Environmental Impact Assessment Report

Volume 2 – EIAR

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Prepared for: Kirkland Investments Limited

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1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) is provided on behalf of Kirkland Investments Limited (hereinafter referred to as 'the Applicant') to support a planning application made to Limerick City and County Council (LCCC).

This EIAR has been prepared in respect of the construction of a Large Residential Development (LRD) on a site of approximately 6.18 hectares located at Singland, Dublin Road (R445), Limerick, Co. Limerick (hereinafter referred to as the "Site"). Figure 1-1 below shows the location of the Proposed Development (Aerial View).

The proposed development consists of five blocks accommodating a total of 403 no. residential units, ranging in height from five to eight storeys. In addition, the scheme includes a creche at ground level within Block B, a medical centre located on the western edge of the site, and all associated site works and infrastructure (hereinafter referred to as the "Proposed Development").

In this chapter of the EIAR, the Proposed Development is introduced, the Environmental Impact Assessment (EIA) process is summarised, and it provides an overview of the methodology used for preparing the EIAR, the competency of the EIAR authors, the consultation undertaken, as well as details of any additional environmental related reports and/or assessments required under Legalisation or EU Directives other than the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU).

A detailed description of the development is contained in Chapter 2 (Description of the Proposed Development) of this EIAR.

Figure 1-1 Aerial View of Proposed Development Site Location with indicative site boundary outlined in red (Source: Google Earth, 2026)

1.2 Requirement for Environmental Impact Assessment

1.2.1 Relevant Legislation, Policy, and Guidelines

This EIA Report has been prepared in accordance with the most relevant guidance and legalisation, including the following:

- EIA Directive (2011/92/EU) as amended by EIA Directive (2014/52/EU);
- Planning and Development Act 2000 (as amended), insofar as relevant provisions remain in force;
- Planning and Development Act 2024 (No. 34 of 2024). A revised consolidated version of the Act is available; however, the Act has not yet been fully commenced;
- Planning and Development Regulations 2001 (as amended);
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Housing, Planning and Local Government, 2018);
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022);
- *Environmental Impact Assessment of Projects Guidance on Scoping* (Directive 2011/92/EU as amended) (European Commission, 2017);
- *Environmental Impact Assessment of Projects Guidance on Screening* (Directive 2011/92/EU as amended) (European Commission, 2017); and
- *Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017)

1.2.2 Background

EIA is an essential tool in the implementation of EU environmental legislation. According to the Guidelines for Planning Authorities and An Coimisiún Pleanála (ACP) on carrying out Environmental Impact Assessment (August 2018) the objective of the Directive 2011/92/EU as amended by 2014/52/EU ('the EIA Directive'), is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of public and private developments that are likely to have significant effects on the environment. The requirement for EIAR is set out in the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU); the EIA Directives have been transposed into existing Irish planning consent procedures i.e., the Planning and Development Act 2000 as amended (the Act) and Planning and Development Regulations, 2001 as amended (the Regulations).

The process involves the preparation of an EIAR by the Applicant. This report is then subjected to review by the competent authority, who will also consult with the public, relevant prescribed bodies. The competent authority will consider the EIAR as well as any other pertinent information before arriving at a reasoned conclusion regarding the probable significant effects of the Proposed Development on the environment.

1.2.3 EIA Project Thresholds

The EIA Directive lists projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II) of the EIA Directive (2011/92/EU and 2014/52/EU), these Annex are transposed into Schedule 5 of the Planning and Development Regulations 2001, as amended. The EU Member States can choose to apply thresholds for Annex II projects or use a case-by-case examination, or a combination of both, to assess where EIA is required. In Ireland, a combination of both has been applied.

Ireland's type of projects for which an EIA is mandatory is set out in the Schedule 5 Part 1 and Part 2 of the Regulations. The EPA Guidance (2022) requires an assessment beyond the general description of the project and to consider the component parts of the project and/or any processes arising from it. In considering the wider context and the component parts of the Proposed Development. AWN have identified the thresholds of relevance to the proposal from Part 2 of Schedule 5; outlined in Table 1-1.

Table 1-1 Relevant Part 2 Schedule 5 Thresholds for EIA and determination of EIA requirement.

Development for the Purposes of:	Related Development Details	Exceeds Threshold?
10. Infrastructure Projects (b) (i) Construction of more than 500 dwelling units.	The Proposed Development involves the construction of 403 no. dwelling units. The Proposed Development site is not equal to nor does it exceed the limit, quantity or threshold set out in Class 10(b)(i); therefore, an EIA is not mandatory under this Project Class.	No – EIA is not mandatory under this class.

Development for the Purposes of:	Related Development Details	Exceeds Threshold?
10. Infrastructure Projects (b) (iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere. (In this paragraph, *"business district" means a district within a city or town in which the predominant land use is retail or commercial use*).	The Proposed Development Site is located at Singland, Dublin Road, Limerick and is c. 6.18 hectares in extent. The site is situated immediately adjacent to the Parkway Retail Park and Parkway Shopping Centre to the west, with additional retail warehousing and commercial uses located along the Dublin Road (R445) and Childers Road. In this context, there is a reasonable basis on which the site could be considered to fall within or form part of a "business district", in which case the 2-hectare threshold would apply. However, it is acknowledged that the wider surrounding area is predominantly residential in character, with established housing estates at Castletroy View, Carn Na Ree and Chesterfield to the south and southwest, and the Groody Valley to the east. On this basis, the site could also reasonably be characterised as falling within "other parts of a built-up area," in which case the applicable threshold would be 10 hectares.	Uncertain. The site exceeds the 2-hectare threshold applicable to "business districts" but falls below the 10-hectare threshold applicable to "other parts of a built-up area". Adopting a precautionary approach, an EIAR has been prepared.

The Site is therefore considered to occupy a transitional location between a "business district" and a predominantly residential part of the built-up area, and there is some inherent uncertainty as to which threshold category applies under Schedule 5, Part 2, Class 10(b)(iv) of the Regulations. Notwithstanding this uncertainty, and adopting a precautionary approach, the Applicant has elected to prepare this EIAR to provide information on the likelihood of significant effects from the project (including demolition, construction, and operation) on the environment, and to fully address and assess all potential and residual (post-mitigation) environmental effects.

Furthermore, it is noted that even in the event that the site is deemed to fall within "other parts of a built-up area" and the 10-hectare threshold applies under Schedule 5, Part 2, Class 10(b)(iv) of the Regulations, the scale, nature and location of the Proposed Development, including its proximity to the Groody River and associated Natura 2000 sites downstream, are such that the preparation of an EIAR is considered appropriate and prudent.

1.3 Methodology and Format of the EIA Report

1.3.1 EIAR Main Structure

This EIAR has been laid out using the grouped format structure, the report examines each environmental factor in a separate chapter (the chapters are listed in Table 1-2). These EIAR chapters have been prepared by suitably qualified expert(s) and have considered the construction and operational phases of the Proposed Development under the following headings:

- Assessment Methodology;
- Receiving Environment;
- Characteristics of the Proposed Development;
- Potential Impacts of the Proposed Development;
- Mitigation Measures;
- Monitoring or Reinstatement Measures;
- Residual Effects of the Proposed Development; and
- Cumulative Impacts of the Proposed Development

Interactions between environmental factors will be considered separately in Chapter 16 of this EIAR.

While the EIAR has the focus on the Proposed Development, each specialist chapter also considers the potential cumulative impact (as far as practically possible) of the Proposed Development with the potential future build out of the Site (as described in Chapter 2) and the cumulative impacts with developments in the locality (including planned and permitted developments).

Table 1-2 EIA Report Structure

EIAR Chapter No.	Chapter Title
EIAR Volume 1	
Chapter 0	Non-Technical Summary
EIAR Volume 2	
Chapter 1	Introduction
Chapter 2	Description of the Proposed Development
Chapter 3	Alternatives
Chapter 4	Human Health and Population
Chapter 5	Land, Soils, and Geology
Chapter 6	Hydrology and Hydrogeology
Chapter 7	Biodiversity
Chapter 8	Air Quality
Chapter 9	Climate
Chapter 10	Noise and Vibration
Chapter 11	Townscape and Visual Impact
Chapter 12	Archaeological, Architectural and Cultural Heritage
Chapter 13	Material Assets – Traffic and Transportation
Chapter 14	Material Assets – Waste Management
Chapter 15	Material Assets – Utilities
Chapter 16	Interactions – Interrelationship between the Aspects

EIAR Chapter No.	Chapter Title
EIAR Volume 3	
	Appendices

1.3.2 EIA Scoping and Consultation Processes

The scope of the EIAR has been defined at an early stage of the design process, the scoping process involves defining the scope of the EIAR early in the design process to ensure that all relevant environmental issues are addressed in the subsequent studies.

To establish the scope, a comprehensive review of the development site's context, including its locality and any previously permitted developments, is undertaken. This review helps identify the specific matters that need to be covered within the environmental impact assessment. By identifying and addressing these issues upfront, the EIAR aims to provide a comprehensive understanding of the potential environmental impacts associated with the Proposed Development.

The structure and presentation of the EIAR is designed to facilitate the dissemination of information to the public and stakeholders. The EIAR is structured in a clear and accessible manner, allowing easy navigation through its content. Additionally, a non-technical summary is provided, which presents a concise overview of the report's main findings and conclusions. The presentation of the information is done in a way that is understandable to both technical experts and non-experts, enabling a wider audience to grasp the key findings and implications of the assessment.

Public participation in the Environmental Impact Assessment (EIA) process is facilitated through the statutory planning application process. As part of this process, the EIAR is made available to the public, allowing interested individuals and organizations to review and comment on the report. This provides an opportunity for public input, ensuring that a wide range of perspectives are considered before making decisions regarding the Proposed Development.

To further enable public access to the EIAR, information about the report is also made available through the Department of Housing, Planning, and Local Government's EIA Portal. This portal serves as a platform that can be accessed by the public, stakeholders, and regulatory authorities. By utilising this portal alongside the LCCC online planning systems, broader public participation and scrutiny, as well as transparency and accountability in the EIA process is enabled.

Ensuring public awareness and involvement is a core objective of the EIAR process in Ireland. By disseminating the information contained in the EIAR, the aim is to make the public and local community aware of the likely environmental impacts of the proposed project prior to the granting of consent. This empowers the public to participate meaningfully in the decision-making process and voice their concerns or provide feedback.

The scoping and consultation are essential components of the EIAR process. The early definition of the EIAR scope ensures that all pertinent environmental issues are addressed, while the structure and presentation of the report, along with the provision of a non-technical summary, facilitates the dissemination of information. Public participation is actively encouraged through the statutory planning application process and the Department's EIA Portal, aiming to ensure that the public and local community are informed and have a voice in the decision-making process regarding Proposed Developments.

Two pre-planning meetings were undertaken with the Planning Department of LCCC as set out in the consultation process for large residential developments (LRD) under the *Planning and Development (Amendment) (Large-scale Residential Development) Act 2021*.

A Section 247 consultation meeting was held on 26th August 2025, followed by a Stage 2 LRD meeting (Section 32B) with LCCC on 18th November 2025 (Ref. 1051450). Following the Stage 2 LRD meeting, an

official LRD Opinion was issued by LCCC on 19th December 2025. Feedback from the LRD consultation process was incorporated into the design of the Proposed Development and into the environmental considerations assessed in this EIAR. A Response to LRD Opinion, prepared by Tetra Tech, also forms part of the planning application documentation.

1.3.3 Contributors to the EIAR Report

The preparation and co-ordination of this EIAR has been completed by AWN Consulting in conjunction with experienced subject matter experts. Each environmental specialist of the applicants project team was commissioned having regard to their previous experience in EIA; their knowledge of relevant environmental legislation relevant to their topic; familiarity with the relevant standards and criteria for evaluation relevant to their topic; ability to interpret the specialised documentation of the construction sector and to understand and anticipate how their topic will be affected during construction and operation phases of development; ability to arrive at practicable and reliable measure to mitigate or avoid adverse environmental impacts; and to clearly and comprehensively present their findings.

Table 1-3 below outlines the specific responsibilities of each author(s) and their corresponding EIAR chapter(s). Further information regarding the qualifications and relevant experience of the EIAR team can be found below the table.

Table 1-3 Roles & Responsibilities for the EIAR

Chapter	Topic	Company and Consultant
Chapter 0	Non-Technical Summary	AWN, with contributions from each subject matter expert
Chapter 1	Introduction	AWN, Elaine Neary and Ana Neary
Chapter 2	Description of Proposed Development	AWN, Elaine Neary and Ana Neary
Chapter 3	Alternatives	AWN, Elaine Neary and Ana Neary
Chapter 4	Human Health & Populations	AWN, Elaine Neary and Marcelle Jordaan
Chapter 5	Land, Soils & Geology	AWN, Marcelo Allende, Megan Walsh
Chapter 6	Hydrology & Hydrogeology	AWN, Marcelo Allende, Megan Walsh
Chapter 7	Biodiversity	Moore Group, Ger O'Donoghue, Ciaran Bruton
Chapter 8	Air Quality	AWN, Ciara Nolan and Tanmay Gojamgunde
Chapter 9	Climate	AWN, Sarah Berry
Chapter 10	Noise and Vibration	Dalton Acoustics, Ted Dalton
Chapter 11	Landscape and Visual Site Assessment	Macroworks Ltd., Richard Barker
Chapter 12	Archaeological, Architectural and Cultural Heritage	Aegis Archaeology Ltd., Frank Coyne
Chapter 13	Material Assets – Traffic and Transportation	Punch Consulting Engineers, Julie Tiernan and Tracey O'Connell
Chapter 14	Waste Management	AWN, Elaine Neary and Ana Neary
Chapter 15	Material Assets	AWN, Elaine Neary and Marcelle Jordaan
Chapter 16	Interactions	AWN, Elaine Neary and Marcelle Jordaan
Supporting Studies/Reports		
Appendix 5.1	NRA/TII Criteria for Rating the Magnitude and Significance of Soils and Geological Impacts	
Appendix 5.2	Site Investigation	OCB Geotechnical
Appendix 6.1	NRA/TII Criteria for Rating the Magnitude and Significance of Hydrogeological Impacts	
Appendix 6.2	Stage 2 Flood Risk Assessment	Punch Consulting Engineers, Julie Tiernan and Tracey O'Connell
Appendix 6.3	Water Framework Directive Assessment	AWN, Marcelo Allende and Megan Walsh

Chapter	Topic	Company and Consultant
Appendix 6.4	Hydrology & Hydrogeology Risk Assessment	AWN, Marcelo Allende and Megan Walsh
Appendix 7.1	Bird and Bat Survey Report	Éire Ecology, John Curtin
Appendix 7.2	AA Screening report	Moore Group, Ger O'Donoghue
Appendix 7.3	Natura Impact Statement	Moore Group, Ger O'Donoghue
Appendix 11.1	Verified views	Digital Dimensions, Jim Manning
Appendix 13.1	Traffic and Transportation Assessment	Punch Consulting Engineers
Appendix 14.1	Resource and Waste Management Plan	AWN, Elaine Neary and Ana Neary
Appendix 14.2	Operational Waste Management Plan	AWN, Elaine Neary and Ana Neary
Appendix 15.1	Aviation Glint and Glare Assessment	Macroworks Ltd., Peter Connell

EIA Project Team Qualifications and Relevant Experience

EIA Co-Ordinator/Selected Chapters

Elaine Neary is an Associate Director at AWN Consulting. She holds a BA in Natural Sciences and a Master of Applied Science (Environmental Science) and is a Chartered Member of the Chartered Institution of Wastes Management (MCWIM). Elaine has over 22 years' experience in environmental consultancy, with particular expertise in Environmental Impact Assessment, waste management, and environmental licensing. Elaine has led and contributed to a wide range of Environmental Impact Assessments, including the project management and coordination of EIARs, preparation of specialist technical inputs, and the delivery of EIA Screening and Scoping reports across a variety of development sectors.

Introduction

Elaine Neary, as above.

Ana Neary is an Environmental Consultant at AWN working on projects including EIA Reports, EIA screening reports, and waste management plans. She has experience across a range of developments including large residential developments, ICT facilities, and water and energy infrastructure. Ana holds a BSc in Sustainability with Social Sciences, Policy, and Law from University College Dublin, and is a graduate member of the Institute of Sustainability and Environmental Professionals (GradISEP).

Description of Proposed Development

Elaine Neary and Ana Neary, as above.

Alternatives

Elaine Neary and Ana Neary, as above.

Human Health and Population

Elaine Neary, as above.

Marcelle Jordaan is an Environmental Consultant at AWN, working on a range of projects that include EIA reports, EPA licence applications, environmental audits, and regulatory compliance for a range of developments including pharmaceutical plants and ICT facilities. Marcelle has a BSc (Environmental and Biological Science) from the North-West University.

Land, Soils, Geology, Hydrogeology and Hydrology

Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) at AWN with over 17 years of experience in Environmental Consulting as well as hydrological and hydrogeological technical studies. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

Megan Walsh (BSc)Hons is an Environmental Consultant in AWN with experience in Environmental Impact Assessment Reporting (EIAR), Hydrological & Hydrogeological Risk Assessment, Soil Quality Assessments, surface and groundwater monitoring and geotechnical site investigations. Megan holds a B.Sc. Hons in Environmental Science from University College Cork. She is currently a member of the International Association of Hydrogeologists (IAH, Irish Group).

Biodiversity

Ger O'Donohoe, Moore Group. Ger is the principal ecologist with Moore Group and has over 30 years' experience in ecological impact assessment. He graduated from ATU Galway in 1993 with a B.Sc. in Applied Freshwater & Marine Biology and subsequently worked in environmental consultancy while completing an M.Sc. in Environmental Sciences, graduating from Trinity College, Dublin in 1999. (He also has over 15 years' experience of carrying out bat surveys and has completed the Bat Conservation Ireland, Bat Detector Workshop which is the standard training for the carrying out of bat surveys in Ireland and follows the Bat Conservation Ireland 'Bat Survey Guidelines' - Aughney *et al*., 2008'. In addition, Ger is an active member of the Galway Bat Group and Bat Conservation Ireland, which monitors bat populations in Ireland, and facilitates the education of bat communities to the public.

Ciaran Bruton, Moore Group He is a conservation ecologist with Moore Group with experience in a range of professional and voluntary roles within the environmental field. A proficient field naturalist, experienced in wildlife surveys and habitat assessment, including terrestrial and aquatic plant and invertebrate surveys, bird surveys, mammal and bat surveys and monitoring. He is also the Botanical Society of Britain and Ireland, Vice County Recorder for Co. Longford.

John Curtin of Éire Ecology John Curtin B.Sc. is the principal ecologist with Éire Ecology and has over 10 years of experience in ecological impact assessment having conducted plant, habitats, birds, bats and mammal surveys since 2010 including at windfarm and solar sites. John conducted bird, bat and badger surveys. Shane O'Neill is an experienced ornithologist (Co-author Hen Harrier Survey, NPWS 2015) with a broad knowledge of breeding birds, waders and all aspects of ornithology. Shane has previously conducted I-WeBS surveys and taken part in the Shannon estuary wintering wader surveys. Laura Hynes has a degree in Wildlife Biology from MTU Kerry and has worked as an ecologist since 2022. Laura has worked as a Curlew officer for the NPWS.

Air Quality

Ciara Nolan is a Principal Consultant in the Air Quality & Climate section of AWN. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental

Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Science (MIEnvSc). She specialises in the fields of air monitoring, air quality & climate assessments for EIA and air dispersion modelling. Ciara has undertaken detailed climate assessments for various projects at EIA stage in line with the requirements in the National Climate Action Plan and Section 15 obligations under the Climate Action and Low Carbon Development Act. Project types include residential, commercial and infrastructure developments (road, utility connections) as well as industrial developments and renewable energy projects.

Tanmay Gojamgunde is an Environmental Consultant in the Air Quality & Climate section of AWN. He holds both a MSc in Air Pollution Management and Control from the University of Birmingham and BTech in Environmental Engineering. He is an Associate Member the Institution of Environmental Sciences (AMIEnvSc). Prior to joining AWN, Tanmay contributed to several key environmental projects in India, including Delhi's first air quality monitoring program (R ASMAN), air quality and traffic planning assessments with IIT Kanpur, and an Environmental Impact Assessment Report (EIAR) for an industrial district in Kanpur. He also specialises in conducting air dispersion modelling assessments of emissions, emission inventories, R programming and knowledge extending to broader aspects of environmental engineering.

Climate

Sarah Berry is a Principal Climate Consultant in the Air Quality and Climate section of AWN. She holds a BSc in Physical Geography from the University of Leeds. She has 9 years' experience in climate change and sustainability, with expertise in greenhouse gas permitting, accounting and verification. Her experience includes conducting strategic sector-specific GHG audits across a range of industries (data centres, industrial facilities, hospitals, manufacturing, power stations and airports). She has prepared climate chapters for EIARs for proposed developments across Ireland including large residential developments, windfarms, industrial developments and wastewater treatment works.

Noise and Vibration

Ted Dalton. Ted Dalton, M.Sc., MAACI, MIOA, Director of Dalton Acoustics Ltd., possesses over 20 years of experience as an environmental consultant with expertise in acoustics, noise impact assessment, and environmental noise management.

Archaeological, Architectural and Cultural Heritage

Frank Coyne is the Director of Aegis Archaeology Ltd., an Irish archaeological and heritage consultancy he co-founded in 1997. He is a licensed archaeologist with more than 28 years' experience working across Ireland and internationally and is involved in all aspects of the company's projects. He holds a BA in Archaeology and History, a Higher Diploma in Education both from NUI Galway, and Masters Degree in Conservation of the Historic Environment from Birmingham City University.

Landscape and Visual Impact Assessment

Richard Barker is a Principal Landscape Architect at Macro Works, with over 22 years' experience in landscape and visual impact assessment. He holds a Master's degree in Landscape Architecture, along with qualifications in environmental studies and forestry, and is a Corporate Member of the Irish Landscape Institute. Richard has led landscape and visual assessments for a wide range of infrastructure, energy and commercial developments, and has extensive experience in the preparation of EIAR chapters and mitigation strategies for major projects.

Traffic and Transportation

Julie Tiernan is a Technical Director at PUNCH Consulting Engineers with over 19 years' experience in civil engineering. She holds a degree from NUI Galway and has developed expertise across a broad range of civil engineering disciplines, including infrastructure design, traffic analysis and flood modelling. She has worked both in Ireland and internationally, including on large-scale developments in Australia. Julie is a competent traffic modeller and designer of DMURS, NCM and TII compliant road layouts. She is proficient at using Junctions 10 and Linsig traffic modelling programs. She has prepared numerous Traffic & Transportation Assessments & Mobility Management Plans for sites and can analyse junction capacities for existing and proposed sites.

Tracey O'Connell is a Senior Engineer at PUNCH Consulting Engineers with over 7 years' experience in civil engineering. She has experience in the design and assessment of developments across a range of sectors and contributes to the delivery of multidisciplinary projects. Her role includes supporting the preparation of civil engineering designs and associated technical assessments for both public and private sector clients.

Material Assets – Waste Management

Elaine Neary and Ana Neary, as above.

Material Assets – Utilities

Elaine Neary and Marcelle Jordaan, as above.

1.3.4 EIAR Assessment Description of Effects

The quality, magnitude and duration of potential effects are defined within each specialist chapter of this EIA in accordance with the criteria provided in the EPA *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2022) as outlined in Table 1-4.

Table 1-4 Description of Effects as per EPA Guidelines (2022)

Effect Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends

Effect Characteristic	Term	Description
	Significant	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 the majority of a sensitive aspect of the environment.
	Profound	An impact which obliterates sensitive characteristics
Duration of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years.
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
Probability of Effects	Likely Effects	The effects that can reasonably be expected to occur as a result 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.
Type of Effects[1]	Indirect Effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents

[1] For the purposes of facilitating the Competent Authority in conducting Environmental Impact Assessment as defined by Annex 1 of the EU Directive, the terms "imperceptible effects", "not significant effects", "Slight effects", and "moderate effects" used within this report, while exhibiting varying degrees of impact, are all considered to be without significant consequence.

1.4 Additional Assessments Required

The additional reports and/or assessments required under Legalisation or EU Directives other than the EIA Directive in respect of the Proposed Development are described in this section.

1.4.1 Habitats Directive (Directive 92/43/EEC) and Birds Directive (Directive 2009/147/EC)

The main EU legislation for conserving biodiversity is the Directive 2009/147//EC of the European Parliament and of the Council of November 2009 on the conservation of wild birds (Birds Directive); and the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The Habitats Directive is the cornerstone of habitats and species protection in Ireland. The Habitats Directive (92/43/EEC) and the associated Birds Directive (2009/147/EC) are transposed into Irish legislation by Part XAB of the 2000 Act and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) as amended.

The environmental sensitivity of the Proposed Development site in respect of Natura 2000 sites designated pursuant to the Habitats Directive and the Birds Directive been considered with reference to the application Appropriate Assessment Screening, which comprises an initial impact assessment of a project; examining the direct and indirect impacts that it might have on its own or in combination with other plans and projects, on one or more Natura 2000 sites in view of the sites' conservation objectives.

The 'Appropriate Assessment Screening' and 'Natura Impact Statement' has been prepared for the Proposed Development by Ger O'Donoghoe of Moore Group and is included with the planning application and as Appendix 7.2 and 7.3 of Chapter 7 (Biodiversity).

1.4.2 Water Framework Directive (Directive 2000/60/EC)

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states. The WFD requires all EU member states to classify the current condition or 'status or potential' of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach 'good status or potential' during the next river basin management planning cycle. Environmental Protection Agency (EPA) and other stakeholders such as planning authorities are the competent authority for implementing the WFD in Ireland. As part of their role, these authorities must consider whether proposals for new developments (other than where exemptions apply) have the potential to:

- Cause a deterioration of a water body from its current status or potential; and/or
- Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to determine whether the project will cause a deterioration of the status of the body of surface water or if it would jeopardise the attainment of good surface water status, having regard to the existing status of the water body as designated in accordance with the Directive.

A WFD Assessment has been undertaken for the Proposed Development, the results of which are presented in Appendix 6.1 of Chapter 6 (Hydrology & Hydrogeology).

1.4.3 The Floods Directive (Directive 2007/60/EC)

The Floods Directive (Directive 2007/60/EC) establishes a framework for the assessment and management of flood risks, with the aim to reduce the adverse consequences on human health, the environment and material assets.

The Floods Directive requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. The Floods Directive also reinforces the rights of the public to access this information and to have a say in the planning process.

The Floods Directive must be implemented in tandem with the WFD. In Ireland, the OPW is the national authority assigned with the implementation of the Floods Directive, which was transposed into Irish law by the EU (Assessment and Management of Flood Risks) Regulations SI 122 of 2010.

A Site-Specific Flood Risk Assessment (FRA) has been prepared by Punch Consulting Engineers in accordance with the Planning System and Flood Risk Management Guidelines for Local Government (2009). This Site-Specific FRA is included as Appendix 6.3 of Chapter 6 (Hydrology & Hydrogeology).

Chapter 2 – Description of the Proposed Development

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2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

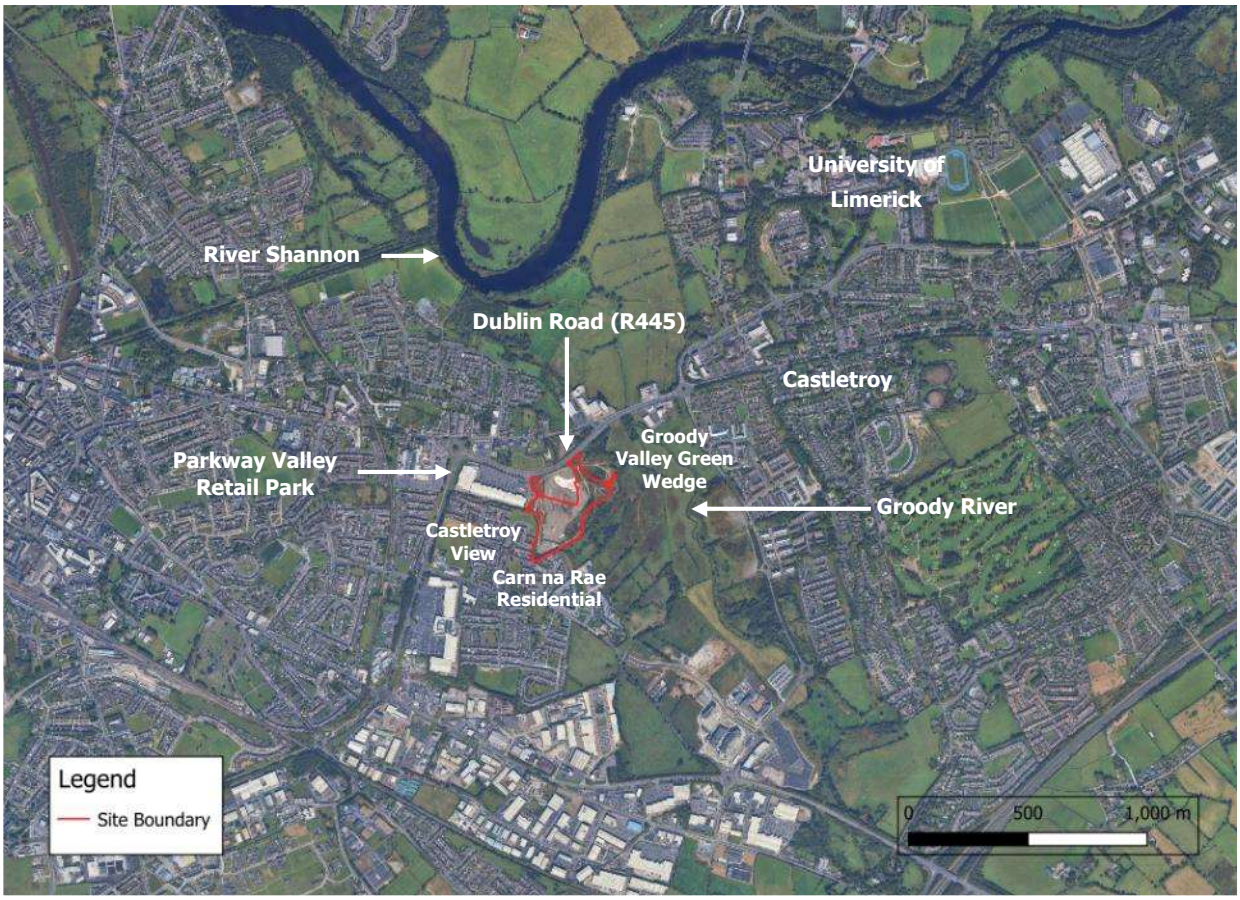
2.1 Introduction

The Proposed Development will deliver a mix of residential, community, and healthcare uses supported by new site infrastructure. The scheme includes a five-storey over podium medical centre of c. 3,082 m^2 located at the western extent of the Site, along with a c. 306 m^2 crèche at lower ground floor level within Block B. The residential component will provide a total of 403 units across 5 no. blocks, comprising 246 one-bedroom units and 157 two-bedroom units. To support the development, a new entrance from the Dublin Road (R445) is proposed, together with nature-based surface water drainage solutions within the neighbouring Groody Valley Green Wedge. The characteristics of the Proposed Development are described in further detail in Section 2.4.

