083	+0.2	7520	7847	+0.2

The predicted increase in AADT traffic levels along the local road network surrounding the Proposed Development range between 0.0 to 0.2 dB(A) for the opening year 2026. During the future design year 2041, the calculated increase in traffic noise levels range between 0.0 to 0.2 dB(A). Reference to Table 12-6 confirms that the traffic noise level increases for both assessment years along the two closest road links are neutral to negative, imperceptible to not significant and long-term.

12.8.3.2 Building Services Plant

Once operational, there will be building services plant items required to serve the residential and crèche building aspects of the proposed development. The specific requirements for mechanical and electrical plant items for each element of the residential buildings and crèche building have not yet been progressed at this stage of the design. Most of this plant will be capable of generating noise to some degree and may operate 24 hours a day. It would, therefore, be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties as well as louder plant areas on roofs would potentially have the greatest impact.

Plant items will be selected, designed and located so that there is no adverse impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the Proposed Development will be designed/attenuated to not exceed the internal noise levels discussed in Table 12.7.

Taking into account that sensitive receptors within the proposed development are much closer than off-site sensitive receptors, once the relevant noise criteria are achieved within the proposed development, it is expected that there will be no significant negative impact to sensitive receptors off site.

12.8.3.3 Creche Playground

Measurement of noise levels generated by children playing outdoors at several crèches and kindergartens indicate typical noise levels in the order of 56 dB $L_{Aeq,1hr}$ at distance of 5 metres. The nearest existing off-site noise sensitive locations to the east are approximately 20m from the Crèche play area (NSL3). Considering the distance, activities from the crèche are calculated to be 44 dB $L_{Aeq,1hr}$ and hence, is more than 10 dB below the range of baseline noise levels recorded to the east of the site at Location AN2, representing of properties set back from road traffic. The resultant noise impact is therefore neutral, not significant and long-term.

12.8.4 Cumulative Effects

For the purpose of the cumulative assessment, two scenarios have been considered.

The first scenario is a review of the cumulative construction impacts from the Proposed Development LRD Phase 1, 2 and Phase 3. For the construction assessment it has been assumed that Phase 1, 2 and Phase 3 construction occurs simultaneously. The closest NSLs to the cumulative site redline boundary have been considered.

The second scenario is a review of approved and proposed developments in the local area which are external to the cumulative site, as summarised in Chapter 1, Section 1.9 of this EIAR.

12.8.4.1 Cumulative Construction Noise Assessment – Scenario One

The closest residential NSLs to the Proposed Development are indicated in Figure 12-4 e.g. NSL 1 to NSL 4, as previously presented in Section 12.8.2.1. During Phase 1 and Phase 2 if construction works were to occur simultaneously at the site boundary the resultant construction noise level at NSL3 would range between 73 to 84 dB $L_{Aeq,T}$ during construction works. Therefore resulting in a negative, significant to very significant and temporary effect at the NSL3 immediately east of Phases 1 and 2, however it is noted that this is a highly conservative assessment.

The construction phase will be controlled through the use of construction noise threshold values which the contractor will be required to work within as much as is practicable. In this regard, the choice of plant, scheduling of works on site, provision of screening and other best practice control measures will be employed. Further discussion on construction noise and vibration control measures are included in Section 12.9.1.

12.8.4.2 Cumulative Construction Vibration– Scenario One

The closest NSLs in the cumulative assessment are set back at similar or further distances from the proposed construction works than those outlined in Section 12.8.2.2. Therefore the impacts assessed will not be higher under the cumulative assessment. All construction works can operate within the limit values presented in Table 12-3 for buildings.

The predicted cumulative vibration impact on human comfort during the construction phase is negative, slight to moderate and temporary impact at the closest NSLs.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 12-3. Mitigation measures and recommended good practices have been outlined in Section 12.9.1.1.

12.8.4.3 Cumulative Construction Noise Assessment – Scenario Two

There are a number of approved applications in the local area as outlined in Chapter 1. Depending on the proximity of the construction works to the nearest NSLs it is possible that cumulative impacts could occur at the nearest receptors to the cumulative site (Phase 1, 2 and Phase 3) should all sites progress construction simultaneously. The closest NSL with potential cumulative impacts relate to the NSLs located along the redline boundary of the cumulative site and other developments along the R474 and Drumbiggle Road.