The Proposed Development will be Phase One of a two-phase, mixed-use masterplan for the overall Parkway Valley lands. The Proposed Development comprises residential, community and healthcare infrastructure (medical center and creche) aspects of the masterplan. Refer to Section 2.3.2 of this Chapter for an overview of the masterplan proposals.

The Site is generally bound as follows: to the north by the Dublin Road (R445), to the east by greenfield lands known as the Groody Valley Green Wedge and the suburb of Castletroy; to the south and southwest residential areas including Castletroy View and Carn Na Ree and to the west by the Parkway Retail Park. Figure 2-1 below shows the location of the Proposed Development with the indicative red line boundary within the context of the surrounding area (Aerial View).

Figure 2-1 Aerial View of Proposed Development Site Location with indicative site boundary outlined in red (Source: Google Earth, May 2026)



2.2 Methodology

This chapter presents the description of the Proposed Development comprising information on the Site, design, size and other relevant features of the Proposed Development. The scope of this chapter aligns with the relevant legislation and guidance which comprises the following:

- EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive);
- European Commission *'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report'* (2017); and
- EPA '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (2022) (herein referred to the as the EPA EIA Guidelines 2022).

This chapter draws on and has been informed by the project design and summarises the key relevant details of the Proposed Development and its lifecycle as it relates to this Environmental Impact Assessment (EIA) Report. EPA EIA Guidelines 2022 advises that description of the existence of the project should define all aspects of the proposed lifecycle of the Proposed Development, including:

- Description of Construction;
- Description of Commissioning;
- Operation of the Project;
- Changes to the Project; and
- Description of Other Related Projects.

This description is not exhaustive, and as such this EIAR should be read in conjunction with the full application package. The description of the Proposed Development is described in this chapter in terms of those environmental topics that will form the basis of the impact assessment process and the characteristics of the Proposed Development and potential effects. The specialist assessments reported in this EIA Report have been conducted using this description, and the full application package as a guide to the details of the development under consideration.

2.3 Description of the Existing Development Site

2.3.1 Existing Land Use

The Site is approximately 6.18 ha in extent and is located in the Singland area immediately to the east of the roundabout entrance to Parkway Retail Park off the Dublin Road (R445). The site is located adjacent to the Dublin Road (R445) approximately 2.5km east of Limerick City centre.

A review of early historical mapping records dated from 1829 to the early 20th century coupled with historical aerial imagery dated from 1995 to the present day indicated that the subject site was unoccupied by any building structures until 2007. Planning permission was granted in 2004 for a mixed-use commercial development on the Site (LCC Reg. Ref. P04/3700), referred to as Horizon Mall, partially constructed on the Site in 2007. It was demolished in 2020 following a Section 11 Notice issued under the Derelict Sites Act 1990. Reinforced concrete retaining walls were left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground.

The subject Site currently consists of a gravel footprint, buried concrete where the previous development was demolished in the centre, and some brownfield areas towards the southern and eastern boundaries which were likely reworked during the construction/demolition phase of the previous project. The reinforced concrete retaining walls have been incorporated into the design of the Proposed Development.

The ground level of the site is elevated above the Groody River floodplain to the east. The current site sits at elevations between 5 m and 17 m above ordnance datum (AOD) Malin, with majority of the site generally flat (between 8.4 m and 9.64 mAOD) and falling to the east.

There is one existing entrance to the site which is via the Parkway Retail Park Roundabout to the west. The site is currently surrounded by perimeter / security fencing.

Current EPA watercourse mapping indicates that the Groody River (Shannon (Lower)_060) is the nearest river waterbody to the site, c. 200 m east of the site. The greenfield lands to the east of the site have been designated as the Groody Valley Green Wedge in the Limerick Development Plan 2022-2028, with the Objective to *'preserve and protect the Groody Valley from development.'* Figure 2-1 illustrates the location of the Groody Valley Green Wedge and Groody Valley in relation to the Site.

2.3.2 Existing Site Utilities, Infrastructure, and Access

2.3.2.1 Existing Potable Water Infrastructure

There is no evidence of existing potable water infrastructure on the Site. As outlined in the Engineering Planning Report prepared by Punch Consulting Engineers (May 2026), Uisce Éireann Drainage Records indicate an existing 300mm diameter watermain which runs along the northern Site boundary in the Dublin Road (R445).

For further details on the existing potable water infrastructure see the Punch Consulting Engineers Engineering Planning Report (May 2026) included with the planning application documentation.

2.3.2.2 Existing Foul Wastewater Drainage Infrastructure

There is no evidence of existing wastewater infrastructure on the Site. As outlined in the Engineering Planning Report prepared by Punch Consulting Engineers (May 2026), Uisce Éireann drainage and supply records indicate an existing foul sewer in the Parkway Retail Park which ultimately discharges into a combined sewer on Childers Road.

For further details on the existing foul wastewater infrastructure see the Punch Consulting Engineers Engineering Planning Report (May 2026) included with the planning application documentation.

2.3.2.3 Existing Surface Water Drainage Infrastructure

As outlined in the Punch Consulting Engineers Engineering Planning Report (May 2026), LCCC drainage and supply records indicate that there is no existing public storm sewer or surface water network on or in close proximity to the Proposed Development site. Uisce Éireann records show evidence of existing stormwater sewers in the residential development to the west of the site and 200m northwest of the site, with no recorded evidence of surface water sewers in the Dublin Road (R445). However, there are existing gullies located on the road.

The EPA online mapping tool shows 2 no. unnamed surface watercourses within the Proposed Development Site boundary, however these were not evident during site walkovers. There is an open drain outside the eastern site boundary connected to Industrial Estate / Galvone Stream which ultimately discharges to the Groody River. The Groody River (EPA Code: IE_SH_25S012600), a tributary of the Shannon (Lower), is located c. 200 m to the east of the site and flows in a northerly direction. For further details on the existing waterbodies, drainage and surface water infrastructure at the site, see Chapter 6 (Hydrology and Hydrogeology) and the Punch Consulting Engineers Engineering Planning Report (May 2026) included with the planning application documentation.

For further details on the existing surface water drainage wastewater infrastructure see the Punch Consulting Engineers Engineering Planning Report (May 2026) included with the planning application documentation.

2.3.2.4 Existing Road Access, Public Transportation, and Cycling Infrastructure

The Proposed Development has frontage on the Dublin Road (R445) to the north. The site is currently accessible from the Parkway Valley Roundabout, associated with the Parkway Retail Park, at the western boundary of the site.

The site is located in an accessible location and is well connected to public transport links. It is located c. 2.5km east of Limerick Colbert Station, which provides services to Dublin City, Galway, Cork, and the wider rail network. Additionally, the site is well served by existing bus network with 3 no. Bus Éireann routes passing the Site along the Dublin Road (R445) which provide services to Limerick City Centre and major locations including the University of Limerick, National Technology Park, University Hospital Limerick, and Limerick Colbert Station. The nearest bus stop to the site is outside the Parkway Retail Park c. 150 m to the northwest of the site.

There are existing facilities for active travel modes (walking and cycling) in the vicinity of the site. Pedestrian footpaths on the Dublin Road (R445) and adjoining residential developments to the south and west are of good quality and condition, with raised footpaths and public lighting. There are a number of completed LCCC two-way designated cycling links in the wider vicinity of the Proposed Development Site, including along Childers' Road to the west, Groody Road to the east, Bloodmill Road to the south, and Bóthar Bhaile Átha Cliath and the Dublin Road (R445) to the north[1]. These links provide connectivity to major locations including the University of Limerick, and Limerick City Centre.

With reference to the Traffic and Transport Assessment prepared by Punch (2026), a new BusConnects network is planned for Limerick City from 2027, with two of the new routes passing directly outside the Proposed Development along the Dublin Road (R445). A Primary Radial Cycle Route has also been identified for the Dublin Road (R445) within the Limerick Shannon Metropolitan Area Transport Strategy. These measures will expand the public transport and active travel capacity in the vicinity of the site.

2.3.2.5 Existing Electricity Infrastructure

With reference to the Utility Report (Moloney Fox Consulting Engineers, 2026), there is existing medium voltage ESB network infrastructure in the local area, comprising a 10/20kV underground network lines.

There are 110kV High Voltage overhead power lines and pylons which transverse the eastern portion of the site.

2.3.2.6 Existing Telecommunication Infrastructure

With reference to the Utility Report (Moloney Fox Consulting Engineers, 2026) there are existing EIR (voice and broadband) and Enet (fibre) underground ducts in the vicinity of the development on the site, running adjacent to the site boundary along the Dublin Road (R445), and to the south west of the development site in the existing residential developments.

There is existing high-speed broadband access from all major providers in the vicinity of the site.

2.3.3 Protected Structures

The Record of Protected Structures (RPS) under the Limerick Development Plan 2022-2028 lists all protected structures and buildings in Limerick. There are no protected structures within the Proposed Development site, the closest (Blood Mill (RPS Reg. No. 1629), Singland Mill (RPS Reg. No. 1630), and Singland House (RPS Reg. No. 1631)) are over 400 m. from the site.

There are no archaeological monuments, as listed in the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR), within the site. The closest Recorded Monument is approximately

[1] https://www.limerick.ie/council/services/roads-and-travel/active-travel/active-travel-limerick

40m from the site boundary. It is the site of a small archaeological excavation of a pit (LI005-107----_ which was fully excavated at that time under excavation licence.

No previous unrecorded archaeological features or previous archaeological investigations have been noted during the desktop study for the subject site. No other sites or structures of archaeological, architectural, or cultural heritage significance were noted within the development area or its immediate environs. Further information is contained in Chapter 12 (Archaeology, Architectural and Cultural Heritage).

2.3.4 Proximity to Seveso and COMAH Sites

The Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) or 'COMAH' regulations define the "consultation distance" as a distance or area relating to an establishment, where a major accident at the establishment could have significant consequences for human health or the environment, including residential areas, buildings, public areas, recreational areas, and major transport routes.

The Health and Safety Authority (HSA) list of Notified Seveso Establishments has been used to identify if the Proposed Development falls within the consultation distance of any nearby Seveso Establishments. The closest Notified Seveso Establishments to the proposed development are the Lower Tier establishments, Grassland Agro, located c. 4.8 km from the site at Dock Road, Limerick City, and Analog Devices International, located c. 6 km from the site at Raheen Business Park, Raheen. The Proposed Development site is not located within the consultation distance of any notified establishment; therefore, there are no implications for major accident hazards.

2.3.5 Proximity to Industrial Emissions Licensed Facilities

Table 2.1 below shows the closest EPA Integrated Pollution Control (IPC) and Industrial Emissions (IE) licensed facilities to the Proposed Development site according to the EPA (2026). The EPA licensed facilities are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment.

It is important to note that the proximity of a licensed facility does not necessarily mean that the Proposed Development will be impacted by their emissions. However, it is essential to consider these sites as part of the existing environment and to consider and understand the potential for cumulative impacts or other interactions with the Proposed Development at this location.

Table 2-1 Integrated Pollution Control (IPC) and Industrial Emissions (IE) Licensed Facilities within 2.5km of the Proposed Development [2]

Registration Number	Name	Category	License Type	Distance (km) & Direction
P0291	Galvotech Ireland Limited	Industry	IE	0.98km SW

2.3.6 Designated Limerick Development Plan 2022-2028 Land Use Zoning Objectives

The Limerick Development Plan (LDP) 2022 – 2028 zoning designations have been reviewed. The Proposed Development site is currently zoned in as M1 (Mixed Use) – '*To provide for a mixture of residential and compatible commercial uses*.' The overall Parkway Valley site is identified as a strategic mixed-use

[2] https://gis.epa.ie/EPAMaps

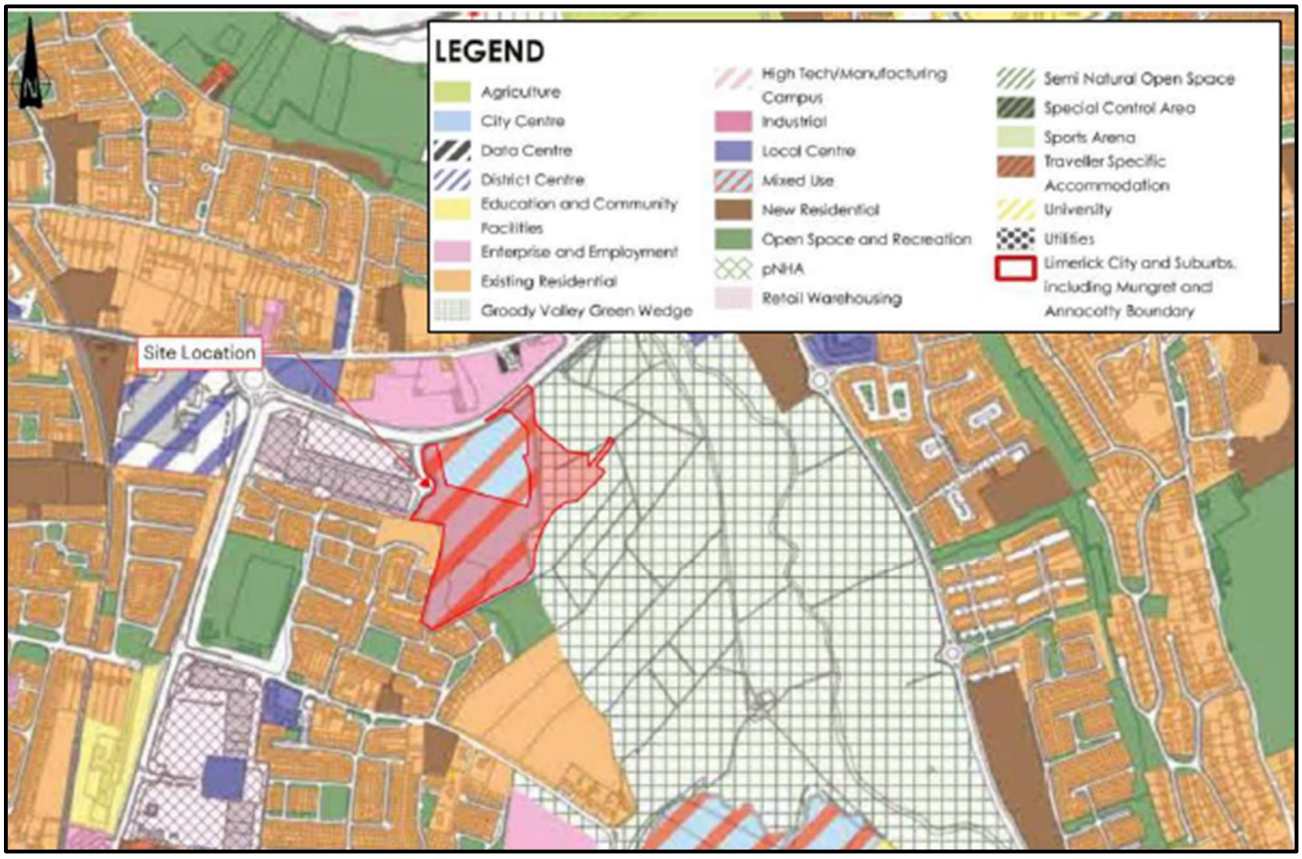
development area under Objective PV01 (Parkway Valley) of the LDP. This objective requires that in line with the site's mixed-use zoning, a maximum of 48% of the Parkway Valley site is to be developed for residential use.

The overall mixed-use masterplan principles are in line with these zoning objectives. The Proposed Development, which is Phase One of the masterplan, comprises the residential portion of the development masterplan in addition to supporting community infrastructure (creche and medical centre).

A proposed variation to the LDP seeks to alter the primary use of the site from employment and enterprise to residential. As such, the overall masterplan principles have been developed with flexibility to be able to accommodate predominantly commercial or predominantly residential uses in Phase Two.

Figure 2-2 below illustrates the current zoning designation of the site as well as the surrounding areas. The indicative Site boundary is illustrated with the red line.

Figure 2-2 Extract From Limerick Development Plan 2022-2028 (Indicative Site Boundary in Red) (Source: Extract of Map 3, Volume 2 - Limerick Development Plan 2022 – 2028)



2.4 Characteristics of the Proposed Development

2.4.1 Proposed Development Overview

As set out in the site notices prepared by Tetra Tech, the Proposed Development will consist of:

- 403 no. apartments in 5 no. blocks (Block A containing 78 no. units, Block B containing 92 no. units, Block C containing 88 no. units, Block D containing 83 no. units, and Block E containing 62 no. units) ranging from 5 to 8 storeys, comprising 246 no. 1-bed units and 157 no. 2 bed units;

- 2 no. single storey bicycle and bin storage blocks, a single storey pump station building, and an electrical substation building;
- A c. 306sq.m creche at lower-ground floor level in Block B;
- A 5-storey, c. 3082sq.m medical centre building;
- Car parking and bicycle parking spaces;
- Site access via a new left-in, left-out access at the Dublin Road (R445) and an access from the existing Parkway Retail Park roundabout;
- c. 2.09ha of communal and public open space;
- Solar panels on roofs of all apartment blocks and on medical centre;
- all associated landscaping, public lighting, pedestrian / cycle connections to the surrounding road network and site boundaries; water supply, foul and surface water drainage arrangements; utility connections; and all associated site development works;
- all on a site of approx. 6.18ha.

The site layout is illustrated in Figure 2-3.

Figure 2-3: Proposed Site Layout Plan (Source: Extract from Landscape Plan Drawing PAV-JBA-XX-XX-DR-L-0002, JBA, May 2026)

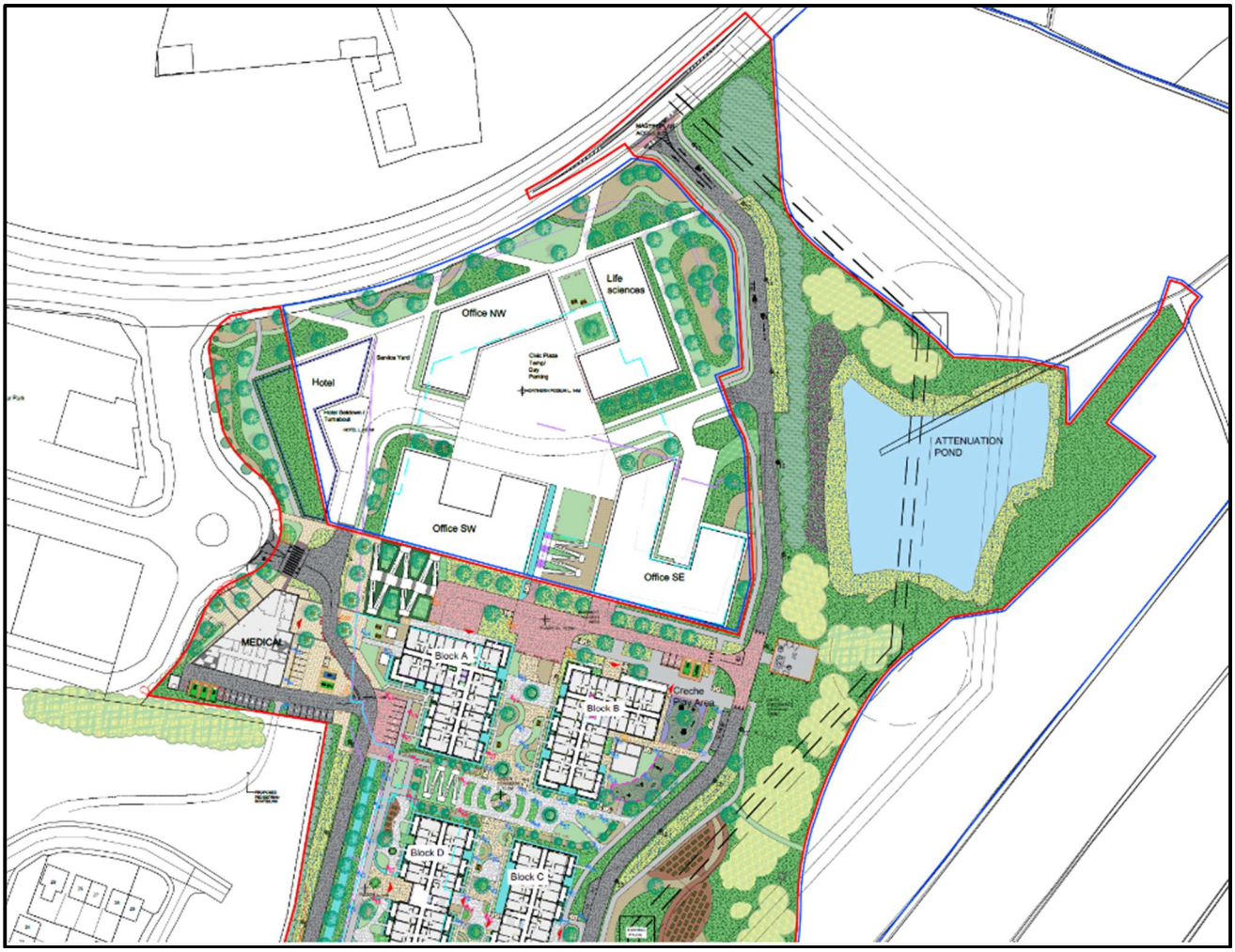
2.4.2 Masterplan Overview

As stated in Section 2.1, the Proposed Development will be Phase One of a two-phase, mixed-use masterplan for the overall Parkway Valley lands. The Proposed Development comprises residential, community and healthcare infrastructure (medical center and creche) aspects of the masterplan. Phase Two provides for primarily employment and commercial uses on the remainder of the masterplan site, which comprises the northern half, with the following mixed-uses proposed:

- A Hotel
- 3 no. Office Buildings
- A Life Sciences Building

The future build out of the remainder of the site for employment and commercial uses represent the primary option for the masterplan layout (referred to as Option 1 in this EIAR for ease of reference). An indicative masterplan layout for this option is presented in Figure 2-4.

Figure 2-4 Masterplan Layout – Option 1 (Source: Extract from Landscape Masterplan Drawing PAV-JBA-XX-XX-DR-L-0001, JBA, May 2026)



As previously stated in Section 2.3.6, a proposed variation to the LDP (Proposed Variation No. 3) seeks to alter the primary use of the site from employment and enterprise to residential. As such, the overall masterplan principles have been developed with flexibility to be able to accommodate predominantly commercial as per the masterplan described above (Option 1) or predominantly residential uses in Phase Two (referred to as Option 2 in this EIAR). If the variation to the LDP is adopted and the majority of the Site is to be developed for residential use, an alternative masterplan envisions additional residential blocks, with the with the potential for supporting commercial / leisure uses as follows:

- A Hotel
- 500 Residential Units

Further details regarding the masterplan proposals are set out in the Parkway Valley Masterplan document prepared by the project architects, Reddy Architecture and Urbanism (Reddy A+U) which is included in this planning application.

This EIAR has assessed the cumulative effects of the Proposed Development with Phase Two, taking into account the two options currently proposed for the future build out, in so far as it is feasible based on the design information currently available.

It should be noted however, the verified views prepared by Digital Dimensions illustrate the cumulative development of the Proposed Development and future buildout using Option 1, the enterprise and employment scenario with hotel, offices and life sciences building.

2.4.3 Architectural Rationale

The architectural rationale is explained in detail in the Parkway Valley Architectural Design Statement (May 2026) prepared by Reddy A+U included with the planning application documentation. The document provides an overview of the site constraints and opportunities, relevant objectives of the Limerick Development Plan 2022-2028, relevant statutory guidance documents, and sets out the development proposals and design concepts.

As set out in the Architectural Design Statement, '*Key themes which have informed the development of this scheme include the promotion of active travel, access and connectivity, height, density and scale, community infrastructure and opportunities to enhance local facilities, tenure and housing, sustainability and biodiversity and the existing concrete walls that enclose the site*.'

2.4.4 Proposed Landscaping and Green Infrastructure

A Landscape Design Statement has been prepared by JBA Consulting which outlines the key landscaping proposals across the Proposed Development site. The landscaping proposals are differentiated across community and residential spaces, passive amenity open space, and the eastern edge of the site adjacent to the Groody Valley. The design of the community and residential spaces have included pedestrian and cycle links, seating, and areas for outdoor exercise, community gardening, and play. Planting proposals have incorporated native species, pollinator-friendly planting, a mix of native and ornamental species, and SuDS features including bioswales and an attenuation pond.

Landscaping proposals in the east of the site comprise the retention and reinforcement of the existing vegetation with native species. The proposals have been designed with respect to the existing biodiversity at the site following consultation with design team ecologists and LCCC. Site-specific measures include the provision of bat houses, swift boxes, an open managed grassland area for bird habitats, and the translocation of existing orchid species at the site. Refer to Chapter 7 (Biodiversity) and the landscape proposals prepared by JBA Consulting for further information.

2.4.5 Proposed Site Utilities and Infrastructure

2.4.5.1 Proposed Potable Water Infrastructure

It is proposed to construct a 225 mm diameter watermain to serve the proposed development. This watermain will connect to the existing 300mm diameter watermain running along the Dublin Road (R445) directly to the north of the site. The watermain layout has been designed in accordance with the Uisce Éireann *Code of Practice for Water Infrastructure.*

For further information refer to the Engineering Planning Report submitted with the planning application, prepared by Punch Consulting Engineers for details on watermain arrangement.

A Pre-Connection Enquiry (ref. CDS25006639) for this scheme has been submitted to Uisce Éireann on the 9th of June 2025. A Confirmation of Feasibility was received on 30th October 2025 in response, stating that a potable water connection to the public system was feasible subject to upgrades of 57 m of existing watermain from 200 mm to 350 mm, to be funded by the Applicant.

2.4.5.2 Proposed Foul Wastewater Drainage

It is proposed to construct a new foul sewer network within the site. All foul effluent generated by the Proposed Development will be conveyed to a proposed pumping station located within the eastern boundary of the site. The pump has been designed in accordance with Uisce Éireann with the proposed rising main passing through the site and discharging into the existing drainage in the Parkway Retail Park which ultimately discharges into a combined sewer on Childers Road. The final connection location is to be agreed with Uisce Éireann. The foul wastewater collected on Site will discharge to the existing local foul water drainage network which ultimately discharges to Limerick WWTP, where it is treated under license.

For further information refer to the Engineering Planning Report prepared by Punch Consulting Engineers for details on proposed foul drainage arrangement and connection point for the Proposed Development.

The proposed foul drainage arrangements have been designed in accordance with Part H of the Building Regulations 2010, the Department of Enterprise *Recommendations for Site Development Works for Housing Areas*, the Greater Dublin Regional Code of Practice for Drainage Works (Version 6), the Greater Dublin Strategic Drainage Study (GDSDS), Uisce Éireann Code of Practice for Wastewater Infrastructure and the Regional Code of Practice Drainage Works.

The Uisce Éireann Confirmation of Feasibility received on the 30th October 2025 (Ref. CDS25006639) advised that a wastewater connection to the public system is feasible without the need for the infrastructure upgrades.

For further information refer to the Engineering Planning Report, prepared by Punch Consulting Engineers and the drawing set submitted with the planning application for the proposed foul drainage network layout. See also Chapter 6 (Hydrology and Hydrogeology) and Chapter 15 (Material Assets - Utilities) which address the potential impacts of the Proposed Development on foul drainage network.

2.4.5.3 Proposed Stormwater Drainage Infrastructure

The proposed stormwater drainage arrangements have been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document - "*Recommendations for Site Development Works for Housing Areas*", with guidance taken from the "*Greater Dublin Strategic Drainage Study"* (GDSDS),CIRIA Publications C644 – *"Building Greener"* and the Limerick Development Plan 2022-2028.

The proposed drainage has also been designed to meet the requirements of the Greater Dublin Strategic Drainage Study and Limerick Development Plan 2022-2028 to limit site discharge to 2 l / s / ha or Qbar, and to provide interception storage in line with Limerick Council drainage requirements.

A new surface water sewer network is proposed to be provided for the Proposed Development, entirely separate to the foul water sewer network.

The surface water drainage system incorporates Sustainable Urban Drainage Solutions (SuDS) to limit site discharge. The following SuDS features have been incorporated into the proposed development design:

- Green Roofs;
- Permeable Pavements;
- Rain Gardens;
- Infiltration Trenches;
- Engineered Swales;
- Tree Root Systems; and
- Attenuation Ponds.

Refer to Punch Consulting Engineers Engineering Planning Report (May 2026) and drawing set submitted with the planning application for details of the proposed surface water drainage, SuDS features and connection points to the existing surface water drainage network. See also Chapter 6 (Hydrology and Hydrogeology) and Chapter 15 (Material Assets - Utilities) which address the potential impacts of the Proposed Development on surface water drainage and the existing storm water network.

A Site-Specific Flood Risk Assessment (SSFRA) has been prepared by Punch Consulting Engineers (May 2026). The Proposed Development site is primarily within Flood Zone C, with the proposed surface water outfall pipe discharging into the Groody River located in Flood Zone A. The flood risk for the Proposed Development is low, and the Proposed Development is considered appropriate for the site following construction of the proposed drainage design. Further detail and specific flood risk mitigation measures are contained within the SSFRA (Appendix 6.2 of this EIAR) and Chapter 6 (Hydrology and Hydrogeology) of this EIAR.

2.4.5.4 Proposed Roads, Access, and Parking

The development site is located in the townland of Singland with frontage to the R445 Dublin Road (R445) and adjacent the Parkway Retail Park. The site will be accessible from the Dublin Road (R445) via the roundabout at the entrance to Parkway Retail Park at the north-west corner of the site and via a new site entrance off the Dublin Road (R445). The new entrance will operate as a left in and left out junction arrangement facilitating left-turn ingress and egress movements only. Figure 2-5 shows the planned vehicle access points to the Site.

Figure 2-5 Site Layout Plan showing Proposed Site Access Locations (Source: Site Plan is Extract from Landscape Plan Drawing PAV-JBA-XX-XX-DR-L-0002, JBA, May 2026)

Internal roads and cycling paths will be constructed within the Proposed Development. As detailed in the Parkway Valley Masterplan (Reddy A+U, May 2026) submitted with this planning application, the internal road strategy has been designed to enhance permeability and promote and sustainable active travel modes in line with urban planning best-practices.

With reference to Reddy A&U planning drawings and documentation (Reddy A+U Drawing Ref. PVAL-XX-SW-XXX-SH-RAU-AR-8001, the Proposed Development shall include a total of 138 no. car parking spaces, of which 101 no. are provided for residents within the lower ground floor car park, accessed via internal

roads. A further 8 no. and 29 no. car parking spaces are provided at surface level for the creche and medical centre, respectively.

Battery electric vehicle charging points shall be provided from the outset for 20% of the residential car parking spaces (i.e. 21 no. EV parking spaces for residents) and 6 no. EV parking for the creche and medical centre within the Proposed Development. The development will include ducting and mini pillars to cater for electric car charging points. Ducting will be provided which will allow for all car parking spaces to become battery electric vehicle charging points in the future.

It is proposed to provide a total of 818 no. bicycle parking spaces across the site, of which 570 no. are provided as secure residential bicycle parking spaces, 214 no. are visitor bicycle parking spaces, 9 no. are provided for the creche, and 25 no. are provided for the medical centre. Parking spaces are located externally at ground level for visitors / creche / medical centre, and in dedicated secure bicycle storage rooms located within each apartment block at lower ground floor level for residents. Internal cycle paths are provided within the site boundary.

Pedestrian access will be available from all roads surrounding the development. The Proposed Development layout has been designed for permeability and includes pedestrian-only path and walkways throughout the interior of the development. The roads layout, together with pedestrian and cycle facilities for the site, have been developed considering the design principles set out in the Design Manual for Roads and Streets (DMURS) (2019); compliance with these principles is demonstrated in the DMURS Compliance Statement (Punch, 2026).

Access arrangements and potential traffic safety impacts are considered in Chapter 13 (Traffic and Transportation), and the Traffic and Transport Assessment (Punch Consulting Engineers, 2026) included as Appendix 13.1 of the EIAR.

2.4.5.5 Proposed Electricity Infrastructure

With reference to the Utility Report (Moloney Fox, 2026), the site will be served by the existing Medium Voltage (MV) ESB Network from the National Grid, which has capacity to cater for the Proposed Development. The network will be extended via underground ducts, connecting to the Proposed ESB substation for each block of apartments and the medical center and mini/micro pillars for external services.

Extension of ESB networks infrastructure has been agreed in consultation with the developer and ESB Network Engineers. Details and locations of substations can be found in the architectural drawings submitted alongside this planning application.

2.4.5.6 Proposed Telecommunications Infrastructure

With reference to the Utility Report (Moloney Fox, 2026), there are telecommunication lines already in existence for telephone and broadband services in the area and fibre provisions for the Proposed Development. Connections will be made to the existing services locally. The site will be provided with a telecommunications network consisting of incoming fibre infrastructure and provided via underground fibre ducts.

2.4.5.7 Proposed Heating and Cooling Infrastructure

There is no requirement for gas connections for the Proposed Development. With reference to the Moloney Fox Climate Action Statement (2026), it is proposed to heat the development with exhaust air heat pump systems.

2.5 Description of Construction Works

2.5.1 Construction Activities and Phasing

The detailed construction programme will be developed by the selected construction Contractor at the detailed design phase. The key construction works relevant to this EIA Report and indicative timelines are summarised in Table 2.2 below.

Subject to a successful grant of planning, it is intended that the construction phase will last c. 36 months. Each of the following EIAR chapters (Chapters 4 to 15) includes an assessment of the potential impact of construction works on their individual environmental aspect and sets out the relevant mitigation measures relating to those aspects.

An outline Construction Environmental Management Plan (CEMP) has been developed by Punch Consulting Engineers and is included with this application.

Table 2-2. Indicative Description of Construction Activities

Activity	Description of Activity
Site preparation Works and Establishment of Construction Services	The site is already enclosed by security fencing. Perimeter hoarding will be erected at the beginning of the construction phase. The site compound will provide office, portable sanitary facilities, equipment storage, and a materials drop-off point for contractors for the duration of the works. The Site compound will be fenced off for health and safety reasons so that access is restricted to authorised personnel only. Temporary connections to electrical and water services will be established. Lighting will be provided as necessary at the construction compound, which will remain at low output unless activated by occupancy/motion sensors. Lighting will be designed in keeping with bat-friendly lighting practice. All required enabling works and surveying and setting out for structures, archaeological investigation (if required) etc. are carried out.
Site clearance, excavation, earthworks, foundations, services	This phase will include installation of construction-phase surface water management measures, site clearance and vegetation removal, roads, levelling of the site, as required, and the excavation of foundations. Removal of scrub vegetation shall only take place outside of the bird breeding season (1st March – 31st August). Earthworks will consist of demolition of some of the existing concrete floor slab, excavation and installation of the main site drainage, roads, site levelling, and the excavation of foundations. Excavate and remove material to the required formation. This will require bulk excavation and removal from the site. Surveying and setting out for structures. Rerouting of services/connections to services, as required. Install granular fill for roads and footpaths. Excavations down to the lowest formation level. Earthworks including attenuation pond. Once the site is prepared, foundation works can begin. This involves excavating and pouring the concrete foundations for the buildings and structures, and construction of the anticipated piles and ground beams required. Foundation works will be followed by construction of the reinforced concrete floor slab and the installation of site services including surface water/foul sewers, watermains, and mechanical/electrical (M&E) services.

Activity	Description of Activity
Structural and Building envelope works	After the foundations are in place, the structural building construction can begin. This involves erecting the concrete framework for the buildings and installing the exterior walls, roofing, and insulation. Once the structural works are complete, building envelope works can begin. This involves installing the roof, walls, and other components that make up the exterior envelope/façade of the buildings.
Site Utilities and Infrastructure	Key site ancillary infrastructure including roads, carparks, and retaining elements will be constructed. The completion of the Proposed Site Utilities and Infrastructure as set out in Section 2.3.4 of this Chapter to each unit will be undertaken in the initial development phase. Once the main structures are complete, services connections will be made to the established main network adjacent to the site. This will be carried out in accordance with the requirements of the various service providers / authorities. New electricity and telecommunications services infrastructure connections will be put in place to serve the various buildings. This will be carried out in accordance with the requirements of the various service providers / authorities.
Landscaping	After the main construction works are completed hard and soft landscaping and reinstatement works will be carried out in accordance with the proposed landscaping design. Landscaped areas will first be brought to a level below the final grading and finished with topsoil, with planting/seeding undertaken in accordance with the site landscaping plan.

2.5.2 Construction Staffing and Working Hours

It is anticipated that the construction of the Proposed Development will be completed during normal construction hours as set out in planning conditions attached to a grant of permission. However, it may be necessary for some construction operations to be undertaken outside these times, for example, service diversions and connections, concrete finishing and fit-out works. Any such works will be completed with the advance agreement of LCCC. Such occurrences will be kept to a minimum and take place over a short timeframe and as such are unlikely to cause excessive disturbance.

It is estimated that during peak construction periods, construction staff may fluctuate up to 100-150 no. staff and contractors on site per day. Site staff will include; management, engineers, construction crews, supervisors and environment health and safety personal.

2.5.3 Site Access, Car Parking, and Traffic Management During Construction

A Construction Traffic Management Plan (CTMP) will be prepared prior to commencement of construction. This plan will set out the requirements for traffic management during the construction phase of the Proposed Development in line with the requirements of the Department of Transport *Traffic Signs Manual 2010 – Chapter 8 Temporary Traffic Measures and Signs for Roadworks* and *Guidance for the Control and Management of Traffic at Road Works (2010),* and additional requirements as set out in the *Design Manual for Roads and Bridges* (DMRB) and *Design Manual for Urban Roads and Streets* (DMURS) and provides information on the existing public roads impacted by the works.

With reference to the Traffic and Transport Assessment prepared for the Proposed Development and submitted as Appendix 13.1 of this EIAR, at construction stage, traffic volumes will be small in comparison to existing traffic volumes. The relatively modest traffic volumes generated during the construction stage will primarily consist of:

- Construction staff vehicles, and
- Occasional deliveries of plant, equipment, and materials.

In this context, the existing junctions and the Proposed Development junctions will have adequate capacity to accommodate the anticipated construction traffic without resulting in congestion or operational issues.

The construction access to and from the proposed Parkway Valley development site will be via a roundabout at the adjacent Parkway Shopping Centre that exits to the Dublin Road (R445) and via the new site entrance at the Dublin Road (R445) that will operate a left-in, left-out system. All deliveries shall be provided with instructions/directions on accessing the site from the Dublin Road, and deliveries shall be scheduled outside of peak commuting hours.

Security personnel will be present at the entrances/exit points from the site to monitor all entering and egressing traffic. A wheel wash will be installed at the exit from the site to prevent any dirt being carried out into the public road. A road sweeper will be employed as required to keep the public road around the site clean.

Carparking for construction staff will provided on within the development site. Construction personnel will be encouraged to walk, cycle, or use public transport, and information on local transport services will be published on site.

Where works interface with the existing road network, the contractor shall prepare a detailed traffic management plan and obtain the required road opening licenses.

2.5.4 Site Preparation Works and Establishment of Construction Services

The Proposed Development site is currently surrounded by perimeter / security fencing. Hoarding will be erected at the outset of construction. Hoarding shall be maintained to a height of 2.4m and kept clean for the duration of the project. The perimeter fencing provides a barrier against unauthorised access from the public areas. Controlled access and egress points to the site, in the form of gates or doors/ turnstiles, shall be kept for any time that these areas are not monitored (e.g., outside working hours).

It is expected that the site compound will be located at the western boundary of the site, adjacent to the site entrance at the Parkway Valley Retail Park roundabout. This will allow for the efficient spread of resources through the site for construction traffic. The compound will be moved dependent on construction needs. Site offices will be provided on site for construction and management personnel. Appropriate levels of welfare facilities will be provided along with secure facilities for the storing of construction materials. Segregation will be employed on site to separate pedestrians from heavy equipment. Fenced off pedestrian walkways will be provided close to the site offices.

On-site facilities will consist of:

- a materials and equipment storage area;
- a materials drop-off point;
- a site office;
- staff welfare facilities (e.g., toilets, drying room, canteen, etc.);
- Parking for on-site personnel.

2.5.5 Site Utilities and Infrastructure During Construction

2.5.5.1 Electricity and Telecommunications

During construction, the contractors will require temporary power for onsite accommodation, and construction equipment / plant. Generators will be used until such time as a temporary connection to the ESB Network can be established. The generators will be fuelled with Hydrotreated Vegetable Oil (HVO), rather than with diesel. The installation of ESB electrical infrastructure is not anticipated to cause any disruption off site beyond that of any standard connection works. All temporary electrical infrastructure

will be removed when construction is complete. The power requirements for the construction phase will be relatively minor.

Vehicles, plant including generators and cranes will be fuelled with HVO. The use of HVO, rather than diesel, means that there will be minimal potential for impact for contamination of surface water or groundwater bodies in the event of a spill / leak. HVO is considered less harmful than traditional fossil oils when it spills on the ground due to its renewable nature and biodegradability. When HVO spills, it tends to degrade rapidly through natural processes involving microorganisms, which can metabolize it into less harmful substances. This quick degradation helps minimize its impact on the hydrological environment, reducing the risk of contamination in water sources and soil. Additionally, HVO has a lower toxicity profile compared to fossil oils, making it less harmful to aquatic life and groundwater systems.

The construction site will require internet phone connectivity for external communication with clients, contractors, and suppliers. Mobile phones are expected to be used for this purpose. Internet connectivity will be achieved through the use of wireless networks.

2.5.5.2 Groundwater and Surface Water Drainage

Ground investigation works completed by OCB Geotechnical in 2025 identified a perched water table at the Proposed Development site. It is expected that during the excavation of the proposed lower ground floor and other excavation works, dewatering (removing of perched groundwater) will be necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the proposed surface water drainage network is completed. During construction, run-off from excavations and / or earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions and underlying groundwater table. Measures will be employed to protect surface water in the receiving environment during construction, and to prevent its contamination by direct run-off or by infiltration from the development site.

The CEMP will be updated by the Construction Manager, Environmental Manager, Resource Manager and/or Ecological Clerk of Works, as required if site conditions change, and for any planning conditions that may be imposed. The CEMP will be implemented and adhered to by the construction Contractor(s). See Chapter 6 (Hydrology and Hydrogeology) for a full description of mitigation measures proposed. The outline CEMP incorporates mitigation measures outlined in the EIAR as they relate to the construction phase.

2.5.5.3 Foul Wastewater

Welfare facilities will be provided for the construction workers on site during the construction works. It is anticipated that for the initial stages of construction portable sanitary facilities will be provided. The facilities will need to have the wastewater collected by a licensed waste sewage contractor. Wastewater will be disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations, to prevent the pollution of watercourses. A temporary connection for wastewater drainage will be made to the public network. The locations and size of the temporary connection will be determined through consultation with Uisce Éireann and LCCC and shall be subject to any restrictions and requirements they may impose.

2.5.5.4 Potable Water Supply

The construction contractor will require a water source for the duration of the construction works for welfare facilities, dust suppression and general construction activities. Water will be required for welfare facilities, dust suppression and general construction activities. Initial the contractor will need have water delivered, until such time as a temporary connection to the public watermain at the Dublin Road (R445)

can be established, subject to consultation and agreement with Uisce Éireann. The temporary connection will be subject any restrictions and requirements Uisce Éireann may impose.

2.5.6 Construction Equipment, Techniques and Materials

Construction will include mechanical excavation, construction of the reinforced and piled concrete foundations and the reinforced concrete floor slab.

Piled foundations will comprise continuous flight auger (CFA) piles to an average depth of approximately 5 m below ground level. Concrete is pumped through the auger as it is withdrawn, forming the pile in situ in a continuous, supported process. As the bore is never left open, the method minimises soil collapse, limits groundwater ingress, and reduces disturbance to surrounding ground conditions. This methodology ensures that the contact time between the concrete and any potential groundwater is minimal and, given the low connectivity of the underlying bedrock aquifer, this contact is limited to the duration of the concrete seal and spatially, only to the potential groundwater in contact with the hollow stem during this brief period. This is discussed in further detail in Section 6.4.1.3 of Chapter 6 (Hydrology and Hydrogeology).

A number of cranes may be erected on the project to assist with the superstructure and façade works.

With reference to the CEMP, the construction plant equipment typical to this type of development which may be used during the construction phase will comprise:

- Tracked excavator;
- Tracked dumper or tractor and trailer;
- Articulated and rigid trucks ;
- Bulldozers, excavators, backhoes and ancillary equipment;
- Concrete delivery trucks and pumps;
- Scissor, boom and fork lifts,
- Piling Rig;
- Tower Crane, Mobile Crane, teleporter; and
- Chains / small tools, concrete pump, concrete vibrator.

Key construction materials will include materials typical to residential developments, including steel, concrete, glass, composite cladding, piping, electrical cabling, process equipment and architectural finishes. A 'Just In Time' delivery system will operate to minimise storage of materials on site.

Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in the compound area within the contractors' compound on site. Liquid materials, such as fuels for construction vehicles, will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications) to prevent spillage.

There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other key construction materials.

Construction materials will be brought to site by road. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

All deliveries to site will be scheduled to ensure their timely arrival and avoid need for storing large quantities of materials on site. Deliveries will be scheduled outside of peak traffic hours, to avoid disturbance to pedestrian and vehicular traffic in the vicinity of the site.

2.5.7 Landscaping/Reinstatement Works

Once the majority of the construction works are completed the landscaping will be completed in accordance with the specification of the project landscape architect, JBA Consulting, in consultation with LCCC.

The landscaping process involves restoring the site by adding new plantings, trees, shrubs, grasses, and other features to create an attractive and functional outdoor space. As detailed in section 2.3.4.3 and the Parkway Valley Masterplan (Reddy's A&U, 2026), the Proposed Development landscaping will also include SuDS features and an attenuation pond. The landscaping has been designed to enhance biodiversity and amenity value of existing green spaces, and to integrate the Proposed Development with the Groody Valley Green Wedge to the east of the site. This process may include installing irrigation systems, walkways, lighting, seating, and other amenities to enhance the usability of outdoor space.

2.5.8 Construction and Environmental Management

2.5.8.1 Construction Environmental Management Plan

Punch Consulting Engineers have prepared an CEMP (May 2026) that is included with the planning application. This outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development.

The CEMP mitigation measures incorporate the mitigation measures set out in this EIAR. All mitigation measures within the CEMP, EIAR and any additional measures required by the planning conditions, once granted, will be implemented to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

Construction works and the proposed mitigation measures are informed by best practice guidance and legislation including but not limited to:

- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013)
- The Waste Framework Directive (Directive 2008/98/EC)
- Environmental Protection Agency Act 1992
- Waste Management Act 1996, the Waste Management (Amendment) Act 2001 and the Protection of the Environment Act 2003
- Waste Management (Collection Permit) (Amendment)(No.2) Regulations 2016
- Waste Management (Permit) Regulations 1998 (SI No. 165 of 1998)
- Local Government Water Pollution Act 1977
- Environmental Protection Agency (EPA) – Draft Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects – April 2021
- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532)
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741)
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).

The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The mitigation and control measures outlined in the CEMP will be employed on site during the construction phase. All mitigation measures outlined within this EIAR, and within the

CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

The CEMP also includes emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction.

The CEMP will be finalised following grant of planning permission and prior to construction to provide for any revisions or additions required by condition of permission. This is an active document which is continuously updated to manage risk during the construction programme.

2.5.8.2 Resource Waste Management Plan (RWMP)

Chapter 14 contains a detailed description of waste management relating to construction of the Proposed Development . The site-specific Resource Waste Management Plan (RWMP) (AWN, 2026) is included as Appendix 14.1 of this EIA Report. This RWMP will be implemented to ensure best practice is followed in the management of waste from the Proposed Development.

Mitchell McDermott engineers have estimated that over the construction phase c. 41,275 m^3 of material will be excavated to facilitate the Proposed Development. Excavated material requiring removal from site will be regularly removed to ensure there is minimal need for stockpiling. Excavated material will be managed in accordance with the Resource and Waste Management Plan prepared by AWN (2026, attached as Appendix 14.1 to this EIAR)

It is expected that volumes of wastes generated (other than that of excavated material) from other construction activities will generally comprise waste generated from construction offcuts and construction workers.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste from construction worker activities would generally be composed of organic/food waste, dry mixed recyclables (waste-paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the Site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the Proposed Development as the exact materials and quantities may be subject to some degree of change and variation during the detailed design and construction process.

2.5.9 Potential Impacts and Mitigation Measures During Construction and Commissioning

There are potential short-term nuisances such as dust, noise, as well as the potential for pollution of groundwater associated with excavations and construction, or the surface water infrastructure.

In order to manage these short-term impacts, the CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Environmental Clerk of Works where relevant. The specific mitigation measures to address potential environmental impacts, are presented in each individual EIAR chapter.

The main potential impacts during demolition, excavation, construction, and commissioning which require mitigation are:

- Control of construction of run-off water in terms of silt runoff and dewatering (if required) (see Chapter 5 (Land, Soils and Geology) and Chapter 6 (Hydrogeology and Hydrology) for further information);
- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated (see Chapter 8 (Air Quality) for further information);
- Potential impacts on the Groody River, Natura 2000 sites (SPA and SAC) linked to the proposed development site (See Chapter 7 (Biodiversity) and the accompanying Appropriate Assessment Screening and Natura Impact Statement included as Appendix 7.2 and 7.3, respectively);
- Potential Impacts on human beings in terms of nuisances due to plant noise and vibration from equipment (see Chapter 10 (Noise and Vibration) for further information);
- Potential impacts on Archaeology, Architectural and Cultural Heritage during the excavation works (See Chapter 12 (Archaeological, Architectural and Cultural Heritage));
- Potential impacts on the road network (due to construction workers and other staff attending site (see Chapter 13 (Traffic and Transportation) for further information); and
- The generation of construction waste materials generated will be soil from excavation works and litter (see Chapter 14 (Waste Management) for further information).

The potential for significant impacts depends on the type of construction activity being carried out in conjunction with environmental factors including prevailing weather conditions i.e. levels of rainfall, wind speeds and wind direction; as well as the distance to potentially sensitive receptors.

2.6 Operation of the Proposed Development

The proposed development, when operational, will generate typical anthropogenic impacts associated with the usual operation of a large-scale residential development.

The main potential impacts are associated with additional traffic (associated air emissions), and surface and foul water emissions, visual impacts, biodiversity, and wastes generation due to changes from the current undeveloped site to a built environment.

2.6.1 Residential Buildings

During the operational phase a Facilities Management Team will be in place for the residential blocks. The Facilities Management Team will be primarily responsible for the following:

- Management and implementation of the parking and mobility strategy.
- Management of lease agreements and operational budgeting for the effective management of the common areas.
- Management of contractors and other requirements of efficient building and estate operation.
- Co-ordination of stakeholder and community events and engagement.
- Ensuring that the appropriate standards for resident behavior are upheld, creating a secure and friendly environment.
- Management of delivery strategies to ensure full access to facilitate deliveries for all stakeholders as required.

The relevant features of the operational phase for the purpose of EIA are described in the corresponding specialist chapters.

2.6.2 Creche and Medical Centre

During the operational phase, the creche and medical centre will be occupied by commercial tenants/operators. The tenants/operators will be responsible for management of parking and mobility

strategies, waste management, management of delivery strategies, management of contractors, and other requirements of efficient building and commercial operation.

2.6.3 Transportation and Accessibility

The proposed parking provision for the Proposed Development is set out in Section 2.4.5.4 above.

Bus stops within a 5-minute walk of the site are served by several NTA-licenced Limerick City bus routes operated by Transport Infrastructure Ireland. These routes serve additional transport links including Limerick Colbert Train Station. With reference to the Public Transport Capacity Assessment (Punch, 2026), the existing public transport network is considered to have sufficient capacity to accommodate the Proposed Development.

With reference to the Architectural Design Statement (Reddy A+U, 2026), the proposed layout of the proposed development prioritises permeability, offering numerous access points for pedestrians, cyclists, and vehicles. These access points connect the site to the surrounding road network and existing developments. The site provides direct connections to the Dublin Road (R445), which serves as a high-capacity route within Limerick City.

An outline Mobility Management Plan has been prepared for the Proposed Development by Punch (2026) which outlines the proposals to be implemented to reduce car dependency associated with the Proposed Development, in line with national and local authority sustainable transport initiatives.

Physical parking and access arrangements, and potential traffic safety impacts, are considered in Chapter 13 (Traffic and Transportation), Appendix 13.1 Traffic and Transport Assessment (Punch, 2026) and the Mobility Management Plan (Punch, 2026) included with the planning documentation.

2.6.4 Site Utilities and Infrastructure (Resource Consumption)

2.6.4.1 Electricity

Once the Proposed Development is operational, electricity is required for internal and external lighting, heating, ventilation, and air conditioning (HVAC) systems, security systems, domestic electrical and kitchen equipment etc. New electricity and services infrastructure will be put in place to serve the Proposed Development, which have been agreed in consultation with ESB Networks. Electricity will be provided to the site via extension of the existing ESB 10/20kv underground network infrastructure to the Proposed Development ESB substations. Additional detail is contained within the Utility Report prepared by Moloney Fox Consulting Engineers (May 2026).

All connection works will be carried out in accordance with the requirements of the various service providers / authorities.

2.6.4.2 Telecommunications

As outlined in the Utility Report (Moloney Fox Consulting Engineers, May 2026), connections will be made to the existing services locally for internet connectivity and telephone services. There is existing EIR voice and broadband communications infrastructure along the northern boundary of the Proposed Development site, this will be extended to service the Proposed Development. The site will be provided with a telecommunications network consisting of separate incoming Enet fibre infrastructure, extended from the existing Enet infrastructure along the northern boundary of the development site. Additional detail is contained within the Utility Report prepared by Moloney Fox Consulting Engineers (May 2026).

All connection works will be carried out in accordance with the requirements of the various service providers / authorities.

2.6.4.3 Surface Water Drainage

As described in Section 2.4.5.3, a new surface water sewer network is proposed to be provided for the Proposed Development, entirely separate to the foul water sewer network. The surface water drainage system is designed to have a minimal impact on the existing public surface water sewer surface system, and incorporates Sustainable urban Drainage Solutions (SuDS) to limit site discharge in line with requirements under the Limerick County Development Plan and the Greater Dublin Strategic Drainage Study.

All stormwater from roofs and hard standing areas will be collected in a gravity pipe system and discharged via the proposed attenuation pond to the existing open drain on the site and ultimately the Groody River. Stormwater discharge flow will be limited by use of a hydrobrake upstream of the stormwater outfall from the site.

2.6.4.4 Foul Wastewater

A foul wastewater connection and drainage is required for the proposed development for toilets and showers, hand basins, sinks, and dishwashers, etc.

Based on the development's calculated residential population, creche occupancy, and the medical centre, the maximum average effluent flow (dry weather flow or DWF) to be generated by the Proposed Development has been calculated by Punch Consulting Engineers to be 3.177 l/s and the corresponding peak effluent flow (Design Flow) has been calculated to be 17.13 l/s (Punch Consulting Engineers 2026). The proposed foul wastewater drainage system has been designed to accommodate this demand.

2.6.4.5 Potable Water Supply

A water supply is for the proposed development required for a variety of purposes, including, drinking water, flushing toilets, washing hands, and other sanitary purposes; cleaning and maintaining the building, including washing floors, cleaning equipment, and maintaining landscaping.

Based on the development's calculated residential population, creche occupancy, and the medical centre, the maximum average potable water demand to be generated by the Proposed Development has been calculated. The average daily water demand for the proposed is 3.177 l/s with a peak water demand of 19.845 l/s (Punch Consulting Engineers, 2026). The proposed potable water connection has been designed to accommodate this demand.

2.6.4.6 Natural Gas

There is no requirement for natural gas connections. With reference to the Climate Action Statement (Moloney Fox Consulting Engineers, 2026), the Proposed Development will be heated by exhaust air heat pump systems.

2.6.5 Waste Generation and Management

As with the construction phase, waste materials will be generated during the operational phase of the Proposed Development. Careful management of these, including segregation at source, will help ensure acceptable local and national waste targets are met.