The following developments in Table 12-14 are under consideration due to their proximity to the closest NSLs:

Table 12-14: Projects Considered for Cumulative Impacts

Proposal/Application Ref.	Development Description	Distance to Proposed Development Site
24/60086	48 no. residential units	3.7km
24/122 extension of duration to 17/977	51 no. residential units	1.5km
24/60652	74 no. residential units	2.1km

The three developments listed in the table above are all at distances greater than 1 km from the Proposed Development. Therefore the construction noise from these sites is expected to be significantly below the predicted noise levels at the closest NSLs (NSL1-4) for the Proposed Development i.e. logarithmically they will be at least 10 dB below the predicted noise levels in Section 12.8.2.1 and there will be no cumulative effect.

12.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 12-15 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction noise from site clearance, bulk excavation, road works and foundations	Negative	NSL1, NSL2 and NSL3 – significant to very significant NSL4 – slight	Closest receptors at NSL1 to NSL3 within 35m of the proposed works	Likely	Short- term	Direct / Worst-Case
Construction noise from superstructure and landscaping works		NSL1, NSL2, NSL3 and NSL4 – significant to very significant All other NSLs at distance greater than 25m – not significant to slight	Closest receptors at NSL1 to NSL4 within 15m of the proposed works	Likely	Short- term	Direct / Worst-Case
Construction traffic noise	Negative	Not significant	At all receptors	Likely	Temporary	Direct / Worst-Case
Construction vibration damage to buildings	Negative	Not significant	At all receptors	Likely	Temporary	Direct / Worst-Case
Construction vibration human perception	Negative	Slight to moderate	NSL1 to NSL3 within 50m of site boundary	Likely	Temporary	Direct / Worst-Case
		Not significant	All other receptors	Likely	Short-term	
Cumulative construction noise scenario 1	Negative	NSL3 – significant to very significant	Closest receptors at NSL3	Likely	Temporary	Direct / Worst-Case
Cumulative construction vibration scenario 1	Negative	Not significant for vibration damage to buildings	At all receptors	Likely	Temporary	Direct / Worst-Case
		Slight to moderate for human perception at NSL3 within 50m of Phase 1 and Phase 2 site boundaries	NSL1 to NSL3 within 50m of site boundary	Likely	Temporary	

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
		Not significant	All other receptors	Likely	Short-term	
Cumulative construction noise scenario 2	Negative	NSL1, NSL2 and NSL3 – significant to very significant NSL4 – slight	Closest receptors at NSL1 to NSL3 within 35m of the proposed works	Likely	Short- term	Direct / Worst-Case

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 12-16 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Additional vehicular traffic noise	Neutral	N85 – imperceptible	All receptors	Likely	Long-term	Direct / Worst-Case
	Negative	R474 –not significant				
Building services plant noise	Negative	Not significant	Closest receptors at NSL1, NSL2 and NSL3	Likely	Long-term	Direct / Worst-Case
Creche playground noise	Neutral	Not significant	Closest receptors at NSL3	Likely	Long-term	Direct / Worst-Case

12.9 Mitigation Measures

The following mitigation measures are outlined for the Proposed Development but are also applicable in the cumulative site scenario i.e. Phase 1, 2 and 3 constructed simultaneously.

12.9.1 Construction Phase Mitigation

Mitigation measures for the construction phase are set out below in order to reduce potential impacts as far as practicable to within the adopted design goals for noise and vibration.

12.9.1.1 Construction Stage

The assessment detailed in Section 12.8.2.1 has determined that the construction activities of *Site Clearance, Bulk Excavation, Foundations, and Road Works* and *Superstructure, Compounds and Landscaping Works* can typically operate within the adopted construction noise threshold levels at the closest off-site NSLs when carried out at distances greater than 60m from the main phases of the construction works. There is potential for the Construction Noise Threshold value to be exceeded due to rock breaking and rock crushing activities during Phases 1 and 2. During Phase 1, exceedances are predicted at all NSLs (1, 2, 3, and 4). In Phase 2, exceedances are expected only at NSLs 2 and 3. These works will be temporary in duration and are scheduled to occur during periods considered least disruptive to surrounding stakeholders — such as mid-morning to mid-afternoon on weekdays, when the majority of nearby residents are likely to be at work or school. During Phase 3, predicted noise levels are not expected to exceed the threshold at any NSL, and therefore no significant noise effects are anticipated for that phase.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 12-3**Error! Reference source not found.** to avoid any cosmetic damage to buildings.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant
- Control of noise sources
- Screening
- Hours of work
- Liaison with the public

Further comment is offered on these items in the following paragraphs.

Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

<u>Selection of Quiet Plant</u>

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

<u>Noise Control at Source</u>

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be considered:

- Site compounds will be located away from noise sensitive boundaries within the site constraints.
- The use of lifting bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver.

The length of the screen should in practice be at least five times the height, however, if shorter sections are necessary then the ends of the screen will be wrapped around the source. BS 5228 - *1:2009+A1* states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice, screens constructed of materials with a mass per unit of surface area greater than 10kg/m^2 will give adequate sound insulation performance.

Post-mitigation construction noise calculations assume a partial line of sight (-5dB) is achieved using a solid 2.4m high standard construction site hoarding.

Annex B of *BS 5228-1:2009+A1:2014* (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.

In addition, careful planning of the site layout will also be considered. The placement of temporary site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening during the phasing of works.

Hours of Work

Construction works will be undertaken within the times below:

- Monday to Friday: 07:00 to 19:00hrs
- Saturdays: 08:00 to 14:00hrs
- Sunday and Public Holidays No noisy work on site.

However, it may be necessary for some construction operations to be undertaken outside these times, for example, to facilitate connections to public service systems or utilities. Such works will be agreed in advance with the local authority.

In the case of rock breaking the following time periods shall be adhered to and confirmed at construction stage:

- Monday to Friday: 08:15 – 17:45hrs
- Saturday/Sunday/Bank Holidays – No rock breaking

The contractor may additionally consider scheduling rock-breaking activities during periods considered least disruptive to surrounding stakeholders, such as mid-morning to mid-afternoon hours on weekdays (when the majority of nearby residents may be at work or school).

Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Vibration

On review of the likely vibration levels associated with construction activities, it may be concluded that the construction of the proposed development is not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to adjacent buildings.

In the case of vibration levels giving rise to human discomfort, in order to minimise such impacts, the following measures shall be implemented during the construction period: -

- A clear communication programme will be established to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to

exceed perceptible levels. The nature and duration of the works will be clearly set out in all communication circulars;

- Appropriate vibration isolation shall be applied to plant, where feasible;
- Monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. The potential for cumulative works occurring both within the site and at any external sites with potential to generate significant noise effects will be reviewed in terms of limiting the duration and scale of these effects.

12.9.2 Operational Phase Mitigation

Mitigation measures for the operational phase are set out below.

12.9.2.1 Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the impact of traffic from the development are not deemed necessary.

12.9.2.2 Mechanical Services Plant

Proprietary noise and vibration control measures will be employed as part of the detailed design in order to ensure that noise emissions from building services plant do not exceed the relevant internal noise criteria within

Table 12-7 for residential dwellings within the proposed development. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. Considering that sensitive receptors within the development are much closer than off-site sensitive receptors, once the relevant noise criteria is achieved within the development, there are no mitigation requirements to control building services and plant at off-site NSLs.

12.9.2.3 Inward Noise

In terms of the inward noise impact of road traffic on the development buildings and amenity areas, Appendix 12.1 sets out the approach for controlling noise levels across the site.

The majority of the Proposed LRD Phases 1-3 Development site has been categorised as a ***Negligible*** *to* ***Low Risk*** in accordance with ProPG. The LRD Phases 1-3 Western Section (Unit Type G in Phase 1, Type F in Phase 2 and 3 only) have been categorised as a ***Low*** *to* ***Medium Risk*** (see further details in Appendix 12.1). Review of the location of residential buildings on site and the external noise levels, the assessment has determined that specific noise mitigation measures are not required to the site boundary or site buildings to control noise intrusion to internal spaces or to control noise in the external amenity spaces.