The residents and operators of the creche and medical centre will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs).

Dedicated communal waste storage areas have been allocated for the residents at lower-ground or ground level. External waste storage areas have been allocated for the creche and medical centre. The waste

storage areas have been appropriately sized to accommodate the estimated waste arisings. These waste storage areas have been allocated to ensure a convenient and efficient management strategy with source segregation a priority. Waste will be collected from the designated waste collection area by permitted waste contractors and removed off-site for re-use, recycling, recovery and/or disposal.

An Operational Waste Management Plan (Appendix 14.2 to this EIAR) has been prepared by AWN, providing 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, glass, confidential paper, and medical waste, as well as providing a strategy for management of waste batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture (to be supplied). The Plan will comply 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.

2.6.6 Sustainability, Energy Efficiency, and Resource Use

With reference to the Climate Action Statement (Moloney Fox Consulting Engineers, 2026), sustainable building practices and technologies have been incorporated into the Proposed Development design.

The Proposed Development has been designed to 'Nearly Zero Energy Buildings' standards, or NZEB, which refers to buildings with very low energy requirements, which will be met by mostly renewable energy sources. NZEB buildings are required to generate 20% of their energy requirements from renewable sources. The Proposed Development buildings will be constructed to achieve an A2 BER rating, in line with NZEB standards. Electrically driven exhaust air heat pumps have been incorporated into the Proposed Development design to meet the heating requirements for the residential dwellings and achieve the requirement to generate 20% of energy from renewable sources. Exhaust air heat pumps are designed to provide ventilation, heating, and hot water to units with very low energy demand, as opposed to standard heat pumps such as Air Source Heat Pumps which are designed for larger heating requirements.

Additional sustainable technologies incorporated into the development design include the use of Demand-Control-Ventilation (DCV), which optimizes the amount of fresh air to improve indoor air quality while increasing energy efficiency. LED lighting and smart lighting controls will be implemented to increase energy efficiency and promote energy conservation.

2.6.7 Potential Impacts During Operation and Mitigation Measures

The Proposed Development shall incorporate several design elements (mitigation by design) intended to mitigate the impact of the Proposed Development during the operational phase on the surrounding environment.

The main potential impacts during operation which require mitigation are:

- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated (see Chapter 8 (Air Quality) for further information);
- Potential impacts on Natura 2000 sites (SPA and SAC) linked to the proposed development site (See Chapter 7 (Biodiversity) and the accompanying Appropriate Assessment Screening and Natura Impact Statement, included as Appendix 7.2 and 7.3);
- Impacts on human beings in terms of nuisances due to plant noise and vibration from mechanical and services plant (see Chapter 10 (Noise and Vibration) for further information);
- Interventions in the visual and landscape environment from the introduction of new buildings and structures (see Chapter 12 (Landscape and Visual Impact) for further information);
- Effects on the road network due to staff (see Chapter 13 (Traffic and Transportation) for further information); and
- The management and segregation of operational waste generated (see Chapter 14 (Waste Management) and Appendix 14.2 OWMP for further information).

Each chapter of the EIA Report prepared assesses the potential impact of the operation of the Proposed Development on the receiving environment. Please refer to each specialist chapter respectively.

2.7 Description of Other Related Projects

As set out in Section 2.4.5.1, Uisce Éireann network upgrades to c. 57 m of watermain will be required to facilitate the Proposed Development water mains connection.

No other known related projects are required in order to facilitate the proposed development.

2.8 Description of Potential Cumulative Developments

As part of the assessment of the impact of the Proposed Development, account has been taken of relevant developments that are currently permitted, or under construction and substantial projects for which planning has been submitted within the surrounding areas. The potential for Cumulative Impacts arising from these other related projects has been addressed within each specialist chapter of this EIA Report (Chapter 4 – 15).

The identification of relevant, currently permitted, and future developments follows a two-fold approach. Firstly, a comprehensive search is undertaken to identify all developments within the vicinity of the Proposed Development site. Subsequently, a review of the magnitude, size, scale, location and current status of these developments is undertaken to assess their potential to contribute to significant cumulative effects. This secondary stage is conducted in alignment with the 2017 guidance from the European Union (EU), which underscores the necessity to focus on effects that are either inherently significant or possess the potential for significance. This comprehensive review is crucial in the context of assessing the potential cumulative effects of a proposed project. It aids in gauging the extent to which these existing and future undertakings might, interact with the Proposed Development, and allow for the exclusion of insignificant developments from any further consideration. This strategic approach ensures that resources are not expended on negligible or inconsequential effects.

The initial stage of this process is facilitated through the utilisation of the planning search tools listed below which collectively hold a comprehensive inventory of planning applications, which systematically generated a comprehensive list of relevant planning permissions granted within the immediate environs of the Proposed Development. A combination of online mapping tools was used for this search including:

- The Department of Housing, Local Government and Heritage EIA Portal
- An Coimisiún Pleanála Map Search
- My Plan National Planning Application Map Viewer
- Limerick City and County Council Planning Map Viewer

The search also showed a number of retentions, individual dwellings, and other minor alterations. These permissions were for established business within the vicinity of the development and have been considered as a part of the overall project impact. Given their proximity to the Proposed Development, scale, and extent, the majority of developments in Appendix 2.1 are not likely to result in any cumulative effect, with the Proposed Development.

2.8.1 Potential Impacts from Cumulative Development and Mitigation Measures

The potential for Cumulative Impacts arising from these other related projects has been addressed within each specialist chapter of this EIAR (Chapter 4 – 15).

A review of the permitted developments with likely overlapping timelines in close proximity to the development was conducted. These are outlined in Table 2-2 below.

Table 2-2 Likely Overlapping Developments

Application Details	Description	Decision Date
Applicant: McCarthy & Woulfe Ltd. Reference: 211395 Location: Rhebogue Road, Rhebogue, Limerick	Construction of a residential development comprising 6 terrace units with site entrance, and all ancillary site development works. Ancillary site development works include a new connection to the public water main, foul and surface water drainage, access road, footpaths, vehicle parking, landscaping, boundary treatments and site development works above and below ground	Decision: Grant Permission (with Conditions) Date: 17/05/2022
Applicant: Kearock Investments Ltd. Reference: 221216 Location: Old Dublin Road (R445), Rhebogue, Limerick City	Large-Scale Residential Development (LRD) on lands (0.53 Ha) at Old Dublin Road (R445), Rhebogue, Limerick City. The Proposed Development comprises of the construction of a Purpose-Built Student Accommodation (PBSA) scheme consisting of 26 no. apartments with a total of 202 no. student bedspaces distributed across 3 No. multi storey blocks with a gross development area of 5,771 sq. m	Decision: Grant Permission (with Conditions) Date: 17/01/2023
Applicant: Dermot Coffey Reference: 23605 Location: Bloodmill Road, and Oakwood, Singland, Limerick	7no. two storey, 3 bedroom, terraced dwelling houses, all with off street car parking, connection to main sewer, public lighting and associated site works	Decision: Grant Permission (with Conditions) Date: 23/10/2024
Applicant: Groody Developments Limited Reference: 2560113 Location: Groody Road, Newcastle, Castletroy, Limerick	a Large-Scale Residential Development (LRD) - development of a Purpose-Built Student Accommodation (PBSA) scheme on land fronting the Groody Road and Dublin Road (R445), Castletroy, in the townland of Newcastle, Limerick for a period of seven years. The development consisting of 196 no. Bed Clusters, is distributed across 5 no. separate blocks, ranging in height from 5 - 8 storeys, with a total of 1,400 no. student bedspaces to be delivered in two phases of development	Decision: Grant Permission (With Conditions) Date: 25/09/2025
Applicant: Ann Hannan Reference: 2560151 Location: Sandybrook House, Bloodmill Road, Limerick	a residential development comprising 31no. residential units, (1no. detached house, 6no. semi-detached houses, 14no. terrace houses, 10no. duplex units in a 3 storey block), construction of all associated roads, site entrance, boundary treatments, footpaths, car parking, street lighting, demolition of an existing dwelling and sheds, and all ancillary site development works	Decision: Grant Permission (With Conditions) Date: 23/10/2025
Applicant: Silvergrove Developments Limited Reference: PL91.321345 Location: Rhebogue Road,, Drominbeg Road, Rhebogue,, Limerick City.	the provision of 25 No. apartments in a two and three-storey height block on a site of 0.243 hectare. The Proposed Development comprises 10 No. 1 bed apartments and 15 No. 2 bed apartments, suitable for older persons and / or persons with disabilities and includes an Entry Lobby from Rhebogue Road, communal room, ground level landscaped communal courtyard, second floor landscaped communal terrace, bin/recycling store, bike store, vehicular access from the adjacent 'Drominbeg Square' development to the north, boundary treatment and landscaping, connections to public services and all associated site development works.	Decision: Grant Permission (With Revised Conditions) Date: 31/10/2025
Applicant: Board of Management of St. Brigid's National School Reference: 2460575 Location: St. Brigid's National School, Singland,, Limerick City,, Limerick.	the construction of a new two-storey school building extension of 622.3m² at the ground floor and 613.3m² at the first floor, together with a single storey link connecting to the existing building of 47.5m², with a total new area of 1,283.1m²; removal of 3 No. pre-fabricated classroom units; external secure play area and sensory garden; 4 No. new surface parking bays, 1 No. EV charging bay and 1 No. Accessible parking bay, a new secure bicycle shelter, 2 No. hard standing ball courts, hard and soft landscaping together with all associated site works	Decision: Grant Permission (with Conditions) Date: 07/11/2024
ACP Ref. 321645/LCCC Ref. 21580	A residential development comprising 55 no. residential units and all associated site works. The development will be accessed via Hillcroft Close, St. Patricks Road, Singland, Limerick. c. 800m from Parkway Valley site.	Decision: Grant Permission Date: 12/05/2025.

The precise timeline for the construction of all the developments listed in Appendix 2.1 are not known and as such, for the purposes of this EIAR the precautionary principle has been applied by assessing, in this EIAR, the potential for cumulative construction impacts occurring in tandem with the Proposed Development with specific reference to the permissions listed above.

This EIAR also considers the likelihood for cumulative impacts associated with the operational phase of the proposed development and the operational phase of the developments listed in Appendix 2.1.

As stated in Section 2.4.2, this EIAR has also assessed the cumulative effects of the Proposed Development with Phase Two, taking into account the two options currently proposed for the future build out, in so far as it is feasible based on the design information currently available.

Any future application in the surrounding area will be subject to planning approval and environmental assessment as required. Any new development proposed in the surrounding area after the submission of the proposed development would be accompanied by an EIA, or EIA Screening as required and take into consideration the development of this site.

Chapter 3 – Alternatives

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3. ALTERNATIVES

3.1 Introduction

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU), and in Schedule 6 of the Planning and Development Regulations, 2001, as amended ("the Regulations"), which states:

> *A description of the **reasonable alternatives** studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.*

Schedule 6(2)(b) of the Regulations elaborates on this requirement by requiring the following information:

> *(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;*
>
> *Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.*

The EPA's *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)* – states:

> *The presentation and consideration of the various reasonable alternatives investigated by the developer is an important requirement of the EIA process.*
>
> *The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*

As such, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

This chapter provides an outline of the reasonable alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects.

This chapter assesses the evolution of development and the alternatives examined by the Applicant relating to the location, size and scale, and project design and processes of the Proposed Development. This chapter provides a full justification for the Proposed Development and provides a comparison of the environmental effects of each alternative option.

The reasonable alternatives examined throughout the design process are set out as follows:

- Do nothing alternative;
- Alternative project locations;
- Alternative layout, size and scale;

- Alternative processes; and
- Alternative mitigation measures.

This chapter describes the alternatives that were considered for the Proposed Development, where applicable, under each of these headings and the reasons for the selection of the chosen options, including a comparison of environmental effects.

3.2 Do Nothing Alternative

There is an established statement of need for all the various elements of the Proposed Development in Ireland within a National, regional and local strategic planning context. In the event that the Proposed Development does not proceed, the specific need for residential and mixed-use developments would still exist, as set out in the following strategic planning documents.

National Planning Framework 2040 (First Revision, 2025)

As outlined in the National Planning Framework 2040 (First Revision, 2025), there is a shortfall in housing delivery coupled with an increased demand for housing as a result of population growth.

With respect to the residential development, National Planning Framework includes several key policy objectives related to the provision of new housing and urban development. These include:

- National Policy Objective 12: *'Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being*;' and
- National Policy Objective 20: '*In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth*.'

The National Planning Framework identifies the following priorities for new housing and mixed-use development in Limerick City:

- '*Implementation of the updated Limerick 2030 economic strategy to create modern, city centre residential, food and beverage, leisure and office accommodation, to reposition the City Centre as the premier regional shopping destination and to deliver a series of transformational city centre commercial and public realm projects*;'
- *'Identifying infill and regeneration opportunities to intensify housing and employment development throughout inner suburban areas, including the regeneration of Colbert Station as a sustainable mixed-use city quarter with an enhanced transport interchange;'* and
- '*Progressing the sustainable development of new brownfield and greenfield areas for housing and the development of supporting public transport and infrastructure.*'

Limerick City & County Development Plan 2022-2028

The Limerick City & County Development Plan 2022-2028 (LDP) includes key objectives for the delivery of housing, principally Strategic Policy Objective 3, to '*Ensure new and existing residential development is of the highest quality, enabling life cycle choices and physical, community, recreation and amenity infrastructure are provided in tandem, to create sustainable, healthy, inclusive and resilient communities.*'

The Proposed Development site is identified in Section 3.4.5.3 of the LDP as a strategic opportunity site for mixed use development. The LDP Spatial Strategy states the following objective, PV 01, for the Parkway Valley site:

"The former Horizon Mall brownfield site of 16.04ha. comprising a mixed-use zone is located adjacent to the Parkway Retail Park in the townland of Singland. The vision for development of these lands will be focused on the creation of a high-quality environment in terms of design and layout, a mixture of functions, tenure types, unit sizes and the provision of a broad range of on-site facilities for employees. The principal uses shall be for employment creation. A range of other uses are considered open for consideration but are seen as ancillary to the primary use as an employment zone. An element of residential use may be considered, where the proposed development makes a positive contribution to the area in terms of adding to the richness and diversity of uses."

The Proposed Development will be Phase One of a two-phase, mixed-use masterplan for the Parkway Valley site. The Proposed Development comprises residential and community infrastructure (medical center and creche) aspects of the masterplan.

The Proposed Development and overall masterplan for the Parkway Valley will contribute to the stated policy objectives of the current LDP and NPF, providing a mixture of uses including residential, commercial office spaces, and community/public realm infrastructure at a brownfield site.

A proposed variation to the LDP seeks to alter the primary use of the site from employment and enterprise to residential. As such, the overall masterplan principles have been developed with flexibility to be able to accommodate predominantly commercial or predominantly residential uses in Phase Two.

If the Proposed Development does not proceed, the existing Parkway Valley site would remain as an undeveloped brownfield site, which would result in a neutral impact on the environment. With respect to the site's zoning for mixed-use development, its identification within the LDP as a strategic opportunity site, and the additional policy objectives outlined above, it is likely that if the Proposed Development does not proceed, the site would be developed for similar uses in the future.

Therefore, opting for the '*do-nothing*' scenario would be underutilising this strategically positioned site, would miss the opportunity to deliver a new high-density residential development and mixed-use amenity, and would contravene existing plans and policies for the Proposed Development site.

3.3 Alternative Project Locations

As noted in Section 4.13 of the 2018 Guidelines *"some projects may be site specific so the consideration of alternative sites may not be relevant."*

We also refer to the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2017), which states that in some instances alternative locations may not be applicable or available for a specific project which is identified for a specific location.

The current location of the Proposed Development was decided by a number of preceding plans, policies and circumstances, including those detailed above, all of which pre-determined that the current location offers the best project location in terms of planning, sustainability and the environment. The Proposed Development is in accordance with the zoning and other relevant policies and objectives of the current LCCC Development Plan 2022 – 2028.

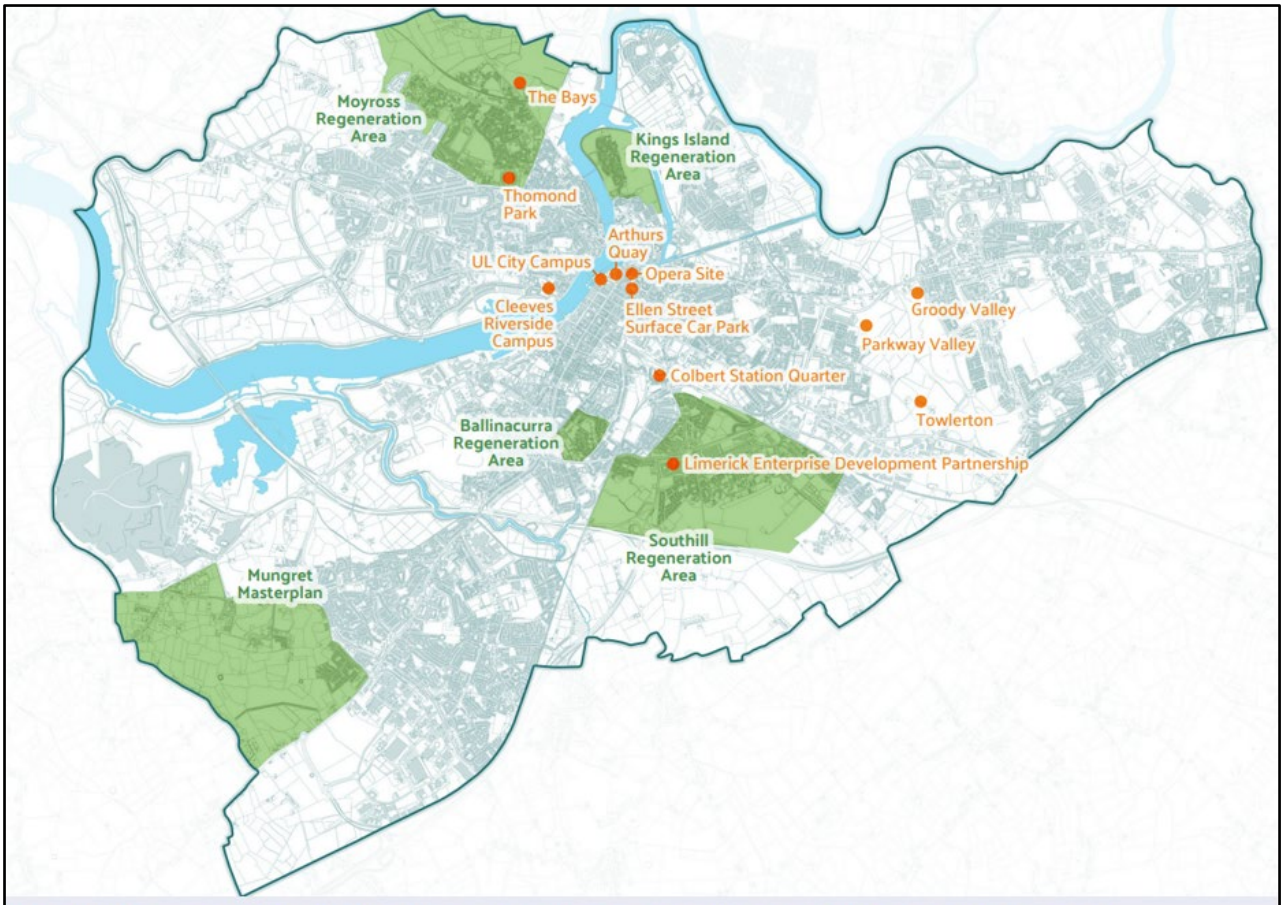
Given the current zoning of the site, the surrounding land uses, and the availability of necessary services and infrastructure, the Proposed Development is the most appropriate use for the site.

The location of residential and mixed-use developments is selected in line with national and regional spatial planning objectives and zoning designations. Within Limerick City, there are limited sites of similar scale zoned for mixed-use development, many of which are already subject to planned or permitted developments.

The site chosen is located on an existing brownfield site where the residential developments and commercial interests associated with the Proposed Development masterplan are compatible with the zoning and strategic objectives for the site. The Parkway Valley site has been subject to previous development and demolition and is now considered to be a derelict site and an "eyesore" in the surrounding local area which would benefit from redevelopment.

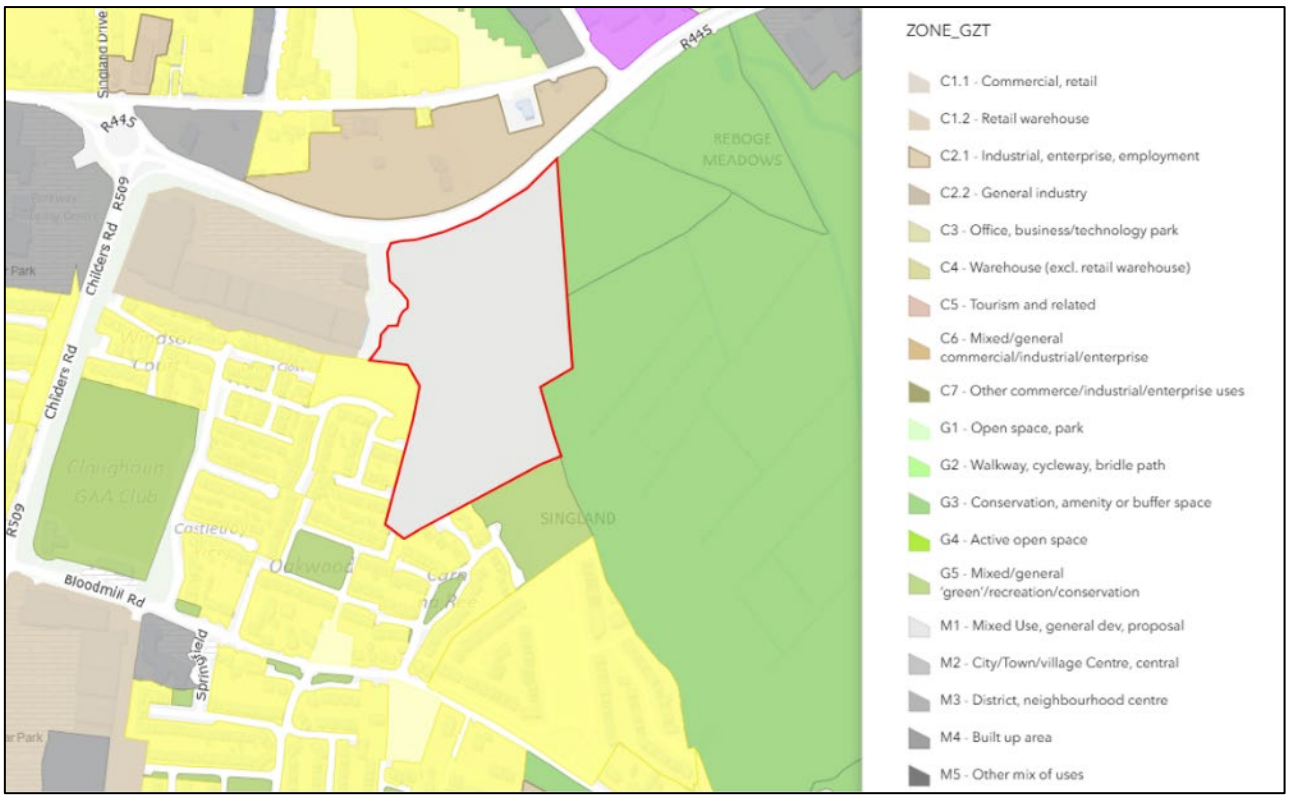
With respect to these objectives and availability of suitable lands, and the various attributes of the proposed development, the subject site can be considered to be the most suitable location for the Proposed Development and additionally would benefit from development.

Figure 3-1 Excerpt from Chapter 3 of Limerick City and County Development Plan: Consolidation and Opportunity Sites



Map 3.9: City and Suburbs (in Limerick), Mungret and Annacotty Consolidation and Opportunity Sites

Figure 3-2 LDP Zoning and Specific Development Objectives



3.4 Alternative Layouts and Design

The project design team undertook a comprehensive design process to determine an effective and efficient masterplan layout for the overall Parkway Valley lands in the first instance and more specifically for the current Phase 1 LRD application. This had regard to the operation requirements, planning requirements (refer to Section 3-2) and the environmental sensitivities of the site and the surrounding context.

The LDP set out the following specific objectives for the development of the Parkway Valley site, which guided the design of the Proposed Layout:

- *'…A high standard of design will be required throughout the site in order to create a high quality environment with a defined sense of space, functionally and physically connected to existing and permitted development on surrounding lands' ;*
- *'Support development of a civic square and streets with active frontage. The public realm will be characterised by a high standard of finishes and treatments. A network of high-quality spaces formed by the highest quality of buildings, paving and landscaping is required. Architecturally designed buildings and open plazas using high quality finishes will define civic spaces. Development shall be double-fronted and shall address the Groody Park, the Dublin Road and streets and civic spaces within the development' ;*
- *'Ensure a sufficient mix of uses, including a maximum of 48% of development for residential use, which shall be appropriately integrated with other development on site to create a successful mixed-use development' ;*
- *'Encourage the use of underground parking, which shall be sensitively located and adequately screened' ;*
- *'Ensure provision of a network of pedestrian and cycle routes through the lands linked to the Groody Valley Green Wedge' ;*
- *'Enable access via one entry point only along the R445 Dublin Road with potential for a new access point to link with the Tipperary Road' ;* and

- *'Ensure adequate provision of social and community facilities within the site, to serve existing and future residents. Provision shall be made of childcare facilities, playground and facilities suitable for a range of age groups including walking paths and community meeting space.'*

Additional factors included LCCC building height and residential density requirements, and compliance with the minimum distance from the existing ESB overhead lines and pylons in the east of the site.

It was established at an early stage that by locating the residential development in the southern portion of the site, it would reduce as far as possible the potential inward noise impacts from the Dublin Road.

In the context of the current planning policy attached to the Parkway Valley site with a focus on employment and enterprise development, it was established at an early stage, that locating commercial development primarily on the northern part of the lands and residential development primarily on the southern portion of the land, would generate greater opportunity for a strong active edge to the Dublin Road. This layout additionally allows the proposed residential elements to benefit from the existing quieter noise environment on the southern part of the lands, which neighbour an existing low density residential development.

The first alternative Masterplan layout for the entire Parkway Valley site (Figure 3-3), did not provide sufficient commercial space to meet the mixed-use requirement for the site, and oriented apartment blocks north to south rather than east to west.

The second alternative Masterplan layout (Figure 3-4) reoriented the residential blocks to east-west, maximizing daylight and sunlight to the apartments for improved residential amenity. The layout includes terraced houses in the southern portion of the site to tie into the existing residential areas to the south, however it was considered that this option did not meet LCCC residential density requirements for the site and did not make efficient use of the site. The roads layout scheme included several dead ends and did not prioritize active travel modes and connectivity throughout the site.

The final agreed Masterplan layout (Figure 3-5) which informs the current proposed LRD application, provides a perimeter road network prioritizing pedestrian and cycle networks in the interior of the site. The design of Block E in the south of the site maximized use of the existing levels and concrete wall by excluding a basement level, and is the shortest block in order to better integrate with the surrounding residential areas. The chosen Masterplan layout is a more efficient use of the site, allowing for improved public realm and landscaping to integrate with the Groody Valley Green Wedge.

The Masterplan layout and LRD application layout were further informed by pre-planning meetings with the Planning Department of LCCC on 11th September 2025 and 27th November 2025, which highlighted the need to consider provision of biodiversity enhancement measures within the Proposed Development layout. A bat house, swift boxes and a managed grassland area for lapwings are included in the final design and layout of the Proposed Development.

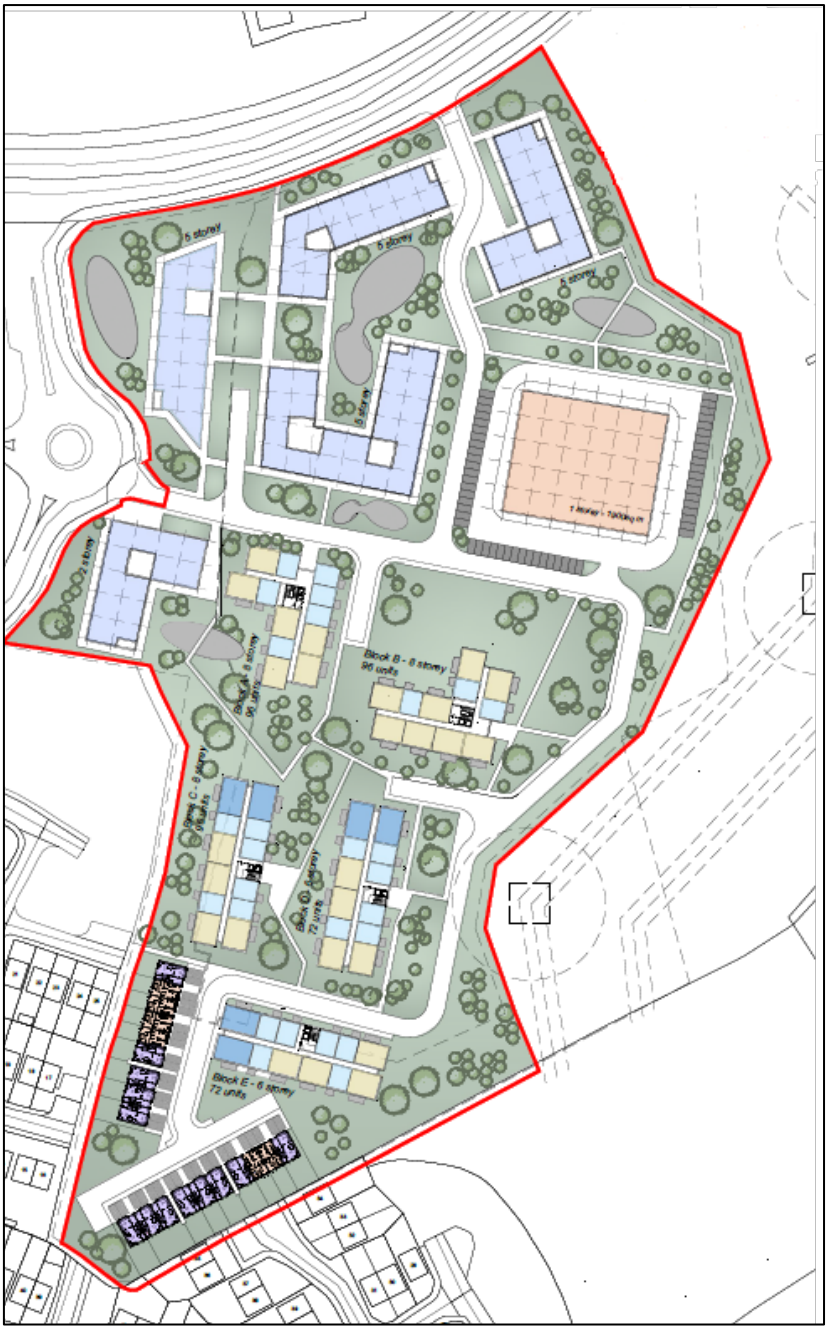
The potential for environmental effects which informed alternative design considerations primarily related to land/soils and waste, noise impact, visual impacts, and ecology. These included:

- To incorporate as far as possible adaptive re-use of the existing concrete retaining wall, minimising the requirement for excavations, geotechnical works, and generation of waste materials;
- To maximise the benefit of the existing quiet residential environment surrounding the southern part of the masterplan site by locating the Phase 1 residential development here;
- To orient residential apartment blocks east-west to maximise daylight/sunlight provision to apartments;
- To integrate the southern part of the site with the surrounding residential neighbourhoods, to reduce impacts to residential and visual amenity;
- To provide an efficient internal road layout, prioritising active travel modes within the site; and
- To preserve and integrate the site with the Groody River Green Wedge to the east of the site, introducing nature based solution for attenuation storage, new green areas and planting for wildlife;

Figure 3-3 Alternative Parkway Valley Layout Option One[1]

[1] Source: Reddy's A&U, April 2026

Figure 3-4 Alternative Parkway Valley Layout Option Two[2]



[2] Source: Reddy's A&U, April 2026

Figure 3-5 Proposed Parkway Valley Layout[3]

[3] Source: Drawing no. PVAL-02-SW-L01-DR-RAU-AR-1009 – Issued for Planning

3.5 Alternative Processes (Technologies)

The EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) state that within each design solution there can be a number of different options as to how the processes or activities of the development can be carried out. This section typically examines the project processes in relation to likely emissions to air, noise and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters.

In terms of the Proposed Development processes, the various layout options considered (Section 3.4) will generally necessitate the same power requirements, and result in the same waste and environmental emissions. The Proposed Development is guided by the applicant's standard specifications and the objectives for the Proposed Development contained within the Limerick City and County Council Development Plan 2022-2028. The flexibility to select alternative processes is limited for residential developments as opposed to an activity that has more complex equipment and processes.

As described in previous sections and the Architectural Design Statement (Reddy, 2026), the Proposed Development is part of a two-phase masterplan for the Parkway Valley site that incorporates a range of best-practice sustainable urban design and planning aspects, including mixed-use development, compact development, active travel components, and placemaking.

Climate Action Statement has been prepared for the Proposed Development by Moloney Fox Consulting Engineers (2026) and is submitted alongside this planning application. The Climate Action Statement outlines the sustainable building design measures incorporated into the Proposed Development design.

The Proposed Development has been designed to meet the Nearly Zero Energy Buildings standard, which applies to all new buildings occupied after the 31st December 2020.[4] The EU Energy Performance in Buildings Directive (EPBD) defines NZEBs as '*a very high energy performance, as determined in accordance with Annex 1, The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.*'[5] With reference to the Climate Action Statement, the all elements of the buildings will be constructed to the latest building standards, with the achievement of these standards resulting in a residential BER rating of A2.

The Proposed Development design has incorporated exhaust air heat pump systems to meet the NZEB requirement to generate 20% of energy from renewable energy sources, either on site or nearby. Air pumps will provide heating, ventilation, and hot water to the Proposed Development residential and commercial units. Exhaust air heat pump systems have been selected over standard heat pump systems, such as Air Source Heat Pumps, as they are designed for smaller units with very low energy requirements. Demand Control Ventilation (DCV) will also be provided to the Proposed Development dwelling units, which provides improved air quality through optimised ventilation, which improving energy consumption and efficiency as compared to continuously run or manual ventilation systems. With reference to the Climate Action Statement (Moloney Fox, 2025), additional sustainable technologies, such as LED lighting and smart lighting controls, have been incorporated into the development design.

The Proposed Development has also embraced the opportunity to utilise other sustainable measures such as Solar Panels, SuDS measures (permeable paving materials, green roofs, swales, and an attenuation pond) along with significant planting and augmentation of existing ecological features. These measures will attenuate the rate of surface water runoff from the development, intercept first flush flows and improve the quality of water that is intercepted by the surface water drainage network through biodegradation, pollutant adsorption and settlement and retention of solids. Landscape design and maintenance will be in accordance with best practice management for biodiversity.

[4] Nearly Zero Energy Building Standard | Business & Public Sector | SEAI
[5] Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast)

3.6 Alternative Mitigation

The EIA process for the Proposed Development involved a team of specialists, each with expertise in a specific aspect of the environment. For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the Proposed Development and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the Proposed Development. In making a decision on the most suitable mitigation measure the specialist has considered relevant guidance and legislation.

Where relevant, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The selected mitigation measures for the Proposed Development are outlined in each of the EIAR Chapters 4-15. These measures have been specifically chosen to address the potential environmental impacts of the Proposed Development and to minimise any adverse effects on the environment. By considering a range of mitigation measures and strategies where appropriate, the specialist team has sought to ensure that the Proposed Development is as environmentally sustainable and responsible as possible.

3.7 Conclusions

Based on the assessment of reasonable alternatives (in relation to location, scale, design, technology, mitigation) relevant to the Proposed Development and its specific characteristics as set out in this chapter, the selected site is considered to be a suitable location for the Proposed Development from an environmental, strategic and planning perspective.

The Proposed Development site is currently zoned as Mixed Use, which is open to consideration for a number of commercial/residential/community facility uses. The Proposed Development is considered to be in keeping with Objective PV01 of the Limerick City and County Development Plan 2022-2028, which outlines a vision for development of the Proposed Development site.

The siting and layout of the Proposed Development has been carefully selected based on a suitably comprehensive assessment of reasonable alternative site layouts and technologies. The Proposed Development presents minimised environmental impacts, while maximising the strategic potential of the site with respect to reuse of brownfield land, potential for rural village enhancement, potential for power self-sufficiency, and proximity to additional power and fibre connections.

In conclusion it is considered that the proposed Site has capacity for development and is highly suitable for the Proposed Development.

Chapter 04 – Human Health and Population

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4. HUMAN HEALTH AND POPULATION

4.1 Introduction

This Human Health and Population Impact Assessment has been prepared to assess the likely significant effects on human health and populations in respect of the Proposed Development.

In this chapter, 'population' refers to the people and communities who live, work in, use, or may be affected by the Proposed Development and its surroundings. For this Large Residential Development, the relevant population considerations include the baseline demographic profile of the study area, population growth trends, settlement and land use patterns, nearby residential and employment uses, community and social infrastructure, local amenity and recreation resources, and the way in which the Proposed Development will contribute to housing supply, local economic activity and demand for services. These matters are assessed alongside human health, including the potential for changes in environmental quality and amenity to influence the wellbeing of existing and future residents, workers, service users and visitors.

The EU (2017) *Guidance on the preparation of the Environmental Impact Assessment Report* outlines that human health is a very broad factor that is be highly project dependent. This guidance states:

The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study.

Human health should be considered in the context of environmental pathways which may affect health such as air quality, noise, water and soil quality. All can contribute to negative effects on human health by facilitating the transport of contaminants or pollutants. An evaluation of the effects of these pathways on health, by considering the accepted standards of safety in dose, exposure or risk of air quality and noise levels for example, is considered appropriate, as these standards have been arrived at via scientific and medical research.

The EPA Guidelines (2022) identify a range of population and human health topics that may be relevant in EIAR chapters of this nature. In this assessment, the population component focuses on baseline population, demographic trends, settlement and land use patterns, employment and local economic activity, community and social infrastructure, and amenity, insofar as these are relevant to the Proposed Development and proportionate to its likely effects. The human health component focuses on environmental and amenity pathways that could influence health and wellbeing, including air quality, noise and vibration, water, land contamination, traffic, visual amenity and major accident risk. The likely significant effects on population and human health associated with these environmental factors are addressed in detail in the following EIAR chapters, which are cross referenced throughout this chapter:

- Chapter 5 – Land, Soils, and Geology;
- Chapter 6 – Hydrology and Hydrogeology;
- Chapter 8 – Air Quality;
- Chapter 10 – Noise and Vibration;
- Chapter 11 – Townscape and Visual Impact; and
- Chapter 13 – Traffic and Transportation.

Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter to provide the Planning Authority with a context for their determination.

Accordingly, this chapter does not duplicate the detailed technical assessments presented elsewhere in the EIAR. Rather, it draws together the findings of those assessments and considers their implications for population and human health, including existing residents, nearby businesses, workers, visitors and future occupants of the Proposed Development

The assessment of other health and safety issues that are carried out under other EU Directives are also relevant. These may include reports prepared under the Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment, Seveso III, Water Framework Directive, Floods or Nuclear Safety Directives. In keeping with the requirement of the amended Directive, an EIAR considers the results of such assessments without duplicating them.

4.2 Methodology

4.2.1 Relevant Legislation and Guidance

This chapter has been prepared in accordance with:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environment Protection Agency (EPA, 2022).
- Health Impact Assessment Guidance. Institute of Public Health (IPH), (IPH, 2021).
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report European Commission (EU, 2017).

This chapter follows the above guidance and examines the likely significant effects of the Proposed Development on population and human health within the relevant study area.

The description of the sensitivity, magnitude and significance, outlined within this assessment are based on the Health Impact Assessment Guidance (IPH, 2021) criteria, while the probability and duration of effects are based on the definitions set out within Section 3.7 of the 'Guidelines on information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

4.2.2 Data Sources of information

The following sources of information have been used in this assessment:

- 2022 Census results carried out by the Central Statistics Office (CSO) 03 April 2022. Made available from https://www.cso.ie/en/
- 2016 Census carried out by the Central Statistics Office (CSO) 24 April 2016. Made available from https://www.cso.ie/en/
- Pobal HP Deprivation Index based on 2022 Census Data (CSO) Made available from https://www.pobal.ie/
- Pobal HP Deprivation Index based on 2016 Census Data (CSO) Made available from https://www.pobal.ie/
- Google maps available from https://www.google.com/maps
- OpenStreetMap and contributors available from https://www.openstreetmap.org
- Health and Safety Authority (HSA) online register of Notified Seveso Establishments available from https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/.

4.2.3 Study Area

There is no specific guidance available on an appropriate study area to focus the assessment of existing land use and/or permitted projects. The research area has been established using expert judgement and based on the accessibility of data and taking into consideration the potential for impact from the Proposed Development.

It is acknowledged that projects like the one proposed can have an impact on activity in a larger area than only the site itself. Generally, the closer to the works, the greater the potential for impacts. Based on our professional experience with similar developments, and the sensitivity of the surrounding source-pathway-receptor human baseline, the majority of the potential environmental impacts are likely to be confined within 50-150 m of the Proposed Development. Some effects from the Proposed Development, including air quality and traffic, might have a larger area of effect, and these are addressed in further detail in the corresponding expert assessments that set out the chapters within this EIAR.

The project being considered, is not expected to have Regional, National or International, or Transboundary impacts on Populations or Human Health. Therefore, the Study area has been restricted to the neighbouring community (site-specific population), and wider community (local population). A general study area of 1 km from the site location is included for population statistics, while the wider area of 2.5 km from the site location has been used to inform the baseline description of the area.

In the desk-based assessment of Population characteristics and Health Sensitivity, the use of Electoral Divisions (ED) statistics from CSO have been utilised. Electoral Divisions are the smallest legally defined administrative areas in the state; developed with the intention of producing areas roughly equivalent in both population and "rateable value" (CSO).

The Proposed Development site is located within the Local Authority area of Limerick County Council (LCC), in the Electoral Division (ED) of Limerick South Rural (127106). Additional EDs included in the study area are those that are either entirely within, or partially within, 1 km of the Proposed Development site. In this case, the ED of Singland B (128036) is directly adjacent to the site, while other EDs within the 1 km radius include Abbey B (128000) and Ballysimon (127026).

Figure 4-1 Location of the Proposed Development within the Study Area

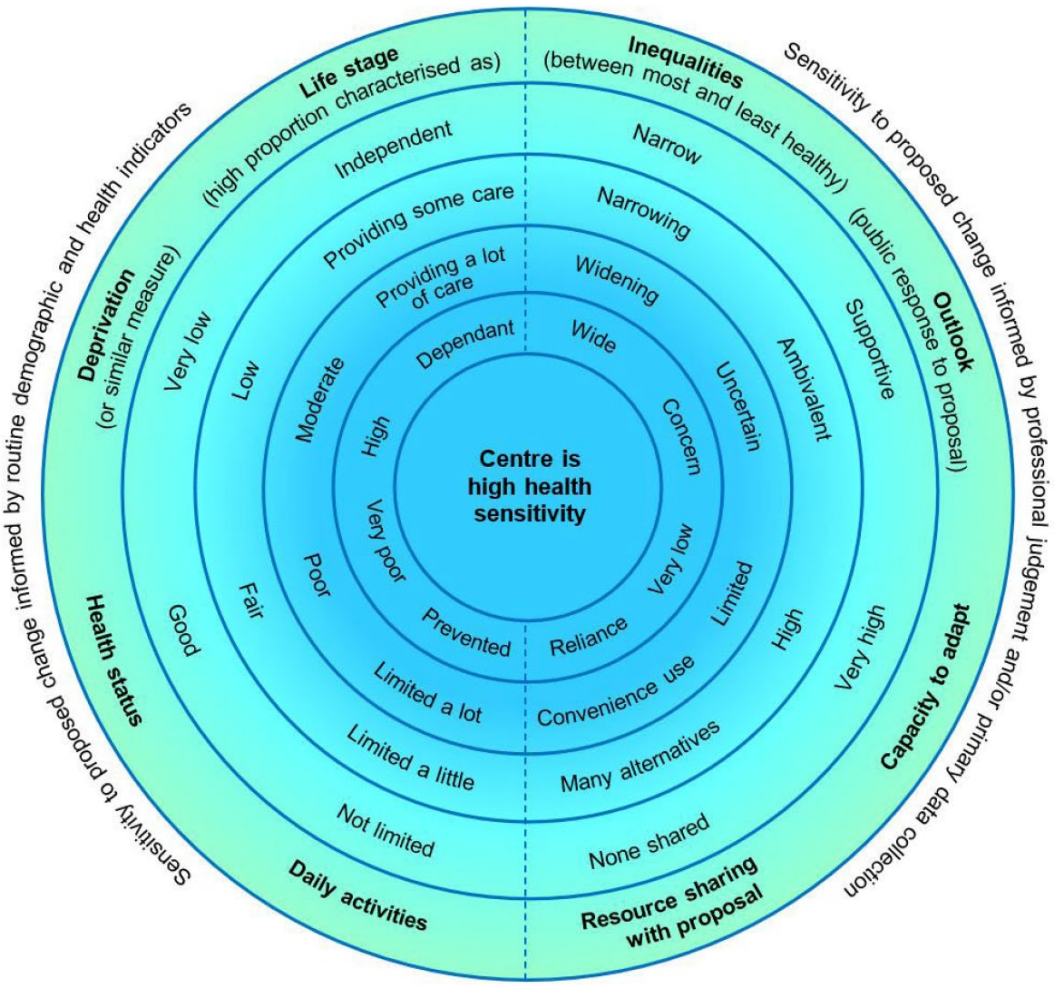
4.2.4 Population Impact Assessment Categories

4.2.4.1 Assessment Sensitivity of Population

The assessment of significance of an impact is a professional appraisal based on the sensitivity of the receptor and the magnitude of effect. Within any area, the sensitivity of individuals in a population will vary. The Health Impact Assessment Guidance (IPH, 2021) sets out conceptual model of the different components of sensitivity (Figure 4-2). It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of sensitivity. The conclusion may be summarised as a high, medium, low or negligible sensitivity to change.

The existing sensitivity of the receiving environment (in terms of population and human health) has been appraised for the study area with a desk-based assessment of routine demographic and health indicators, rather than the use of surveys or collection of primary data. This includes analysis of existing data (based on the availably of information) from the Central Statistics Office (CSO) and Pobal to build up a profile of the baseline population information within the study area. Topographical maps and Google maps have also been used to inform the baseline description of the area to inform the proximity of the site to areas of economic activity, employment, community infrastructure, emergency services, tourism and recreation amenities.

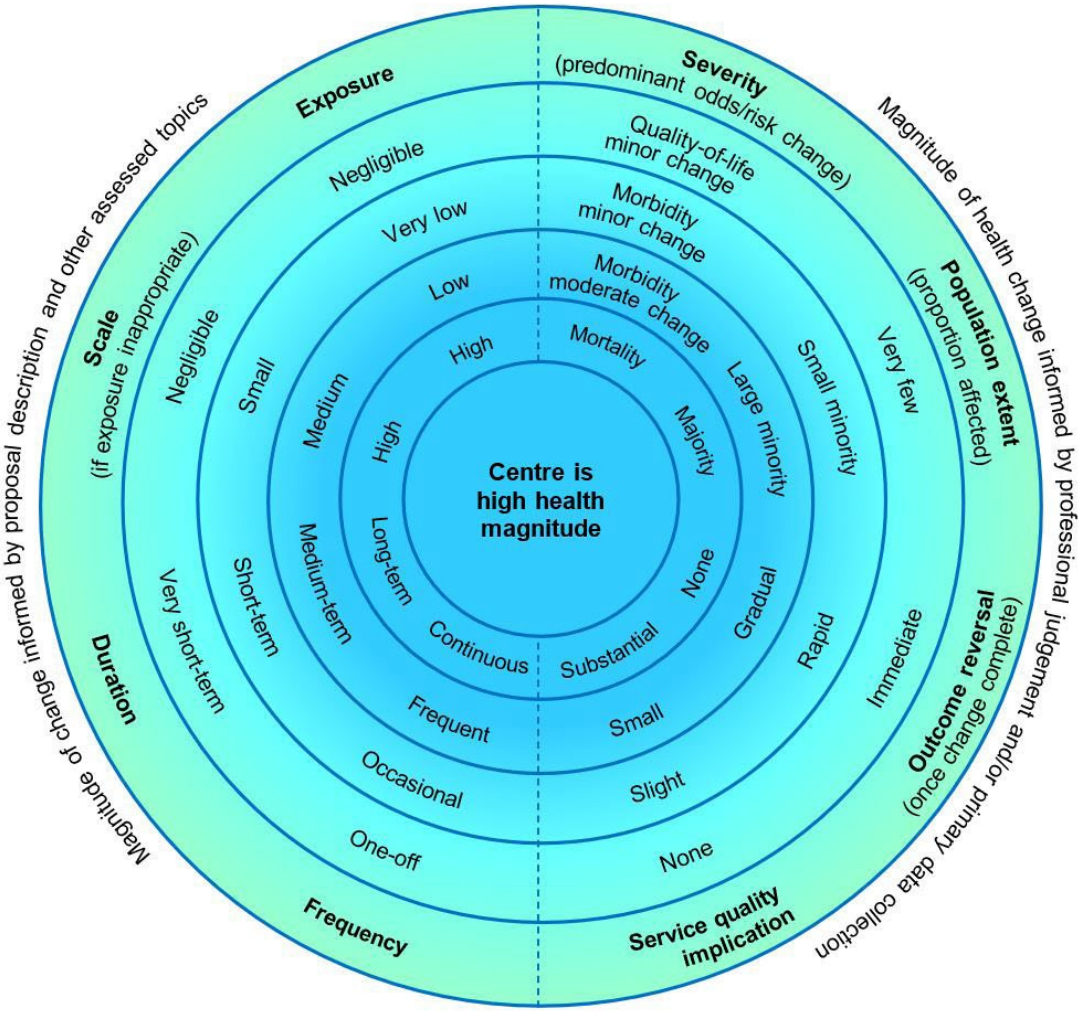
Figure 4-2 Health sensitivity: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))



4.2.4.2 Magnitude of Impact

Magnitude considers the characteristics of the change which would affect the receptor as a result of the proposal. The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of sensitivity (Figure 4-3). Again, this model provides different components of *magnitude*. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding of *magnitude*. The conclusion may be summarised as a high, medium, low or negligible magnitude of change.

Figure 4-3 Health magnitude: conceptual model (Source: Health Impact Assessment Guidance (IPH, 2021))



4.2.4.3 Significance of Effects

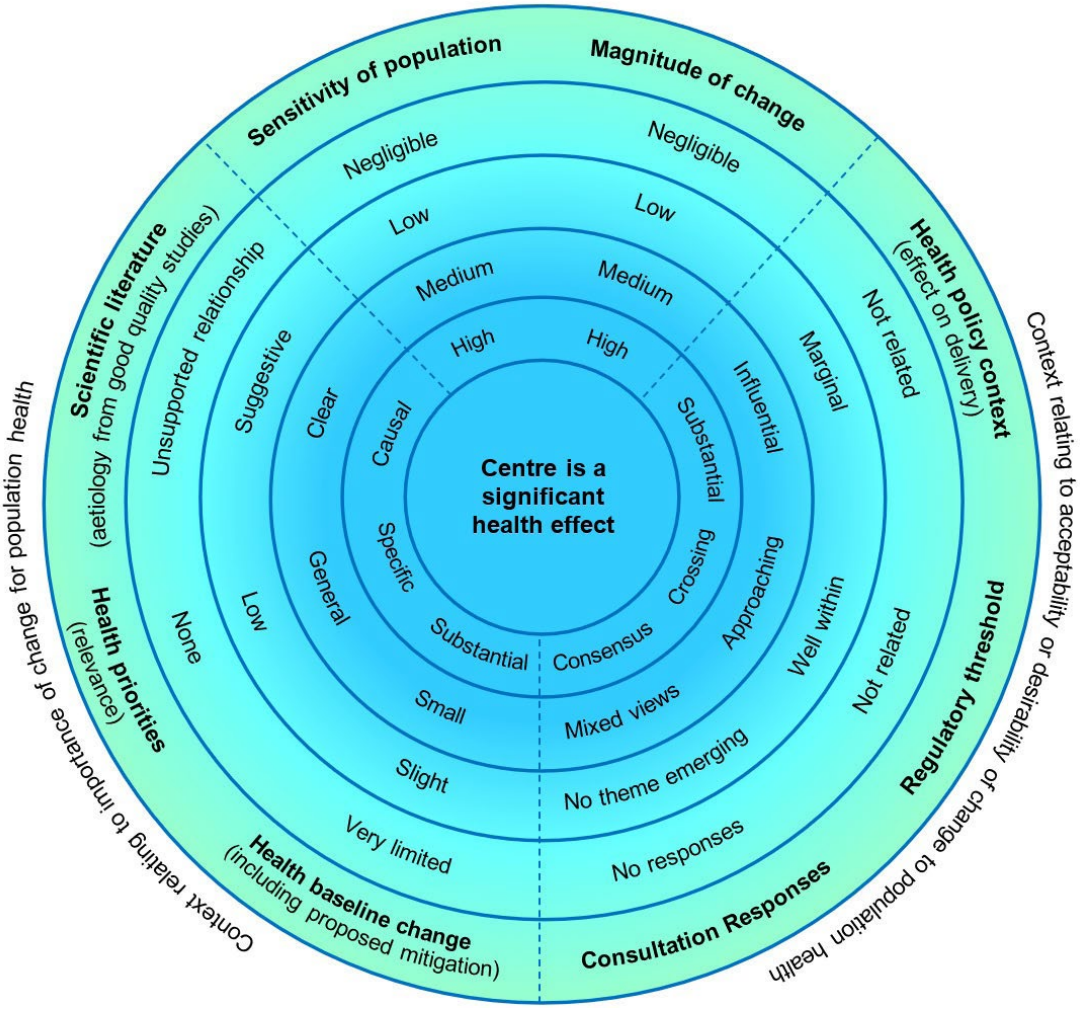
Significance relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the proposal in question. The assessment of the significance of effects in this assessment is a professional appraisal and has been based on the relationship between the magnitude of the effects and the sensitivity of the receptor.

The Health Impact Assessment Guidance (IPH, 2021) sets out a conceptual model of the different components of significance. It uses criteria (segments) and indicative classifications (levels) to explore, and explain, a finding that a health effect is significant or not significant.

The Health Impact Assessment Guidance (IPH, 2021) model brings together different types of evidence, e.g. scientific literature, public health priorities, regulatory standards and health policy. The model thus not only take into account a range of evidence sources, but also a diversity of professional perspectives, e.g. academics, public health practitioners, regulators and policy makers.

The model below, includes the factors of magnitude of impact and the sensitivity of receptors as determined in Section 4.2.1 and Section 4.2.2 above. This EIA assessment typically relies on regulatory thresholds, where there would be formal monitoring by regulators, to set out the acceptability or desirability of change to population health.

Figure 4-4 Health significance: conceptual model



4.2.5 Forecasting Methods and Difficulties Encountered

No particular difficulties were encountered in preparing the population assessment.

There are uncertainties in relation to assessing health impacts on individuals or communities due to the lack of individual health data and the difficulty in predicting effects, which can only be based on general guidance and assumptions.

Forecasting methods and methodology, if any, are set out within the specialist chapters that this assessment relies upon.

4.3 Receiving Environment

4.3.1 Population Health Sensitivity within the Study Area

The purpose of the population health sensitivity assessment is to identify the likely sensitivity of the local population and its capacity to absorb change. It is considered that for the purpose of this assessment that available data on: Population; Deprivation; Life Stage; and Health Status within the Study Area provides sufficient information to establish the population sensitivity and to provide the Planning Authority with a context for this assessment.

4.3.1.1 Population

The most recent census of population was carried out by the CSO on the 3rd of April 2022. The census compiles data for the whole state as well as smaller individual areas including counties, cities, towns, and electoral divisions. Taking into consideration the location of the Proposed Development, the census information on population, age profile, employment, and social class, has been analysed in relation to the development site.

Table 4-1 denotes the population change of the State and the electoral divisions which make up the Study Area for the census years 2016 and 2022. The latest census data (2022) indicates that all four Electoral Divisions (EDs) experienced population growth between 2016 and 2022. However, the growth rates in Singland B and Abbey B were lower than that of the Republic of Ireland during the same period, while Limerick South Rural and Ballysimon recorded higher growth rates than the national average.