12.9.3 Cumulative Mitigation

The same design guidance applies to all elements of the development and to the Ennis LRD development as a whole. In this instance, there are no additional noise mitigation measures over and above those set out in Sections 12.9.1 and 12.9.2 for the construction and operational phases.

12.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

12.10.1 Construction Phase

12.10.1.1 Noise

During the construction phase of the project there is the potential for temporary to short-term noise effects on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable. For the duration of the construction period, construction noise impacts will be short-term and negative, depending on the proximity of the works to the site boundary.

During site clearance the residual effect is **negative, significant to very significant and temporary** for noise impact at distances up to 10m for NSL 1 in Phase 1 and NSL3 in Phase 2 if all plant items were assumed to work simultaneously while adjacent to the closest boundary to the site. In line with DMRB Noise and Vibration (UKHE 2020) document, a significant effect relating to construction noise is deemed to occur where a moderate or major impact is likely to occur for a period of greater that 10 days/nights over 15 consecutive day/nights, or greater than 40 days over 6 consecutive months. In

the case of this activity, it is unlikely the durations will be exceeded and hence the overall residual effect is categorised as **negative, moderate and temporary**. At all other NSLs at distances of 20m and greater the CNT would not be exceeded and the residual significance of effect is **negative, slight to moderate and temporary**.

During super structure, compounds and landscaping the residual effect is **negative, not significant to moderate and temporary** at all NSLs (greater than 10m from works) during all phases of the construction.

During rock breaking and crushing activities, the residual noise effect is predicted to be **negative, significant to very significant, and temporary** at distances up to 60m from the works, assuming all plant items operate simultaneously adjacent to the closest site boundary. This applies to all NSLs during Phase 1, and to NSL 3 during Phase 2, where exceedances of the Construction Noise Threshold (CNT) are predicted.

At distances of 60m and greater, the CNT is not expected to be exceeded at any NSLs, and the residual significance of effect is considered **negative, slight to moderate, and temporary.**

During Phase 3, noise levels are predicted to remain below the CNT at all NSLs, and therefore no significant residual noise effects are anticipated.

12.10.1.2Vibration

Likely noise and vibration effects during the construction phase will be **negative, slight to moderate and temporary**.

12.10.2 Operational Phase

12.10.2.1 Additional Vehicular Traffic on Surrounding Roads

In the context of the existing noise environment, the overall contribution of traffic is not considered to pose any significant impact to nearby residential locations. The resulting residual effect is **neutral to negative, imperceptible to not significant, and long-term.**

12.10.2.2 Building Services Plant

There are no sources of mechanical or electrical plant associated with the building types across the development with potential to emit audible noise levels beyond the site boundary at off-site NSLs. Any required plant items will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself.

In this instance, best practice is to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the proposed development. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the proposed development will be designed/attenuated to not exceed the internal noise levels discussed in

Table 12-7. Once the relevant noise criteria are not exceeded within the proposed development, the related noise impact to existing NSLs offsite will be **negative, not significant and long-term.**

12.10.2.3 Inward Noise

The results of the baseline survey have determined the noise climate along the western site boundary bordering the N85, have the highest day and night-time noise levels measured during the baseline study (UN1). The measured noise levels (see Appendix 12.1 for full details) indicate that with standard double glazing and mechanical ventilation good and reasonable internal noise levels can be achieved with windows open for all dwellings. The exception to this are the western facing bedrooms to the immediate western boundary of the site overlooking the N85 (Unit Type G in Phase 1, Type F in Phase 2 and 3 only), which can achieve good internal levels with windows closed. The resultant residual inward noise effect will be of **neutral, not significant and long term**.

12.10.3 Summary of Post-mitigation Effects

The following Table summarises the residual effects during the construction phase of the Proposed Development following the application of mitigation measures for effects identified as significant pre-mitigation.

Table 12.20 Summary of Construction Phase Effects Post-Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction noise from site clearance, bulk excavation, road works and foundations	Negative	NSL1 and NSL3 – moderate	Closest receptors at NSL1 and NSL3 within 20m of the proposed works	Likely	Short- term	Direct / Worst-Case
		All other NSLs – slight to moderate				
Construction noise from superstructure and landscaping works		All NSLs at distance greater than 10m – not significant to moderate	All NSLs	Likely	Short- term	Direct / Worst-Case
Construction vibration human perception	Negative	Slight to moderate	NSL1 to NSL3 within 50m of site boundary	Likely	Temporary	Direct / Worst-Case
		Not significant	All other receptors	Likely	Short-term	

The following Table summarises the residual effects during the operational phase of the proposed development following the application of mitigation measures for effects identified as significant pre-mitigation.