Table 4-1 Population Change at National, County and Electoral Division Level from 2016 – 2022 (Source: www.cso.ie)

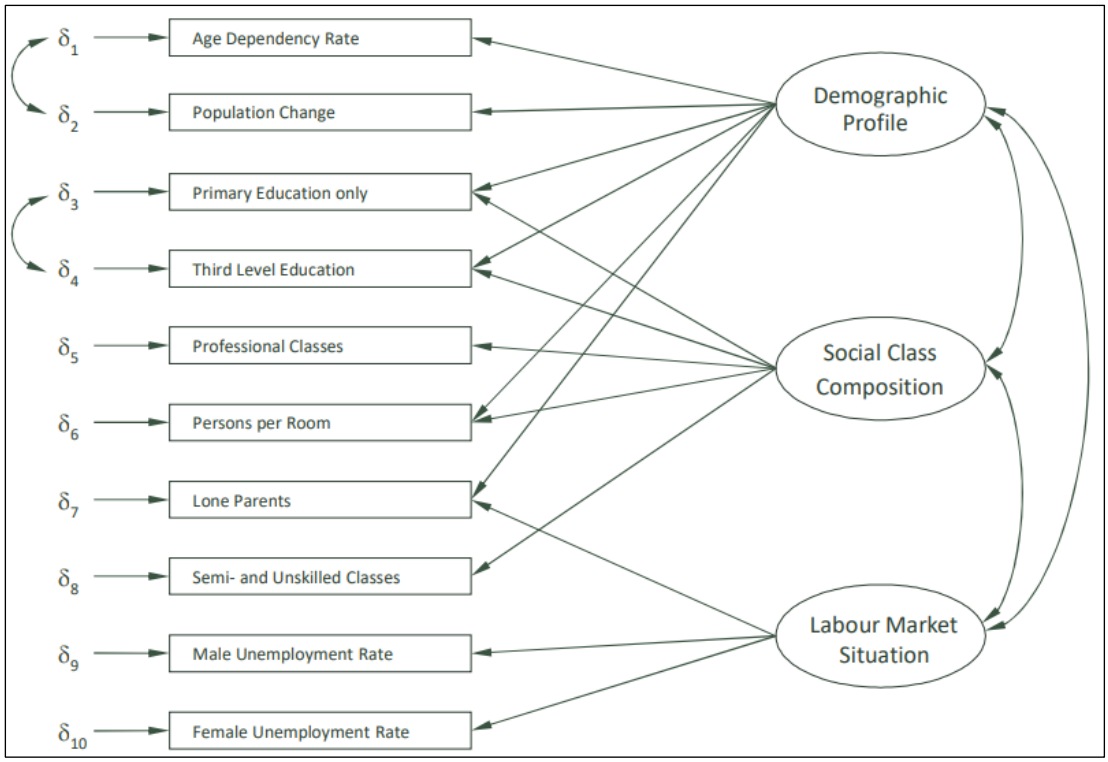
Area	Population for Census Year		% Change 2016-2022
	2016	2022	
State - Republic of Ireland	4,761,865	5,149,139	+8.1%
Limerick South Rural	1,786	2,215	+24.02%
Singland B	3,873	3,777	+2.48%
Abbey B	2,653	2,807	+5.81%
Ballysimon	13,590	16,540	+21.71%

4.3.1.2 Deprivation

The Health Impact Assessment Guidance (IPH, 2021) outlines that impact assessments should consider if the population is already stressed by limited resources or high burdens as well as if groups are affected that have reduced access to financial, social and political resources. Deprivation differences between areas are indicative of social gradients, which are central to the consideration of health inequalities.

Deprivation statistics for Ireland are available from the Pobal HP Deprivation Index that shows the overall affluence and deprivation. This Index draws on data from the national Census and combines three dimensions of relative affluence and deprivation: Demographic Profile, Social Class Composition and Labour Market Situation that are measured by ten key socio-economic indicators from the Census of Population.

Figure 4-5 Basic Model of the Pobal HP Deprivation Index



The Pobal HP Deprivation Index Relative Index Score allows for the provision of descriptive labels with the scores, which are grouped by standard deviation as seen in Table 4-2 below.

In order to make a uniform assessment of Population Sensitivty using the conceptual model as set out in Figure 4-5 above, a Deprivation Score of 'Very disadvantaged', or 'Extremely disadvantaged' would represent a high sensitivity. Conversely, a 'Extremely affluent' or 'Very affluent' would represent a very low sensitivity.

Table 4-2 Pobal HP Index Relevant Index Score labels (Source: Pobal HP Deprivation Index)

Deprivation Score	Pobal HP Description	Sensitivity of Population
> 30	Extremely affluent	Very Low
20 to 30	Very affluent	Very Low
10 to 20	Affluent	Low
0 to 10	Marginally above average	Low
0 to -10	Marginally below average	Moderate
-10 to -20	Disadvantaged	Moderate
-20 to -30	Very disadvantaged	High
< -30	Extremely disadvantaged	High

The data in Table 4-3 shows the Pobal HP Deprivation Index scores for the Study Area, based on the 2022 Census. As Pobal has not yet released national-level deprivation scores for 2022, the Limerick County score has been used for comparison. The Deprivation Index indicates that, in 2022, two of the EDs in the Study Area were classified as 'Marginally Above Average', indicating a higher score than Limerick County.

Two EDs were classified as 'Marginally Below Average'. Overall, this suggests a low to moderate population sensitivity (deprivation) within the Study Area.

Table 4-3 Deprivation Score within the Study Area (Pobal HP Deprivation Index, 2022 Census)

Area	Deprivation Score	Pobal HP Description
Limerick County	-0.83	Marginally Below Average
Limerick South Rural	0.76	Marginally Above Average
Singland B	-5.91	Marginally Below Average
Abbey B	-1.30	Marginally Below Average
Ballysimon	9.51	Marginally Above Average

4.3.1.3 Life Stage (Age Dependency)

The Health Impact Assessment Guidance (IPH, 2021) outlines that life-course analysis is often used in public health and reflects differing health sensitivities and needs at different ages. Typically, children and older people are particularly sensitive to change, including due to being dependants. Dependents are defined for statistical purposes as people outside the normal working age of 15-64. Dependency ratios are used to give a useful indication of the age structure of a population with young (0-14) and old (65+) shown as a percentage of the population of working age (15-64).

A low dependency ratio indicates that there is a larger proportion of working population age (15–64) years as compared to young (0-14) and old (65+). Conversely, a high dependency ratio indicates that there is a larger proportion of young (0-14) and old (65+) as compared to working population age. High dependency ratio can also indicate if some groups are more likely to be at home during the day (for example, due to childcare, or retired persons) and would therefore be more likely to be impacted by a development within the area.

Age dependency ratio is available through the Pobal Online Geo-Profiling tools (https://maps.pobal.ie/) which are based on the national Census.

The age dependency ratio for the study area is shown in Table 4-4 below. From these dependency ratios we can tell that the Study Area is less dependent when compared with the national average. This indicates a largely 'independent' Study Area as compared with ROI, which can be defined as per the conceptual model as 'providing some care' to 'providing a lot of care'. This indicates that there is a larger proportion of working population within the Study Area, likely to be more mobile, and out of the home during the day, and would therefore be less likely to be impacted by a development within the area as compared to a more dependant population.

Table 4-4 Age Dependency Ratio within the Study Area (Pobal Geo-Profiling, 2022 Census)

Area	Age Dependency Ratio for Census Year (%)	
	2016	2022
State - Republic of Ireland	52.70	53.22
Limerick South Rural	33.57	31.15
Singland B	32.55	30.92
Abbey B	27.46	26.54
Ballysimon	25.47	27.97

4.3.1.4 Health Status (General Health)

The CSO as part of the census records an overall self-reported measure of population health within Ireland. Areas with a poor health status are typically considered to be of a higher sensitivity and more susceptible to change in environmental conditions.

Table 4-5 below shows the self-reported measure of population health within the Study Area compared to ROI. This shows the area predominately self-reports their health as 'Very Good', which is in-line with national trends.

Table 4-5 Self-reported Measure of Population Health (CSO, 2022 Census)

Area	% population describing their general health					
	Not Stated	Very Bad	Bad	Fair	Good	Very Good
State - Republic of Ireland	6.74%	0.32%	1.41%	8.64%	29.66%	53.23%
Limerick South Rural	20.09%	0.36%	1.44%	7.45%	27.73%	42.93%
Singland B	11.55%	0.40%	1.91%	11.31%	32.04%	42.81%
Abbey B	11.58%	0.21%	1.35%	9.01%	32.85%	44.98%
Ballysimon	16.66%	0.22%	0.92%	5.24%	24.56%	52.40%

4.3.1.5 Ability to Perform Daily Activities

People's ability to perform day-to-day activities is relevant to population sensitivity, particularly where there are changes in access to services or community amenities. Persons with disabilities can also be more susceptible to the changes in environmental conditions. The CSO as part of the census records an overall self-reported measure of persons with disabilities within Ireland.

Table 4-6 presents the number of persons with a disability compared to the overall population. The data shows that two EDs within the Study Area have a lower percentage of persons with a disability than the national average, indicating relatively fewer restrictions on daily activities. In contrast, two other EDs show slightly higher percentages than the national average.

Table 4-6 Persons with a disability (CSO, 2022 Census)

Area	Persons with a disability	Population	% Persons with a disability
State - Republic of Ireland	1,109,557	5,149,139	21.5%
Limerick South Rural	459	2,215	20.73%
Singland B	935	3,777	24.76%
Abbey B	619	2,807	22.05%
Ballysimon	2,884	16,540	17.44%

4.3.1.6 Summary of Population Health Sensitivity

The 2022 Census data indicate population growth across all four Electoral Divisions (EDs) in the Study Area between 2016 and 2022. Growth in Singland B and Abbey B was below the national average, while Limerick South Rural and Ballysimon exceeded it.

The Pobal Deprivation Index (2022) classifies two EDs as 'Marginally Above Average' and two as 'Marginally Below Average', suggesting overall low to moderate population sensitivity in terms of deprivation.

The Study Area also has a low age dependency ratio, reflecting a high proportion of working-age individuals and implying greater resilience and self-sufficiency. Health data for the Study Area shows a high proportion of residents (42%–53%) reporting 'Very Good' health, with few reporting 'Bad' or 'Very Bad' health. Additionally, the percentage of persons with a disability data reveals that two EDs have lower percentages of persons with a disability than the national average, while two have slightly higher rates, indicating varied but generally limited restrictions on daily activities.

Taking all of these factors into account, the population in the Study Area demonstrates relatively low sensitivity to change. In accordance with the criteria outlined in Figure 4-2, the Study Area is therefore assessed as having Low to Moderate Population Sensitivity. This baseline also provides the context for assessing how existing and future population groups within the study area may experience changes in amenity, accessibility, service provision and environmental quality as a result of the Proposed Development.

4.3.2 Location and Character of the Local Environment

The purpose of describing the location and character of the local environment is to provide useful information on the existing local community services and facilities and their usage within the study area, thereby providing the Planning Authority with a context for this assessment. This includes community and social infrastructure that covers a range of services and facilities that meet local and strategic needs and contribute towards a good quality of life. In this context it includes local business, residential areas, education, health facilities, emergency services, and places of worship, and green infrastructure.

Furthermore, the baseline identifies tourism and landscape amenity within the study Area which provides an indication on current intrinsic values placed on the area for local, national and international users that may be impacted by the Proposed Development.

The local environment also includes areas of natural resources that relate to populations and human health that may be impacted by the Proposed Development, this includes economic resources, recreational and bathing waters, and drinking water resources.

While a general study area of ED's within 1 km from the site location is included for population statistics, the wider area of 2.5 km from the site location has been used to inform the baseline description of the area. Refer to Figure 4-6 for baseline area map.

Figure 4-6 2.5km Radius Baseline Description Area

4.3.2.1 Community and Social Infrastructure within the Study Area

This section provides an overview of the key community and social infrastructure facilities within the Study Area. For an in-depth audit of the available social infrastructure within the Study Area please refer to the Social Infrastructure Audit prepared by Tetra Tech (2026).

Residential and Employment areas

The Proposed Development site is situated in a high-density urban area, surrounded by a mix of enterprises, retail outlets, and residential dwellings to the north, west, and south. It falls under the jurisdiction of the Limerick Development Plan 2022–2028, and zoning designations have been assessed in accordance with this plan. The site is currently classified as brownfield and is zoned for 'Mixed Use', with the zoning objective stated as: *"To provide for a mixture of residential and compatible commercial uses."*

To the east, the site directly adjoins the East Groody Valley Green Wedge. North of the site, beyond the R445 road that borders it, lies an area designated for enterprise and employment. To the west is a retail development, while residential areas predominantly surround the west and south. The nearest residential properties are located along Chesterfield Grove, immediately west of the site.

There are between 10 and 100 no. high sensitivity residential properties within 20 m of the site boundary and >100 high sensitivity receptors within 250 m of the boundary.

Shopping areas within the Study Area of the Proposed Development site include Parkway Retail Park, located directly west of the site, and Aldi, c. 250 m to the north. Parkway Shopping Centre is situated about 450 m to the west. Additionally, a larger concentration of retailers offering a variety of shops can be found c. 2.4 km west of the site.

There are no industrial facilities within the Study Area, and large number of commercial businesses are located within a 2.5 km radius of the Proposed Development. The existing commercial facilities within the Study Area and their approximate distances from the site boundary are as follows:

- Beata's Driving School – c. 90 m west
- Limerick Computers – c. 95 m north
- Richard Whelan Auto Electrics – c. 155 m east
- ICMSA Agricultural Service – c. 213 m north
- Supermac's & Papa John's Singland – c. 450 m northeast
- Groody Student Park accommodation – 643 m east
- Courtyard student village accommodation – 770 m east
- Cunneens Sand and Gravel concrete supplier – c. 757 m northwest
- Limerick City Credit Union – c. 835 m west
- Park View Hall Student Accommodation – c. 910 m northwest

Education, Childcare, Schools

There are 7 no. childcare facilities within 1 km of the site, which provide childcare for children from 0 to 6 years. The Social Infrastructure Audit prepared by Tetra Tech Based provides a review of the capacity of these facilities, which showed that at the time of writing, there was a total of c. 417 childcare spaces across the seven facilities.

There are several schools, and other educational facilities within the Study Area including:

- St Brigids National School Limerick – c. 629 m southeast
- Limerick Educate Together Secondary School (LETSS) – c. 994 m southeast
- Saint Patrick's Boys National School – c. 1.26 km northwest
- St Patrick's G.N.S – c. 1.34 km northwest
- Scoil Padraig Naofa Buachailli – c. 1.37 km northeast
- Gaelcholáiste Luimnigh – c. 1.55 km northwest
- St John the Baptist Boys' National School – c. 1.57 km northwest
- University of Limerick – c. 1.7 km northeast
- Milford National School – c. 1.78 km northeast
- St Johns Girls & Infant Boys School – 1.80 km west
- Limerick School of Art and Design-TUS, Clare St. Campus – c. 1.8 km northwest
- Ardscoil Mhuire – c. 1.95 km northwest

Healthcare Services

There are 7 no. facilities providing health and medical services within 1km of the site. 2 no. of these are primary care and GP services, 2 no. are dental practices, and 3 no. are pharmacies.

Emergency Services

Emergency services within the Study Area include Roxboro Road Garda Station, located c. 1.98 km southwest of the Proposed Development site. The nearest fire station is Limerick City Fire Station, located c. 2.0 km west of the site.

Places of Worship

There are several places of worship in the vicinity of the Proposed Development:

- Restoration Bible Church Limerick Ireland – c. 660m south
- RCCG Living Stone Parish Church Limerick – c. 674m south
- St Brigid's Catholic Church – c. 932m west
- Hussainiat Imam al-Mahdi Mosque – c. 1.28 km northwest
- Saint Patrick's Roman Catholic Church – c. 1.52km northwest
- Church of Our Lady Help Of Christians – c. 1.7km northeast
- Holy Family Catholic Parish, Southill – c. 1.86 km aouthwest
- St John's Cathedral – c. 1.87km west
- Church of Our Lady, Queen of Peace - c. 1.9km southwest
- Mary Magdalene Catholic Church - c. 1.9km east
- Masjid Al-Noor Mosque Islamic Centre – c. 1.99km northwest
- Saint Mary's Church – c. 2.27km northwest
- Ghousia Masjid Mosque – 2.31km west
- St Michael's Catholic Church – c. 2.4 km west

Green Infrastructure, Landscape and Amenity within the Study Area

Noteworthy recreational features in the vicinity of the Proposed Development site include a number of sports clubs. Castletroy Golf Club is located 1.27 km to the east. The Richmond Rugby Football Club is c. 1.21 km northwest, Abbey Rovers Football Club 1.65km northwest, St Mary's Rugby Footballl club 1.96km northwest, Treaty United FC 1.75km west, Geraldines AFC 1.32km west, Fairview Rangers AFC 1.06km southwest. Claughaun GAA is located c. 430m west and ST Patricks GAA ckub is c. 859 km northwest.

Quigley's Lough hiking area is c. 728 m north of the Proposed Development site. O'Brians park is c. 1.68km to the northwest and features a children's playground.

In terms of landscape amenity, the lands surrounding the site constitute predominantly residential and commercial uses, with greenfield lands associated with the Groody Valley to the east of the site. With reference to the Limerick Count Development Plan 2022-2028, the site is located within the 'City' landscape area, with the Castletroy character area immediately to the east of the site. There are no listed or scenic views pertaining to the site.

There are no Architectural Conservation Areas (ACA), or Special Areas of Conservation (SAC) located within the Study Area.

There are no Recorded Monuments (as listed in the Record of Monuments and Places (RMP) or the Sites and Monuments Record (SMR) for County Limerick), Protected Structures, National Monuments, or National Inventory of Architectural Heritage sites within the subject site. The closest Protected Structures are located over 400m from the subject site, while the closest RMP is a pit c. 40 m from the site boundary.

4.3.2.2 Tourism within the Study Area

As noted in the Limerick Development Plan 2022–2028, tourism is one of Limerick's most important economic drivers which is fully embraced by the Council. The following is stated in Section 3 (titled Tourism) within the Limerick Development Plan 2022–2028:

> *"Tourism is a proven economic driver, playing a significant role in the overall development of Limerick. The sector is uniquely positioned to contribute strongly to job creation and reversing unemployment in communities throughout Limerick. As a significant economic activity, Limerick City and County Council in partnership with local and national stakeholders, seeks to increase*

tourist numbers and support sustainable job creation, through targeted tourism initiatives including the development of new tourism products and leveraging natural and built heritage assets to support tourism across Limerick. Limerick strategically positioned in the Mid-West Region with excellent connectivity nationally by rail and road corridors and internationally by its proximity to Shannon International Airport, which has capacity to cater for 4.5 million passengers per annum."

The Proposed Development site is located within a predominantly residential and commercial area. The site itself does not currently serve any tourism function, nor is it situated in the vicinity of any established or notable tourist destinations.

4.3.2.3 Natural Resources within the Study Area

Geological Heritage, and Economic Resources

Natural resources and land use in the Study Area has also been considered as they may have implications for the development of the lands. A review of Geological Survey Ireland online maps has shown that there are no extractive industries or active quarries within the Study Area. There are two recorded mineral localities within a 2 km radius of the site, a worked clay mineral locality 560 km southwest of the site, and a metallic locality c. 1.2 km west of the site. Based on the distance there is no potential for effects to these localities. The Proposed Development site is not located within or in the vicinity of a geological heritage site.

Recreational Waters and Bathing Waterbodies

A review of EPA maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no protected Recreational Waters or Bathing Waterbodies within the Study Area.

The Lower River Shannon SAC (site code 002165) is located c. 705 m north of the site.

Drinking Water Resources

A review of Geological Survey of Ireland online maps and EPA maps that includes the Water Abstraction locations, and Groundwater Public Supply Source Protection Zones (SPZ) has been undertaken. There are no groundwater drinking water protections areas within the Study Area.

The GSI dataset for groundwater wells and springs indicates two boreholes within the Study Area, with one listed for industrial use and the other listed as an unknown use. The site and the surrounding area are serviced by a public water supply.

4.3.3 Risk of Major Accident Hazards or Disasters

The potential for a project to cause risks to human health, cultural heritage, or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g., the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required.

Landslides, Seismic Activity and Volcanic Activity

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat

areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). Based on the GSI spatial map viewer, the landslide susceptibility classification of the site ranges between 'Low' and 'Low Inferred'.

There are no active volcanoes in Ireland so there is no risk of volcanic activity.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the Proposed Development site. This means that there is less than a 2% chance of potentially damaging earthquake shaking in the next 50 years.

The Proposed Development site is not vulnerable to landslides, seismic activity or volcanic activity within its boundary. Therefore, there is no significant potential for the Proposed Development to cause risks to human health due to its vulnerability to landslides, seismic activity or volcanic activity.

Proximity to Seveso or Industrial Emissions Sites

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

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

Establishments are either lower tier establishments or upper-tier COMAH sites with above threshold quantities of dangerous substances present, and to which the provisions of the COMAH regulations apply.

The Health and Safety Authority (HSA) list of Notified Seveso Establishments has been used to identify if the Proposed Development falls within the consultation distance of any nearby Seveso Establishments. There are no Upper or Lower Tier Notified Seveso Establishments within the Study Area. The closest Notified Seveso Establishments to the proposed development are the Lower Tier establishments, Grassland Agro, located c. 4.8 km from the site at Dock Road, Limerick City, and Analog Devices International, located c. 6 km from the site at Raheen Business Park, Raheen. The site is not a Seveso facility and is not within the consultation distance of any Seveso facility. Therefore, there are no implications for major accidents or hazards at the Proposed Development site.

There are two EPA Licenced facility within the Study Area that could potentially give rise to cumulative effects, detailed in Table 4.7 below. Licensed facilities are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment.

Table 4.7 EPA Licenced Facilities nearby to the Proposed Development Site

Registration number	Name	Category	Licence type	Distance (km)
P0291	Galvotech Ireland Limited	Industry	IE	0.98km SW
P0341	Heiton Buckley Limited	Industry	IE	1.1km SW

It is important to note that the proximity of a licensed facility does not necessarily mean that the Proposed Development will be impacted by their emissions. However, it is essential to consider these sites as part of the existing environment and to consider and understand the potential for cumulative impacts or other interactions with the Proposed Development at this location.

Risk of Flooding

A Site-Specific Flood Risk Assessment was carried out for the Proposed Development site by Punch (2026). The Proposed Development site is primarily located within Flood Zone C for fluvial flooding, which indicates the probability of a 1-in-1000-year event or an event of less severity occurring (0.1% annual exceedance probability or AEP). A surface water outfall pipe for the site will be located within Flood Zone A, indicating the probability of a 1-in-100-year event or one of greater severity occurring (1% AEP). It is not considered that the site is at risk of coastal flooding.

It is considered that the Proposed Development is at a low risk of flooding and is considered appropriate in line with the requirements set out in the '*Planning System and Food Risk Management Gudelines*'. Any residual risk of flooding is proposed to be mitigated by compliance with best practice for finished floor levels, and provision / regular inspection of surface water drainage.

4.4 Characteristics of the Proposed Development

The Proposed Development will comprise a Large-Scale Residential Development (LRD), consisting of 403 no. residential units, a c. 306 m^2 creche, a four-storey c. 3082 m^2 medical centre, 138 no. parking spaces, 818 no. bicycle parking spaces, and all associated landscaping, services, infrastructure, and other ancillary development.

A full description of the development can be found in Chapter 2 (Description of the Proposed Development).

4.5 Potential Impacts of the Proposed Development

The main potential effects on population and human health from the Proposed Development relate to environmental pathways such as land and water emissions, air quality, noise and vibration, visual amenity and traffic, together with population effects associated with employment, housing provision, local economic activity, community and social infrastructure, amenity and accessibility. The baseline environment, pollution pathways, relevant mitigation measures and residual impacts have been assessed in greater detail within the corresponding specialist chapters (Chapter 5 Land, Soils and Geology, Chapter 6 Hydrology and Hydrogeology, Chapter 8 Air Quality, Chapter 10 Noise and Vibration, Chapter 11 Townscape and Visual Impact, and Chapter 13 Material Assets – Traffic and Transportation), while this chapter considers how those findings translate into effects on people and communities.

A summary of the main potential impacts, as they are relevant to populations and human health criteria during the construction and operation phases of the Proposed Development, is presented herein.

4.5.1 Construction Phase

4.5.1.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are dealt with within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality
- Chapter 10 – Noise and Vibration
- Chapter 11 – Townscape and Visual Impact
- Chapter 13 – Material Assets - Traffic and Transportation

In population terms, the construction phase has the potential to affect existing residents, nearby businesses and users of local services through temporary changes in amenity and accessibility, while also generating short term employment and expenditure within the local economy.

The construction phase of the Proposed Development will generate a temporary increase in the local population due to the employment of workers, some of whom may come from outside the Singland and / or Limerick City area and choose to reside either locally or in the wider region. This is anticipated to represent only a small proportion of the overall construction workforce, with the majority expected to commute from their existing places of residence. Some local employment opportunities within the wider area are also expected.

Construction activity will indirectly benefit support industries such as builders' suppliers, construction material manufacturing, equipment hires, landscaping, maintenance, and other local services. In addition, specialist workers will be required on a periodic basis; however, these workers are only expected to remain for short durations, depending on the nature of the work.

Overall, the construction phase is considered to have a ***short term, positive*** and ***not significant*** effect on population in terms of employment and local economic activity, notwithstanding the temporary amenity effects on nearby residents and other receptors assessed separately in the sections that follow.

4.5.1.2 Potential Impacts on Townscape, Amenity and Tourism

There will be no significant impact on local parks or the larger amenity areas. It is not anticipated the Proposed Development will have significant impact on local tourism or shopping amenities. The Proposed Development will not create any significant wastewater discharge which could have a potential impact on local amenities or the local population.

It is considered following landscape (townscape) and visual assessment guidelines that the overall impact of the Proposed Development on the local townscape will be ***negative, moderate,*** and ***short-term*** during the construction phase, with effects reducing with increased distance from the site. Based on the findings of Chapter 11 (Townscape and Visual Impact), the construction of the Proposed Development will be most noticeable in the immediate setting of the site, including the residential area of Singland. Given the urban context, surrounding busy road network, and lack of notable views/scenery, visual receptor sensitivity is considered to be medium low to low. The highest magnitude of visual effects will be during peak construction activities when main structures have emerged but are incomplete, and will be at most ***moderate, negative,*** and ***short-term.***

4.5.1.3 Potential Impact from Land and Water Emissions on Population and Human Health

With reference to Chapter 5 (Land, Soils, and Geology), during construction of the Proposed Development, the potential for impacts on human health and populations during the construction phase primarily relates to the disturbance of soils and the possibility of encountering previously unidentified contamination.

Uncontrolled soil contamination can negatively affect human health through inhalation of fumes or dust from hydrocarbons and petroleum products. Depending on the contaminant type and exposure level, such contamination can have serious health implications for workers and nearby populations.

Without the consideration and employment of mitigation measures the potential impacts during the construction phase on human health and populations due to the potential for soil contamination to occur are ***negative***, ***not significant*** and ***short term***.

With reference to Chapter 6 (Hydrology and Hydrogeology) during construction of the Proposed Development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage. Note HVO will be used for vehicles and plant, instead of diesel);
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

As stated in Chapter 6 (Hydrology and Hydrogeology), during the construction phase a reduction in water quality via unmitigated pollutants entering the onsite drainage system and migrating towards the Groody River and Shannon (Lower) has the potential to lead to negative impacts on human health and populations. Additionally, infiltration of contaminated water poses a risk to the underlying Locally Important Aquifer (Limerick City East GWB).

Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA in the immediate downstream environment of the site. The abstraction point associated with the Shannon (Lower) surface water drinking RPA is located upstream of the subject site and the Proposed Development will have no impact on this RPA.

In addition, there are no recorded public groundwater supplies or group schemes, groundwater source protection zones, public supply source protection area or group scheme preliminary source protection areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the site. The locality is served by mains water supply.

Therefore, in the absence of mitigation measures, no likely significant effects on population or human health are predicted from water emissions during the construction phase of the Proposed Development.

4.5.1.4 Potential Impact from Air Quality on Population and Human Health

The primary elements in relation to the construction of the Proposed Development with the potential to impact air quality and subsequently human health are:

- Dust soiling effects on people and property from general site preparation, construction vehicles and construction activities;
- Potential human health effects from dust (PM_{10} and $PM_{2.5}$) emissions from general site preparation, construction vehicles and construction activities;
- Engines emissions from construction vehicles or machinery and construction traffic.

There are between 10 and 100 no. high sensitivity residential properties within 20 m of the site boundary and >100 high sensitivity receptors within 250 m. of the boundary (Refer to Figure 8.2). In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) as referenced in Chapter 8 (Section 8.5.3.1) the overall sensitivity of the area to dust soiling impacts is high based on the IAQM criteria outlined in Table 8.5. In addition, the IAQM criteria outlined in Table 8.16 indicates that the worst-case sensitivity of the area to dust-related human health effects is low.

There is at most a high risk of dust soiling impacts based on the high sensitivity of the surrounding area to dust soiling and, at most, large dust emissions magnitude. There is a low risk of dust-related human health impacts associated with the proposed works based on the low sensitivity of the area to human health impacts and the large dust emission magnitude. Without mitigation in place, construction dust will potentially have a ***direct, negative, short-term*** and ***slight*** impact on the local population and human health due to fugitive dust, which has the potential to be significant.

There is also the potential for traffic emissions to affect air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as described in Section 8.2.3.2 of Chapter 8. It can therefore be determined that the construction stage traffic will have a ***negative, localised, short-term,*** and ***not significant*** impact on air quality, and consequently human health, which is overall not significant in EIA terms.

4.5.1.5 Potential Impact from Noise and Vibration on Population and Human Health

Exposure to excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include;

- Annoyance
- Sleep Disturbance
- Heart and circulation problems
- Quality of Life
- Cognitive Process
- Hearing

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Noise and vibration impacts associated with the development have been assessed within Chapter 10 of the EIA Report.

The nearest noise-sensitive receptors to the Proposed Development are residential buildings located about 30 meters to the west of the closest development structures.

The results presented in Chapter 10 indicate that construction noise levels may result in exceedance of the recommended daytime construction noise limit, 65 dB LAeq(T). This exceedance represents a significant impact to the nearest noise-sensitive receptors during the demolition works, which are likely to be the loudest phase of construction. These noise levels are expected to occur only intermittently and affect only a limited number of properties. For the majority of the time and across most properties surrounding the Proposed Development, construction noise levels will be lower than those predicted.

Based on the construction noise levels, the worst-case impacts to the noise environment, and consequently on the local population and human health, at the closest residences are determined to be ***negative***, ***significant,*** and ***temporary,*** reducing to ***negative, slight*** to ***moderate***, and ***short-term*** for the other phases of works.

With respect to construction vibration, in the direction of the nearest noise sensitive dwellings, vibration impacts during the construction phase are required to comply with the limits set out in Chapter 10, Tables 10-7 and 10-8.

Impacts on the local population and human health, associated with noise the additional construction traffic on local roads is considered to be ***negative, imperceptible,*** and ***short-term***.

4.5.1.6 Potential Impact from Traffic and Transportation on Population and Human Health

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states;

"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians"

In the Department of Communications, Climate Action & Environment document *Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy* vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the Proposed Development during the construction and operational phases is presented in Chapter 13 (Material Assets - Traffic and Transportation).

As noted in Chapter 13 (Material Assets – Traffic and Transportation), the Proposed Development's construction phase shall generate vehicular traffic comprising a mix of Heavy Goods Vehicles (HGVs), Light Goods Vehicles (LGVs) and cars. Due to the designated site access point, which allows delivery vehicles to pull off into the Site, there will be no significant disruption to the traffic flows on the Dublin Road (R445) or at the Parkway Valley Retail Park roundabout as a result of the construction of the development. It is not envisaged that any diversions will be required.

Construction traffic will result in increases of less than 10% of total peak hour vehicle movements at affected junctions. Existing public footpaths and cycling facilities in the vicinity of the Proposed Development Site will be unaffected during construction phase.

The overall potential construction phase effect of the Proposed Development on the operation of the surrounding road network, and consequently on population and human health, is therefore considered to be ***not significant*** to ***slight, negative*** and ***temporary.***

4.5.1.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The Proposed Development has the potential for an impact on the health and safety of workers employed during the construction phase. The activities of the applicant's contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimise the likelihood of any impacts on workers' health and safety.

As outlined in Section 4.3.3, there is a negligible risk of seismic activity, volcanic activity and sea level rise. Regarding landslides, the landslide susceptibility classification of the site ranges between 'Low' and 'Low Inferred'.

There are no COMAH sites / Seveso Establishments located within Proposed Development study area. The Proposed Development is considered appropriate and with a negligible risk of being impacted by a COMAH site.

As stated in Section 4.3.3, the majority of the site is located within Flood Zone C with a surface water outfall pipe located in Flood Zone A. Given that construction works will not take place in flood zone A, the overall flood risk to and from the development during the construction phase is considered to be minimal.

The potential effect is therefore imperceptible and unlikely in respect of population and human health arising from major accident hazards or natural disasters during the construction phase of the Proposed Development.

4.5.2 Operational Phase

4.5.2.1 Potential Impacts on Businesses and Residences

The main potential impacts on local businesses and residences associated with the Proposed Development will be in relation to nuisances; air quality, noise, visual impact and traffic. The potential impacts and mitigation measures to address them are outlined in the following sections of this chapter and in detail within the corresponding chapters of this EIA Report as follows:

- Chapter 8 – Air Quality and Climate
- Chapter 10 – Noise and Vibration
- Chapter 11 – Townscape and Visual Impact
- Chapter 13 – Material Assets - Traffic and Transportation

The addition of new housing, a creche and a medical centre will positively contribute to the population of the area by increasing housing supply, supporting local service provision and strengthening the viability of existing community and commercial facilities. As set out in Section 4.3.2 and the Social Infrastructure Audit (Tetra Tech, 2026), a range of community and social facilities already exists within the surrounding area and will help support the Proposed Development. Residents of the Proposed Development are also likely to spend a portion of their income locally, thereby supporting local economic activity. Adequate provision of high quality housing is recognised as a key determinant of good population and public health outcomes.

Overall, the operational phase will result in a ***positive, moderate*** and ***long-term*** effect on population, while also supporting human health and wellbeing through the provision of high quality homes and convenient access to services in a sustainable urban location.

4.5.2.2 Potential Impacts on Townscape, Amenity and Tourism

The Proposed Development once operational will have no perceptible impact on local tourism. It will have a positive impact on shopping amenities in the locality. There will be no perceptible impact on the local parks or the larger amenity areas.

The Proposed Development will not create any wastewater discharge which could have a potential impact on local amenities or the local population. All wastewater generated at the Proposed Development will be connected to the existing public foul network and so will not impact local amenities or the local population.

The Proposed Development will consist of the provision of new residential apartments, creche, medical centre, associated vehicle / pedestrian / cycling infrastructure, communal open space, new streetscape, and ancillary elements, and will replace the existing open area of disturbed, previously developed land currently forming the majority of the site. The potential impact on local amenities can thus be considered to be ***positive, not significant***, and ***long-term***.

With respect to visual impacts, a total of 16 no. viewpoints were analysed in Chapter 11 (Townscape and Visual Impacts). The Proposed Development will transform the current disturbed, brownfield site into a high-quality residential scheme. The most significant visual (and landscape) effects would be on the immediate environs, where the structures will be the most visible. The Proposed Development is of greater height and scale than its surroundings, substantially altering the landscape character. Outside of the immediate Singland environs, the development's visual and landscape effects would be limited, as it would be perceived as part of the wider Limerick cityscape.

The potential impacts on local visual amenity are considered to be ***permanent***, ranging from ***slight-imperceptible neutral*** to ***moderate-slight positive*** to ***moderate negative-neutral*** across the study area, while landscape effects are considered to be ***moderate, positive,*** and ***long term.***

4.5.2.3 Potential Impact from Land and Water Emissions on Population and Human Health

With reference to Chapter 5 (Land, Soils, and Geology), there are no sensitive economic or historical geological features within the site. During the operational phase, the majority of the site will be capped with hardstanding, eliminating pathways for direct contact with soils and subsoils. In addition, there is no requirement for bulk storage of chemicals or hazardous substances during the operational phase. As a result, there is no potential for impacts on population and human health or populations arising from changes in land, soils, or geology.

With reference to Chapter 6 (Hydrology and Hydrogeology), there are no recorded recreational waters, bathing water bodies, or surface water abstraction points located downstream of or directly hydrologically connected to the site that could be impacted by changes in water quality or flow. In addition, the Geological Survey Ireland (GSI) records no Public Supply Source Protection Areas or Group Scheme Preliminary Source Protection Areas within the zone of influence of the Proposed Development.

Given the proposed design and drainage infrastructure, there is no potential for unmitigated off site flooding arising from the increased hardstanding areas, as operational runoff will be managed and attenuated through the proposed drainage design and SuDS measures.

There is also no potential for off site contamination from car parking or trafficked areas, including hydrocarbons, as all runoff from these areas will be intercepted, treated, and attenuated within the integrated SuDS network (e.g. permeable paving, bioretention areas, swales, attenuation pond) prior to entering the controlled drainage system.

Accordingly, there is no potential for significant effects on population or human health from land or water emissions during the operational phase of the Proposed Development.

4.5.2.4 Potential Impact from Air Emissions on Population and Human Health

As outlined in Chapter 8 (Air Quality), National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are set for the protection of human health and the environment. The applicable limit values in relation to the Proposed Development are set out in Table 8.1 of Chapter 8.

Due to the design of the Proposed Development there is no potential for significant impacts to air quality during operation as a result of emissions.

There is the potential for vehicles accessing the site to result in emissions of NO_2, PM_{10} and $PM_{2.5}$. However, the Proposed Development will not increase traffic by 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. A detailed air quality assessment was scoped out for the operational stage of the development as per the TII screening criteria. The potential

operational phase effects on air quality, and consequently on population and human health, will be ***neutral, long term*** and ***imperceptible.***

4.5.2.5 Potential Impact from Noise and Vibration Emissions on Population and Human Health

As set out in Section 4.5.1.5 above, exposure to excessive noise and vibration stimuli is becoming recognised as a large environmental health concern. Noise and vibration impacts associated with the development have been assessed within Chapter 10 of the EIA Report.

Once the Proposed Development is operational, potential noise impacts on the surrounding environment are expected to be minimal. The residential element of the development is not anticipated to generate any significant noise sources beyond those typical of existing residential environments.

Noise emissions from operational plant associated with the development will be selected, designed and located so that there is no negative impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive locations within the development (e.g. apartments, etc.) will be designed/attenuated to meet the relevant noise criteria as set out in Section 10.5.2.3 (Chapter 10) for day and night-time periods.

The main potential operational noise impact is associated with the generation of additional traffic to and from the site resulting from the new residential and medical centre / creche elements.

Tables 10-11 and 10-12 (Chapter 10) summarises the calculated change in noise levels along assessed road links due to development-related traffic. The resulting changes are calculated as <1dB at all junctions assessed.

The predicted impact of traffic related noise on population and human health will be ***neutral, long term*** and ***imperceptible*** when considered in the context of the existing road network.

Once operational, there will be no vibration sources associated with the development.

4.5.2.6 Potential Impact from Traffic and Transportation on Population and Human Health

As has been identified in Section 4.5.1.6, traffic-related impacts can have negative consequences for human health. With reference to Chapter 13 (Material Assets – Traffic and Transportation), the Proposed Development will generate vehicular traffic, however, the convenient accessible location of the Site supports sustainable transport usage and will therefore not generate high levels of vehicular traffic in the area. A public transport capacity assessment found that there is adequate capacity within the existing public transport services to accommodate the Proposed Development.

With regard to the current development proposals, expected traffic volumes will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.

Therefore, in the absence of mitigation measures, there is no potential for significant effects on population or human health as a result of additional traffic generation. The potential impact is characterised as ***long term, neutral*** and ***not significant.***

4.5.2.7 Potential Impacts from Major Accident Hazards and/or Natural Disasters on Population and Human Health

The Proposed Development has been designed with consideration given to the health and safety risks of people living and working in the vicinity. The facility has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience.

As outlined in Section 4.3.3 there is a negligible risk of external natural disasters; including seismic activity, volcanic activity and sea level rise. The landslide susceptibility classification of the site ranges between 'Low' and 'Low Inferred'.

COMAH related impacts are considered negligible as the site is not a Seveso facility and is not within the consultation distance of any Seveso facility. Therefore, there are no implications for major accidents or hazards at the Proposed Development site.

As stated in Section 4.3.3, the site is in Flood Zone C, with one surface water outfall pipe located in Flood Zone A. The Proposed Development is at a low risk of flooding and is considered appropriate in line with the requirements set out in the 'Planning System and Food Risk Management Gudelines'. Any residual risk of flooding is proposed to be mitigated by compliance with best practice for finished floor levels, and provision / regular inspection of surface water drainage.

The potential effect is therefore ***imperceptible*** and unlikely in respect of population and human health arising from major accident hazards or natural disasters during the operational phase of the Proposed Development.

4.6 Mitigation Measures

4.6.1 Construction Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Townscape and Visual); Chapter 13 (Material Assets - Traffic and Transportation).

4.6.1.1 Businesses and Residences

There are no potential likely significant impacts on Businesses and Residences, and therefore specific mitigation measures over and above what has been specified in each specialist chapter of the EIAR are not considered necessary. Any impact will be further mitigated by the use of binding hours of construction, as well as the measures set out in Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Townscape and Visual); and Chapter 13 (Material Assets - Traffic and Transportation).

4.6.1.2 Townscape, Amenity and Tourism

As outlined in Chapter 11 (Townscape and Visual Impact), measures during the construction stage will comprise standard best-practice construction measures including management of timing of construction activities, which will be restricted per local authority guidance. A site hoarding will also screen ground level clutter and activity from view. No further site-specific mitigation measures are proposed.

4.6.1.3 Land and Water Emissions

All mitigation measures outlined within the Chapter 5 (Land, Soils and Geology) and Chapter 6 (Hydrology and Hydrogeology) will be implemented in accordance with Construction Environmental Management Plan (CEMP), as well as any additional measures required pursuant to planning conditions which may be

imposed. The construction phase mitigation measures set out in the CEMP, will be implemented by the construction contractor to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection.

No additional mitigation measures are required the beyond standard construction good practice as set out in the CEMP. No hazardous waste has been identified within the site boundary (see Chapter, 5, Section 5.3.9), and therefore no significant risks to human health are predicted. To minimise the potential for spills or accidental releases during construction, fuels and oils will be handled and stored in designated areas and spill kits will be available at all work locations.

All excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor. All sampling and soil handling will be undertaken by suitably qualified and trained persons using suitable personal protective equipment to avoid risks to human health and populations.

As set out in Section 4.5.1.3, there are no recorded Recreational Waters, Bathing Waterbodies located in the immediate downstream environment. The Shannon (Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking RPA, but the abstraction point relating to this protection is located upstream of the subject site. The Proposed Development will have no impact on this RPA. As there is no source pathway linkage, no further mitigation is required.

4.6.1.4 Air Emissions

A suite of best practice dust mitigation measures appropriate for sites with a high risk of dust impacts are outlined in Section 8.6.1 of Chapter 8. These include measures for dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. The measures draw on best practice guidance from Ireland, *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* (DCC, 2018), the UK, *Guidance on the Assessment of Dust from Demolition and Construction Version 2.2* (IAQM, 2024), *Controlling Particles, Vapours & Noise Pollution from Construction Sites* (BRE, 2003), *Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings* (The Scottish Office, 1996), *Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance* (ODPM, 2002)) and the USA, *Fugitive Dust Technical Information Document for the Best Available Control Measures* (USEPA, 1997).

The dust mitigation measures proposed in Chapter 8 will reduce dust emissions and thus dust-related human health effects.

4.6.1.5 Noise and Vibration Emissions

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. Further details of the mitigation measures proposed are provided in Chapter 10 (Noise and Vibration).

During the project's construction phase, some nearby residential properties may occasionally experience temporary noise disturbances caused by on-site operations and vehicle movements to and from the site.

Through enforcement of strict noise limits, monitoring on site, the restriction of working hours, and application of the above listed mitigation strategies, these impacts will be managed with the intention of remaining within acceptable limits.

4.6.1.6 Traffic and Transportation

For the Construction Phase, the appointed contractor shall be required to prepare a Construction Traffic Management Plan prior to the commencement of development, including a plan for the scheduling and management of construction traffic, which will outline measures to be taken to mitigate the effects of construction traffic on the surrounding road network. Dedicated construction traffic routes and restrictions will be identified and will be agreed with the Council prior to the commencement of construction activities on site.

Construction personnel will be encouraged to use public transportation, carpooling, or active travel methods when travelling to the site. The proposed distribution of construction workers with the proposed shifts will be managed to minimise the Construction Phase impacts during the road network peak hours.

4.6.1.7 Major Accident Hazards and/or Natural Disasters

All mitigation measures outlined in the submitted CEMP will be implemented throughout the construction phase of the development. This will include mitigation measures outlined within this EIAR. The CEMP includes emergency response procedures for environmental incidents. It will be continuously updated to manage risks during construction.

4.6.2 Operational Phase

The mitigation measures to address the potential impacts on population and human health from the Proposed Development have been assessed within the corresponding specialist chapters; Chapter 5 (Land, Soils and Geology); Chapter 6 (Hydrology and Hydrogeology); Chapter 8 (Air Quality), Chapter 10 (Noise and Vibration); Chapter 11 (Townscape and Visual); and Chapter 13 (Material Assets - Traffic and Transportation).

4.6.2.1 Businesses and Residences

Once construction works are completed there are no specific mitigation measures required in respect of local businesses and residences.

4.6.2.2 Townscape, Amenity and Tourism

As outlined in Chapter 11 (Townscape and Visual Impact), landscaping and urban design measures have been integral in the Proposed Development design. The potential operational phase landscape and visual effects are classified as ***neutral*** or ***positive*** from most viewpoints with two of the viewpoints classified as marginally negative. Other than those features and characteristics of the development proposals that have been embedded into the design of the scheme, Chapter 11 concludes that there are no specific townscape and visual mitigation measures considered necessary in this instance.

4.6.2.3 Land and Water Emissions

With reference to Chapter 5 (Land, Soils, and Geology), there are no sensitive economic or historical geological features within the site. During the operational phase, the majority of the site will be capped with hardstanding, eliminating pathways for direct contact with soils and subsoils. Furthermore, as stated in Chapter 5, Section 5.5.2.2., there is no requirement for bulk storage of chemicals or hazardous substances.

The mitigation measures outlined in Chapter 5, Section 5.6.2.1 will be implemented during operation, and no additional measures are required for the protection of human health and populations.

In accordance with Chapter 6 (Hydrology and Hydrogeology), several best practice measures are proposed to safeguard human health and populations during the operational phase of the Proposed Development. To prevent potential contamination from surface water runoff originating from roads and hardstanding areas, a Sustainable Drainage System (SuDS) will be implemented. This system will reduce the risk of pollutants such as hydrocarbons entering the stormwater drainage network and subsequently impacting surface water bodies.

There are no recorded Recreational Waters, Bathing Waterbodies, Surface Water Drinking RPA abstraction points, public groundwater supplies, groundwater source protection zones, public supply source protection area or group scheme preliminary source protection areas which could be impacted by the Proposed Development. As there is no source pathway linkage, no further mitigation is required.

4.6.2.4 Air Emissions

The impact of the operational traffic associated with Proposed Development on air quality is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

4.6.2.5 Noise and Vibration Emissions

As detailed in Chapter 10, during the operational phase, no additional noise mitigation measures are required for either the development itself or associated traffic. Access to the site will be directly from the R445 roadway, with no vehicular connections to the adjacent residential estates, thereby minimizing traffic noise impacts on those areas. As on-site sensitive receptors are located closer to potential noise sources than off-site receptors, compliance with the internal noise criteria outlined in 10.5.2.3 (Chapter 10) will ensure that no negative impacts occur at off-site sensitive locations, and therefore, no further mitigation is required.

4.6.2.6 Traffic and Transportation

With reference to Chapter 13 (Material Assets – Traffic and Transportation), Section 13.7.2, the Proposed Development has been designed in accordance with the relevant design standards, in order to ensure the safe and efficient accommodation of development-generated traffic and will minimise potential impacts on the surrounding road network during the operational phase. The development has been designed to facilitate the use of sustainable and active travel modes.

4.6.2.7 Major Accident Hazards and/or Natural Disasters

The potential effect is imperceptible, and unlikely, in respect of major accident hazards or natural disasters on population and human health during the operational phase of the Proposed Development. There are no specific mitigation measures required in respect of Major Accident Hazards and Disasters.

4.7 Residual Impacts of the Proposed Development

4.7.1 Construction Phase

4.7.1.1 Businesses and Residences

No mitigation is proposed regarding this factor as impacts will be positive. The construction phase residual impact on the economy and employment of the local and wider area remains unchanged from the potential impact, being ***positive, not significant,*** and ***short-term***.

The main residual impacts on local businesses and residences associated with the Proposed Development will be in relation to air quality, noise, visual impact, and traffic. The residual impacts have been summarised in the sections below.

4.7.1.2 Townscape, Amenity and Tourism

With reference to Chapter 11 (Townscape and Visual Impact), during the construction phase, the site and immediate environs would be disturbed by construction activities and haulage, and the incremental growth of the buildings on site. The site's landscape fabric, already substantially altered by the previous development of the site and existing concrete slab, has medium-low to low sensitivity. The significance of visual effects would vary depending on the viewer's proximity to the site and would vary over the construction period, with residual construction-stage visual effects being at most ***moderate, negative,*** and ***short-term*** during peak construction activities. Residual construction-stage effect on the townscape will be at most ***negative, moderate,*** and ***short-term.***

The Proposed Development will have no discernible effect on local tourism or amenities during construction stage.

4.7.1.3 Land and Water Emissions

The implementation of the mitigation and monitoring measures detailed in Chapter 5 will ensure that potential impacts on the human health and populations from land emissions do not occur during the construction phase.

The residual effect on human health and populations during the construction phase is considered to be ***neutral, imperceptible*** and ***short term.***

There are no source pathway linkages to potable water supplies or water amenities. The implementation of the mitigation measures referred to above will ensure that no residual impacts on population or human health arise from water emissions during the construction phase.

4.7.1.4 Air Emissions

Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of construction of the Proposed Development will be ***short-term, negative, localised*** and ***not significant*** with respect to human health.

4.7.1.5 Noise and Vibration Emissions

During the construction phase of the project there may be impacts to nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of enforceable noise limits and restricted hours of operation, combined with the implementation of appropriate noise and vibration control measures previously outlined, will ensure that any noise and vibration impacts are minimized as far as reasonably practicable. The residual noise impact on human health is determined to be ***negative, not significant*** and ***short-term.***

4.7.1.6 Traffic and Transportation

Considering that the nature of the traffic increase will be ***short-term***, the mitigation measures outlined in the above sections will ensure that there will be no significant residual effects. Traffic impacts are deemed ***negative*** and ***not significant*** during construction phase of Proposed Development.

4.7.1.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on human health from major accident hazards and/or natural disasters; therefore, there are no residual impacts.

4.7.2 Operational Phase

4.7.2.1 Businesses and Residences

No mitigation is proposed regarding this factor as impacts will be positive. The operational phase, therefore, is considered to have the potential to have a ***positive, moderate, long term*** residual impact on the local population.

4.7.2.2 Townscape, Amenity and Tourism

Overall, the Proposed Development is relatively sizeable in terms of its scale. However, it achieves the site's zoning objective and purpose and thus is not considered an inappropriate form of development in this urban landscape context is characterises by other development of a similar and larger-scale.

With reference to Chapter 11 (Townscape and Visual Impact), during the operational phase, the Proposed Development has been assessed as predominantly positive or neutral for landscape and visual effects, and no mitigation measures are considered necessary. The residual effects will remain as assessed in Section 4.5.2.2. The potential impacts on local visual amenity are considered to be ***permanent***, ranging from ***slight-imperceptible neutral*** to ***moderate-slight positive*** to ***moderate negative-neutral*** across the study area, while landscape effects are considered to be ***moderate, positive*****,** and ***long term.***

No mitigation is required for local tourism or amenities, as impacts are ***positive, not significant*** and ***long term.***

4.7.2.3 Land and Water Emissions

As set out in Section 4.5.2.3, there are no potential impacts to human health and populations from changes to land, soils, or geology during the construction phase. The implementation mitigation and monitoring measures detailed in Chapter 5 will continue to ensure that there are no residual impacts to human health and populations.

There are no source pathway linkages to potable water supplies or water amenities. As such the implementation of the design measures will continue to ensure that there are no residual impacts to human health and population from water emissions during the operational phase.

4.7.2.4 Air Emissions

As no mitigation is proposed, the operational phase residual effect on air quality, and consequently on population and human health, as a result of increased traffic is ***long-term, neutral*** and ***imperceptible***.

4.7.2.5 Noise and Vibration Emissions

Considering the implementation of the indicated mitigation measures the residual noise impact on human health associated with the Proposed Development mechanical and electrical plant operation is expected to be ***neutral, not significant*** and ***long-term*** at the nearest sensitive receptors.

The operational noise assessment of vehicle movements associated with the site will be ***neutral, not significant*** and ***long-term*** at noise-sensitive locations off site.

4.7.2.6 Traffic and Transportation

With the design, construction and operation of site access, internal roads and associated infrastructure in accordance with relevant design standards, residual impacts on the surrounding traffic network, and consequently on population and human health, are considered to be ***long-term neutral*** and ***imperceptible.***

4.7.2.7 Major Accident Hazards and/or Natural Disasters

There are no significant potential impacts on Human Health from Major Accident Hazards and/or Natural Disasters; therefore, there are no residual impacts.

4.8 CUMULATIVE IMPACT ASSESSMENT

The cumulative impact of the Proposed Development with any/all relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2 of this EIA Report.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

4.8.1 Construction Phase

In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase and contribute to additional impacts in terms of traffic, dust, and noise.

Contractors for the Proposed Development will be contractually required to operate in compliance with a project-specific CEMP and Construction Traffic Management Plan which will include the mitigation measures outlined in this EIA Report. The construction phase for the overall development of the applicant owned lands would be restricted by the binding limits for noise, dust, and emissions to water.

As stated in Chapter 10 (Noise and Vibration), in the event that construction activities at nearby sites are taking place concurrently with the construction of the Proposed Development, there is potential for cumulative noise impacts to occur. With standard mitigation measures in place—such as controlling working hours, using well-maintained equipment, and managing construction traffic—any cumulative impacts during this phase are expected to remain limited and not significant. Similarly for vibration, developments between 500 m and 750 m are considered negligible as typically vibration levels attenuate much more quickly than airborne noise, unless there are exceptional activities (e.g., blasting, piling in sensitive ground conditions).

The implementation of mitigation and monitoring measures detailed in Chapter 6 (Hydrology and Hydrogeology) as well as the compliance of permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the construction phase of the Proposed Development. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments on hydrology and hydrogeology, and consequently on population and human health, can therefore be considered to be ***neutral, imperceptible*** and ***short term*****.**

According to the IAQM guidance (2024) should the construction phase of the Proposed Development coincide with the construction phase of any other development within 500m then there is the potential for cumulative construction dust impacts. The dust mitigation measures outlined in Chapter 8 (Air Quality) will be applied during the construction phase which will avoid significant cumulative effects on air quality. Similar dust mitigation measures are required for other permitted developments as per their respective impact assessments and planning conditions. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality, and consequently on population and human health, associated with the construction phase of the Proposed Development and the aforementioned developments are deemed ***short-term, negative, localised*** and ***not significant***.

The implementation of mitigation measures within each chapter and detailed in Section 4.6.1 as well as the compliance of adjacent development with their respective planning permissions, will ensure there will

be minimal cumulative potential for change in soil quality or the natural groundwater regime during the construction phase of the Proposed Development.

4.8.2 Operational Phase

Overall, whilst the Proposed Development will present as one of the most notable built developments within the immediate site context, it is not considered that there will be any significant cumulative impacts arising from the Proposed Development in conjunction with any planned or permitted developments.

The implementation of design measures detailed in Chapter 6 (Hydrology and Hydrogeology) as well as the compliance of permitted and future development with their respective planning conditions, will ensure there will be minimal potential for cumulative effects on the receiving water environment during the operational phase of the Proposed Development. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments on the receiving water environment, and consequently on population and human health, can therefore be considered to be ***neutral, imperceptible*** and ***long-term.***

The potential cumulative impacts of the Proposed Development during the operational phase in terms of air emissions and noise generation in the context of the Permitted Development have been considered in Chapter 8 (Air Quality) and Chapter 10 (Noise and Vibration).

There is the potential for cumulative impacts to air quality during the operational phase due to traffic associated with other existing and permitted developments within the area. The traffic data supplied for the operational phase assessment included data for cumulative development within the area. The effect on air quality during the operational phase of the Proposed Development, including the cumulative effect, and consequently on population and human health, will be ***direct, long-term, neutral*** and ***imperceptible***.

The noise limits set for off-site noise sensitive locations are designed to avoid any significant increase in the prevailing background noise environment. Operational noise limits included in Chapter 10 refer to cumulative noise from all sources on site. The design of plant and other fixed installations will be progressed during the design stage to ensure the noise limits at off-site noise sensitive locations are not exceeded. Traffic volumes assessed take account of the additional traffic from other permitted developments and therefore the traffic noise assessment presented is already assessing the cumulative impact. The additional contribution from the Proposed Development is not expected to materially change the existing noise environment or result in significant adverse effects.

As stated in Chapter 11 (Townscape and Visual Impacts), the Proposed Development is part of planned change and is assessed as contributing to the achievement of planning policy. The surrounding urban environment is subject to ongoing planned and permitted development. However, there are no projects of scale identified in the project area which could give rise to any material cumulative effects. Any potential for negative cumulative impacts would be limited to those projects which would contravene planning policy, are out of character, and / or do not contribute to positive placemaking.

With reference to Chapter 13 (Material Assets – Traffic and Transportation), the operational vehicular trip generation of committed developments has been calculated and assessed in Chapter 13, Section 13.9. Adjacent planning consents/applications granted/submitted in the area have been reviewed and none are considered to have a potential significant impact on the traffic assessment for the Proposed Development.

4.9 REFERENCES

- Central Statistics Office. Statbank Databases (Accessed October 2024, https://www.cso.ie/en/databases/).

- Central Statistics Office. Census of Population, 2016 and 2022. (Accessed October 2024, https://www.cso.ie/en/census/).
- Central Statistics Office. Labour Force Survey, 2020 (Accessed October 2024, www.cso.ie/en/statistics/labourmarket/labourforcesurveylfs).
- Environment Protection Agency, *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).
- European Commission (EC)*, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (EC, 2017).
- Limerick City and County Council (2022). *Limerick Development Plan 2022-2028.*
- Pobal HP Deprivation Index (Accessed April 2026, https://data.gov.ie/dataset/pobal-hp-deprivation-index).
- Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU).

Chapter 5 – Land, Soils and Geology

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5. LAND, SOILS AND GEOLOGY

5.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the Proposed Development will have on Land, Soils and Geology. This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). Reference is made to hydrogeology, but this aspect is covered in more detail in Chapter 6 (Hydrology & Hydrogeology).

The chapter provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and define the residual effects of the Overall Proposed Development (the effect after the implementation of mitigation measures).