Table 12-17: Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Building services plant noise	Negative	Not significant	Closest receptors at NSL1 to NSL3.	Likely	Long-term	Direct / Worst-Case
Inward impact noise	Neutral	Not significant	All units within proposed development	Likely	Long-term	Direct / Worst-Case

12.10.4 Cumulative Residual Effects

12.10.4.1 Construction Stage

The similar magnitude of residual noise and vibration impacts discussed in Section 12.10.1 for the Proposed Development are relevant to the full Ennis development (Phases 1-3), given the same construction noise and vibration criteria will apply to all phases. Table below summarises the cumulative residual effects post mitigation.

Table 12-18: Summary of Cumulative Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Cumulative construction noise scenario 1	Negative	NSL3 – moderate	Closest receptors at NSL3	Likely	Temporary	Direct / Worst-Case
Cumulative construction vibration scenario 1	Negative	Not significant for vibration damage to buildings	At all receptors	Likely	Temporary	Direct / Worst-Case
		Slight to moderate for human perception at NSL3 within 50m of Phase 1 and Phase 2 site boundaries	NSL1 to NSL3 within 50m of site boundary	Likely	Temporary	

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
		Not significant	All other receptors	Likely	Short-term	
Cumulative construction noise scenario 2	Negative	All NSLs - not significant to moderate	All NSLs at distance greater than 10m	Likely	Short- term	Direct / Worst-Case

12.10.4.2 Operational Stage

There were no significant effects identified for the cumulative operational phase pre-mitigation. The similar magnitude of residual noise and vibration impacts discussed in Section 12.10.2 for the proposed development are relevant to the cumulative site given the same operational noise criteria will apply to all phases.

12.11 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to noise and vibration associated with the proposed development and the cumulative development.

12.12 Worst Case Scenario

In terms of construction phase impacts, worst-case assumptions regarding volumes of excavation materials and number of vehicle movements have been used in order to determine the highest level of mitigation required in relation to potential noise impacts (see Section 12.8.2). The proposed development is the worst-case scenario in terms of noise emissions, emissions from each individual phase will be lower than the cumulative proposed development.

Worst-case traffic data was used in the assessment of construction and operational phase impacts. In addition, conservative background concentrations were used in order to ensure a robust assessment. Thus, the predicted results of the construction and operational stage assessment are worst-case and the significance of effects is most likely overestimated.

12.13 Significant Interactions

The potential interaction between noise and vibration and other specialist chapters in the EIAR is primarily limited to Chapter 4 (Population & Human Health), Chapter 11 (Biodiversity) and Chapter 6 (Material Assets - Traffic & Transportation). This chapter has been prepared in consideration of and in conjunction with the relevant elements of these chapters. For example noise and vibration impacts associated with the Proposed Development have been fully considered within this Chapter of the EIA Report. However, commentary on the impact assessment and related noise levels are also summarised specifically with respect to potential human health impacts in Chapter 4. The traffic flow

projections associated with the development provided by the traffic consultants in Chapter 6 (Material Assets - Traffic & Transportation) has been utilised in the construction and operational noise calculations in this Chapter of the EIAR report.

12.14 Monitoring

The following monitoring measures are required to be implemented at the site for the project to ensure that construction activities do not cause excessive nuisance to receptors in the vicinity of the site.

12.14.1 Noise Monitoring

During the construction phase, the appointed contractor will monitor noise at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise will be monitored in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

The selection of monitoring locations will be based on the closest NSLs to the proposed works which have the potential to exceed the CNT, i.e., at NSL1 and NSL3 to the southern and eastern site boundaries.

Any Noise Monitoring Terminal (NMT) (number and locations to be agreed post-consent with Local Authority), to be installed will have the following specifications (or similar approved):

- Logging of two concurrent periods, e.g., 15-minute & hourly.
- Daily automated Charge Injection Calibration (CIC).
- E-mail alert on threshold exceedance.
- E-mail alert on low battery and low memory.
- Remote access to measured data.
- Live display of noise levels.

In addition, it is recommended that spot-check noise measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have the potential to generate high levels of noise on site in order to confirm the potential extent of effects.

A monthly noise-monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

12.14.2 Vibration Monitoring

Where the excavation works take place within 50m of vibration-sensitive locations (VSLs) e.g. NSL1 to NSL3 vibration monitoring shall be installed, with the number and locations to be agreed with Local Authority.

Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.

The mounting of the transducer to the vibrating structure will need to comply with BS ISO 5348: 2021: Mechanical vibration and shock – Mechanical mounting of accelerometers.

In summary, the following ideal mounting conditions apply:

- The transducer and its mountings should be as rigid as possible;
- The mounting surfaces should be as clean and flat as possible;
- Simple symmetric mountings are best;
- The mass of the mounting should be small in comparison to that of the structure under test;
- The monitoring equipment should be set to monitor vibration in 5-minute periods;
- E-mail alert on threshold exceedance;
- E-mail alert on low battery and low memory;
- Remote access to measured data;
- Live display of vibration levels.

In addition, it is recommended that spot-check vibration measurements are conducted on a monthly basis. These spot checks can be organised to coincide with works that have potential to generate high levels of vibration on site in order to confirm the potential extent of effects.

A monthly vibration monitoring report should be prepared by the contractor. Reports should identify any exceedances above nominal limit values and attempts to clarify the causes. Where remedial measures are required and identifiable, these should also be clearly stated.

No monitoring is required for the operational phase.

12.15 Summary of Mitigation and Monitoring

There are no significant residual effects during the construction or operational phases of the development. The following Table summarises the construction phase mitigation and monitoring measures.

Table 12-19: Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Site clearance, bulk excavation, road works, foundations and rock breaking / crushing.	Selection of quiet plant; control of noise sources; screening, controlling; hours of work; liaison with the public.	NSL1, NSL 2 and NSL3
Vibration	Liaison with the public; appropriate vibration isolation shall be applied to plant; monitoring will be undertaken at southern site boundary in close proximity to NSL1 and eastern site boundary in close proximity to NSL2 and NSL3.	NSL1, NSL2 and NSL3

The following Table summarises the operational phase mitigation and monitoring measures.

Table 12-20: Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Building services plant noise	Selection of quiet plant at detailed design stage to ensure adherence to criteria outlined in Table 12-7.	Not applicable
Inward impact noise	None - to be confirmed at detailed design stage to ensure adherence to criteria outlined in Table 12-7.	Not applicable

12.16 Conclusion

AWN Consulting have undertaken an assessment of the potential noise and vibration impacts as a result of the proposed development. A range of mitigation measures have been specified for the construction stages, with no specific mitigation required for the operational stage.

The potential impacts associated with the site and its various construction phases have been assessed. The findings indicate that noise mitigation measures will be required to reduce impacts at the nearest NSLs during certain stages of construction. The early phases — particularly site clearance, excavation, and rock breaking — are expected to generate the highest noise levels. Although the duration of these activities at any one location is likely to be temporary, targeted mitigation strategies will be necessary to reduce noise levels as far as reasonably practicable, and to minimise any avoidable significant effects.

Following the implementation of these mitigation measures, the worst-case residual construction noise and vibration impacts are expected to be negative, temporary, and significant to very significant at the closest NSLs during the early stages of construction. These impacts are anticipated to reduce to slight to moderate during the more prolonged general construction phase.

The ProPG inward impact assessment has identified that the proposed units located at the immediate western edge of the development boundary will achieve suitable internal noise levels with standard double glazing. The resultant residual inward noise effect will be of neutral, not significant and long term.

12.17 References and Sources

- Clare County Council Noise Action Plan 2024-2028.
- ANC, IOA & CIEH (2017). ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development.
- British Standard BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.
- British Standard BS 5228: 2009 +A1:2014: Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise & Part 2: Vibration.

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- Department of Transport Welsh Office, HMSO (1988). Calculation of Road Traffic Noise.
- EPA (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports.
- ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.
- ISO 9613-2: 2024: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.
- United Kingdom Highways England (now National Highways) (UKHE) Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UKHE, 2020).