5.2 Methodology

The assessment follows the procedures set out in the Institute of Geologists of Ireland (IGI) Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) and other relevant guidelines set out below to assess and evaluates land, soils and geology within the context of the Proposed Development.

In the EIA, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute.

The Transport Infrastructure Ireland (TII) (formerly National Roads Authority) criteria is used for estimating the importance of the soil, geology and hydrogeological attributes (Table 1 and 2 in Appendix 5.1).

The magnitude of the potential environmental impacts effects on the land, soil, geological and hydrogeological environment is based on the TII matrix presented in Table 3 in Appendix 5.1 and the quality, significance and duration of potential impacts are described in this chapter in accordance with the criteria provided in the Chapter 1 (Introduction), Table 1.2.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts. Where an impact is identified, planned mitigation measures are identified and assessed.

The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves; and
- The extent of made ground and subsoil cover and the potential use of this material on site as well or requirement to remove it off-site as waste for disposal or recovery.

5.2.1 Relevant Legislation and Guidance

The baseline study and impact assessment were undertaken in accordance with the following key guidance and established best practice:

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland - Road Drainage and Water Environment (TII, 2015).
- Institute of Geologists Ireland (IGI) - Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).

Land soil and geology resource management in Ireland is dealt with in the following key pieces of legislation and guidelines:

- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- Waste Management Acts 1996 as amended.
- Environment Agency (EA), Land contamination: risk assessment (EA 2020).
- BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (British Standards Institute 2017).
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Transport Infrastructure Ireland, The Management of Waste from National Road Construction Projects (TII 2017).
- Environmental Protection Agency, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013).
- Local Authority planning guidance as applicable.
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU.

5.2.2 Sources of Information

Desk-based geological information on the substrata (both quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing national databases and site archives. The collection of baseline regional data was undertaken by reviewing the following sources:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- Teagasc soil and subsoil database.
- Ordnance Survey Ireland - aerial photographs and historical mapping.
- Environmental Protection Agency (EPA) – website mapping and database information.

Site specific data is derived from the following sources:

- Various design site plans and drawings, as submitted with the planning documentation for this application.
- Stage 2 Flood Risk Assessment, Punch Consulting Engineers, May 2026.

- Planning Engineering Report, Punch Consulting Engineers, May 2026.
- Construction Environmental Management Plan (CEMP), Punch Consulting Engineers, May 2026.
- Parkway Valley Phase 1, Dublin Road, Singland, Limerick – Site Investigation, Report no. OCB25-049, OCB Geotechnical, October 2026 (Appendix 5.2).
- Consultation with design architects and engineers.

5.2.3 Forecasting Methods and Difficulties Encountered

No difficulties were encountered in the development of this document.

5.3 Receiving Environment

5.3.1 Existing Land Use, Topography and Site History

The site is approximately 6.18 ha and is located in the Singland area immediately to the east of the roundabout entrance to Parkway Retail Park off the R445 (Dublin Road). The site is located adjacent to the Dublin Road approximately 2.5km east of Limerick City centre. There are existing semi-detached two storey houses and a retail park to the west, semi-detached two storey houses to the south, agricultural lands to the east and agricultural lands, an apartment block, commercial units and an ESB substation to the north separated from the site by the R445 (Dublin Road). The site location and surrounding land use for the present day is presented in Figure 5-1 below.

The Groody River (EPA Code: IE_SH_25S012600) is located c. 200 m to the east of the site, and flows in a northerly direction towards the Shannon(Lower) river. There is also an open drain and an OPW arterial drainage channel c. 160 m to the east referred to by the EPA as 'Industrial Estate Galvone' located between the Groody River and the site, which ultimately discharges to the Groody River. The hydrological and hydrogeological environment is presented in further detail in Chapter 6 (Hydrology & Hydrogeology of the EIA).

A review of early historical mapping records dated from 1829 to the early 20th century coupled with historical aerial imagery dated from 1995 to the present day indicated that the subject site was unoccupied by any building structures until 2007 (refer to

Figure 5-2 to Figure 5-4 below).

A shopping centre was partially constructed in 2007 and was demolished in 2020, with reinforced concrete retaining walls left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground.

The subject site consists of a gravel footprint, buried concrete where the previous development was demolished in the centre, and some brownfield areas towards the southern and eastern boundaries which were likely reworked during the construction/demolition phase of the previous project. The reinforced concrete retaining walls are to be incorporated as part of the Proposed Development. The ground level of the site is elevated above the Groody River floodplain to the east. The current site sits at elevations between 5 m and 17 m above ordnance datum (AOD) Malin, with majority of the site generally flat (between 8.4 m and 9.64 mAOD) and falling to the east.

Figure 5-1 Site Location and Surrounding Land Use (Google Satellite, 2026)

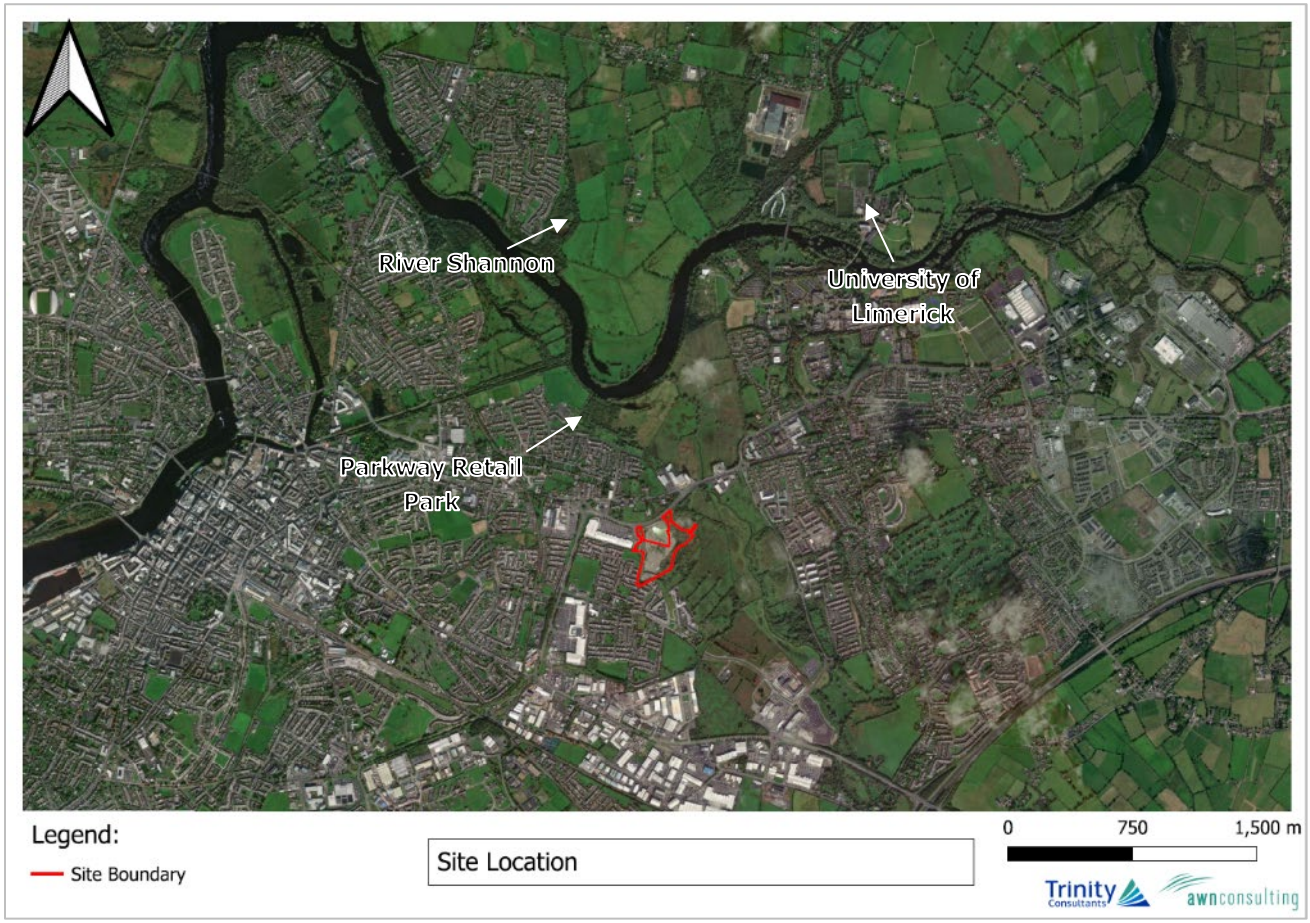


Figure 5-2: Historic Site Location Map and Surrounding Land Use - 1995 (Geohive, 2026)

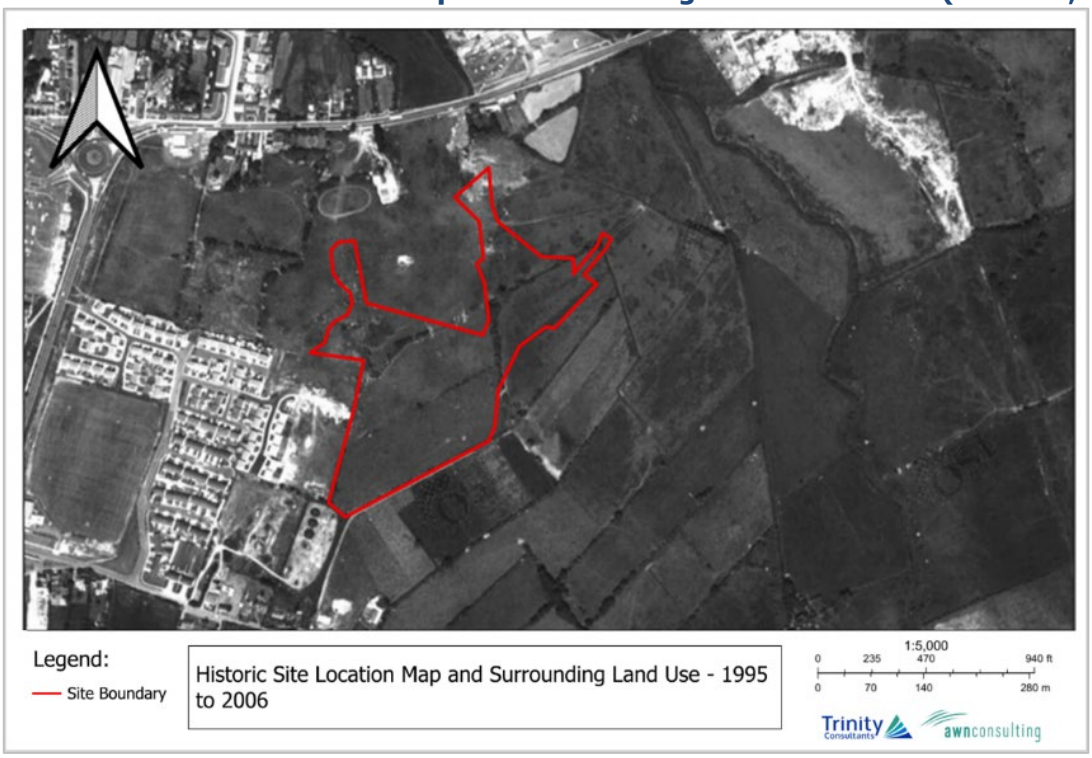


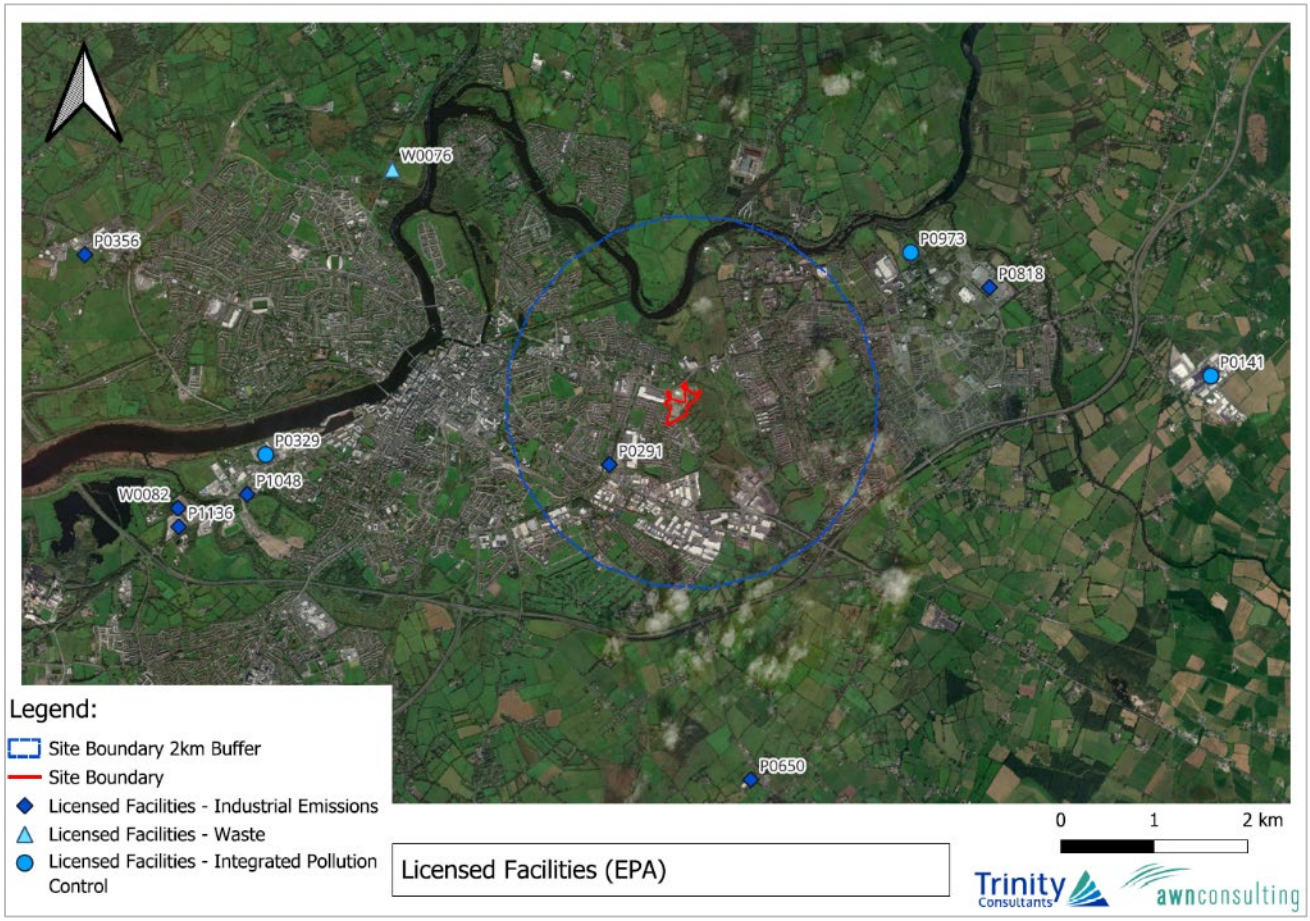
Figure 5-3: Historic Site Location Map and Surrounding Land Use - 2006-2013 (Geohive, 2026)

Figure 5-4: Historic Site Location Map and Surrounding Land Use - 2020 to Present (Google Earth, 2026)

5.3.2 Surrounding Land-Use

Licensed facilities are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment. There are no licenced facilities within the site boundary. The closest Industrial Emissions (IE), Integrated Pollution Control (IPC) or Waste facility to the Proposed Development according to the EPA (2026) is Galvotech Ireland Limited (IEL: P0291) which is located 0.98 km southwest of the subject site. This is the only active licensed facility within a 2 km radius of the Proposed Development as shown in Figure 5-5 below. It is important to note that the proximity of a licensed facility does not necessarily mean that the Proposed Development will be impacted by their emissions.

Figure 5-5: Industrial Emissions and Integrated Pollution Control Facilities within 2km of the Proposed Development (EPA, Accessed: 14/04/2026)



5.3.3 Soils and Subsoils

According to the GSI/Teagasc online mapping (2026), two (2) no. soil types are present across the site. The western portion of the site is underlain by fine loamy drift derived from limestones, which is classified as a well-drained mineral soil. This soil type typically supports good permeability and is suitable for a range of land uses. The eastern portion of the site is underlain by tidal marsh deposits, which are characterized as poorly drained soils. These soils are frequently saturated due to tidal influence, resulting in anaerobic conditions and high organic matter content.

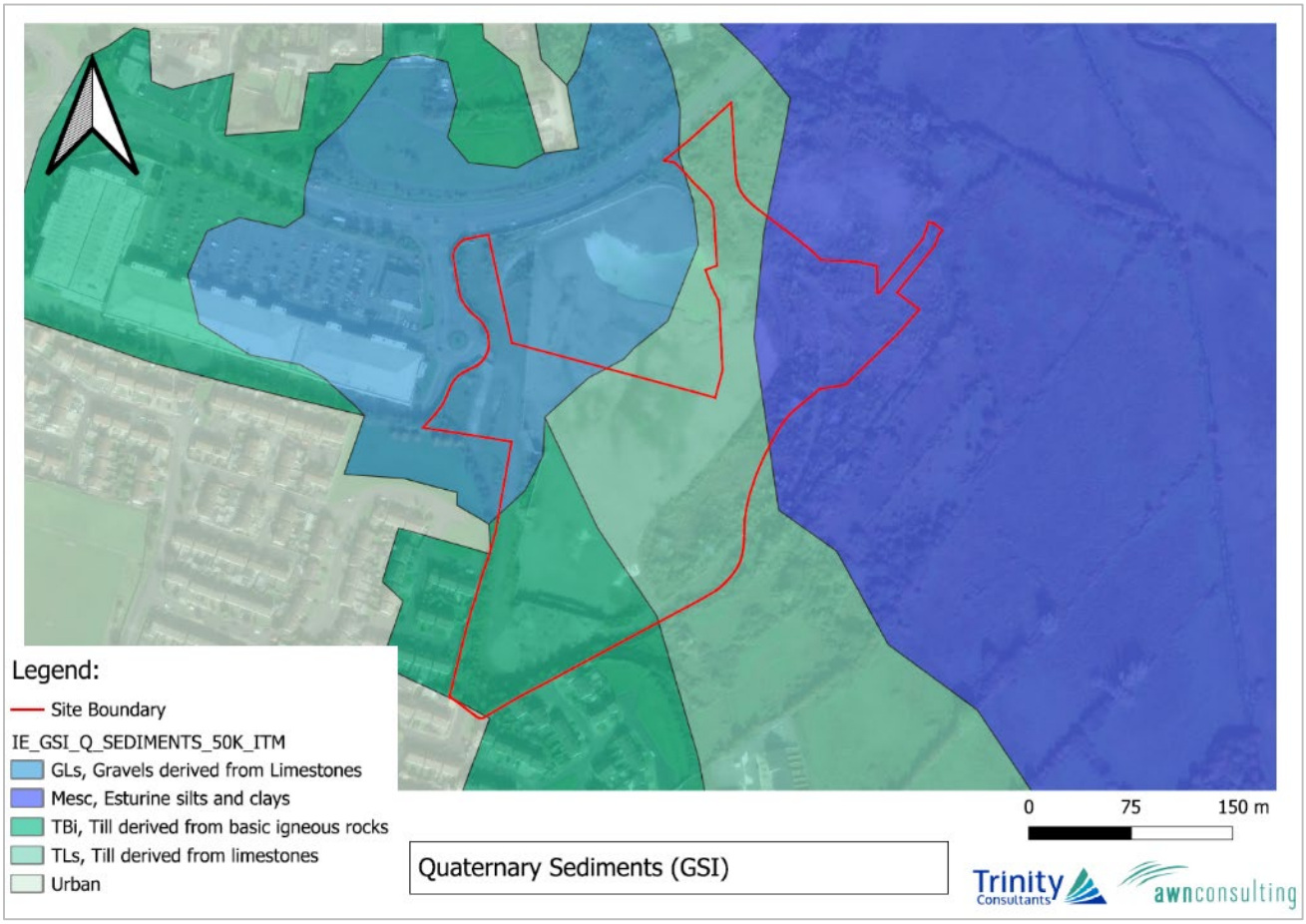
The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period, which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

- The GSI/ Teagasc mapping (2026) of the subsoils in the area of the site indicates four (4) no. principal subsoil types, as shown in

Figure 5-6 below. The subsoil types present across site are as follows:

- Gravels derived from limestones (GLs), underlying the north-western portion of the site.
- Till derived from basic igneous rock (TBis), underlying the south-western corner of the site.
- Till derived from limestones (TLs), underlying the central and northern portion of the site.
- Estuarine silt and clays, underlying the eastern portion of the site.

Figure 5-6: Quaternary Geology (GSI, 2026)



5.3.3.1 Site Investigation

During the ground investigation carried out by OCB Geotechnical Ltd between 31st July and 30th September 2025, extensive Made Ground was encountered across the site, primarily comprising crushed concrete and hardcore. Crushed concrete with occasional steel rebar was encountered at most locations, typically 0.2 m to 1.35 m thick. Beneath this, hardcore composed of limestone and basalt gravel and cobbles was recorded in several trial pits, including TP12, with thicknesses up to 2.0 m. Surface and subsurface concrete slabs were also noted near TP01, TP03, TP04, TP06, and TP07, with thicknesses up to 1.5 m. Perched water was observed within the Made Ground retained by concrete slabs beneath the surface.

Below the fill, occasional anthropogenic fragments were noted in cohesive layers and in some areas, possible natural soils were also encountered. These cohesive soils consisted mainly of sand and gravel layers, generally slightly silty and locally clayey. These were encountered at TP02 (1.0–2.25 m), TP04 (1.25–1.9 m), TP08 (1.2–2.7 m), TP10 (1.8–2.0 m), and TP13 (1.1–2.25 m). Very dense sand was recorded to 3.5 m in borehole RC07. Cohesive deposits were present in BH02 in the north (3.6–4.0 m), TP04 in the northeast (1.9–3.2 m), TP08 (1.05–1.2 m), RC04 (4.0–5.2 m), BH01 near the centre (0.4–2.0 m over glaciolacustrine deposits), and TP12 in the south (1.4–2.0 m). This cohesive material included silty clay and clayey silt layers, some associated with estuarine alluvium.

Glaciofluvial deposits were encountered beneath cohesive layers in several boreholes. At BH01 near the centre, slightly silty very sandy gravel with medium to high cobble content was recorded from 2.0 m to 3.8 m depth, becoming slightly clayey in the upper portion. BH02 in the north encountered medium dense silty very gravelly sand from 4.0 m to 5.0 m over sandy gravel with cobbles to 6.3 m depth. Rotary drilling

confirmed similar granular soils, including dense sandy gravel from 1.0 m to 4.0 m at RC02 and very dense sandy gravel with cobbles from 5.2 m to 6.5 m at RC04 above bedrock.

Refer to Appendix 5.2 for the complete site investigation report (OCB25-049).

5.3.4 Bedrock Geology

Inspection of the available GSI (2026) records (Data Sheet 16 and on-line mapping database) show the site is underlain by Volcaniclastic Rocks (Rock Unit Code: LTVOLCC) from the Carboniferous and Palaeozoic age bracket. The GSI database does not indicate any geological structural (tectonic) faulting traversing the site or in the immediate vicinity of the development site. No bedrock outcrops were identified within the site boundary. However, a number of outcrops are present in the wider area as shown in Figure 5-7 below.

5.3.4.1 Site Investigation

The ground investigation carried out by OCB Geotechnical Ltd between 31st July and 30th September 2025 confirmed bedrock at depths ranging from approximately 3.5 m BGL to 8.7 m BGL, varying across the site. The bedrock was described as strong micritic limestone, with occasional thin calcite veins and fossil shell debris, and locally interbedded with rare volcaniclastic laminae. These findings are consistent with the GSI bedrock mapping for the area.

Possible bedrock outcrops or large boulders consisting of strong grey fine-grained limestone were observed at the southeast portion of the site. Limestone fragments were noted at 2.0 m depth in TP12, and refusal on limestone occurred at 2.25 m in TP13. Rotary drilling confirmed bedrock at depths of 3.5 m (RC07, south), 4.0–6.5 m (RC03 and RC04, central), and 8.7 m (RC02, north). Coring revealed fresh to slightly weathered limestone with closely to moderately spaced discontinuities, predominantly subhorizontal to steep, with rough surfaces and occasional dissolution features. A possible void was noted between 7.48 m and 9.0 m at RC04 where no core was recovered. Groundwater was encountered at 8.2 m in RC02 in the north of the site, at 5.8 m (which rose to 0.65 m after 20 minutes) in RC04 in the centre, and at approx. 8.8 m (which rose to 7.2 m overnight) in RC07 in the south of the site.

Figure 5-7: Bedrock Geology (GSI, 2026)

5.3.5 Geological Heritage Areas

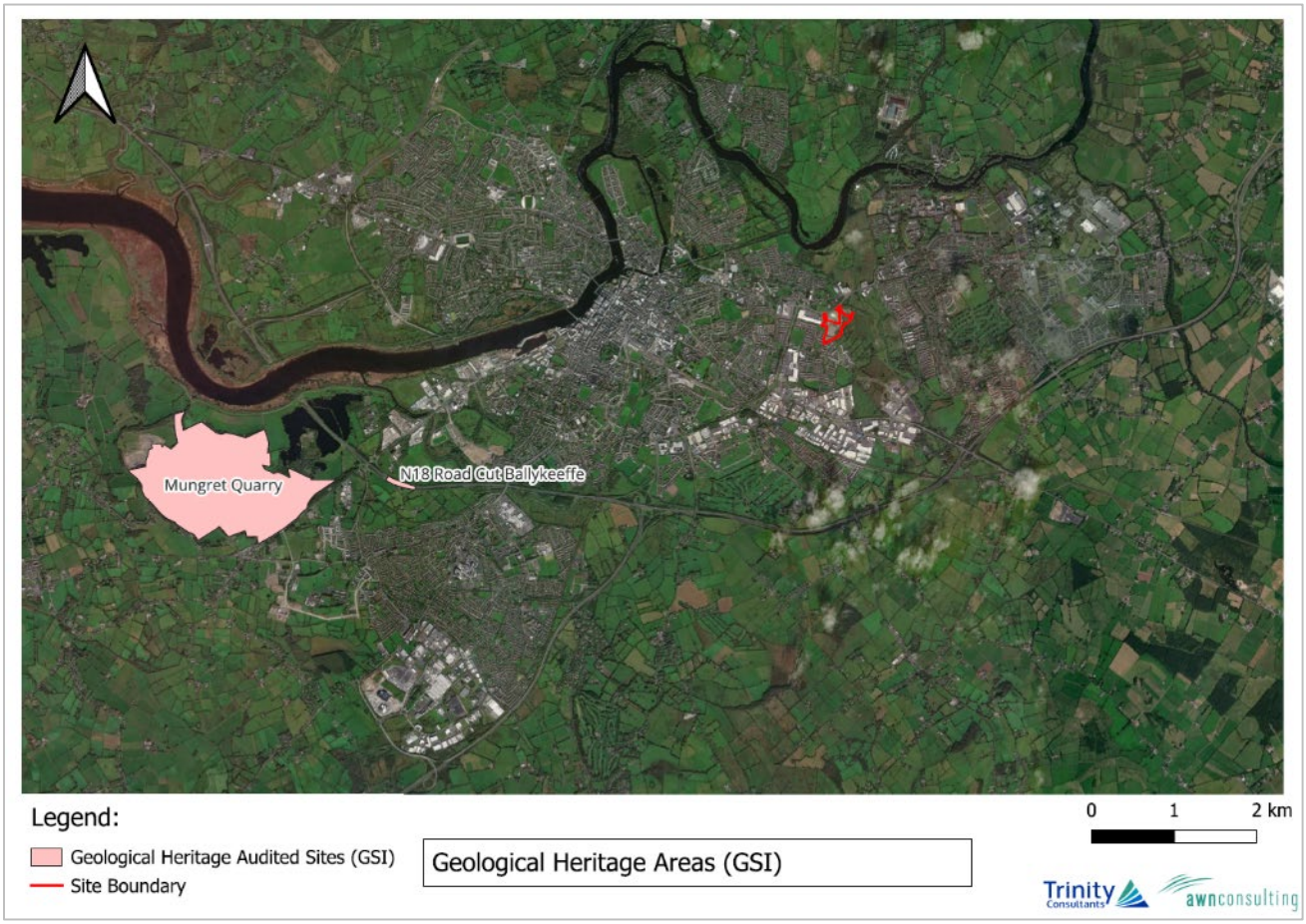
The Geological Survey Ireland (GSI) online mapping (2026) was reviewed to identify any geological heritage sites within the Proposed Development area and its surroundings. No geological heritage sites are recorded within the site boundary or within a 5 km radius (GSI, 2026). The nearest geological heritage features are located approximately 5.2 km southwest of the site at the N18 Roadcut Ballykeeffe, and 6.1 km southwest at Mungret Quarry, as illustrated in Figure 5-8.

The N18 Roadcut Ballykeeffe site is described as "a road cut excavated through limestone bedrock on the N18 route east of the Limerick Tunnel."

Mungret Quarry is described as "a complex network of extensive branching pit offshoots within a large, active quarry producing limestone for cement manufacture. Mungret Quarry is one of the largest quarries in Ireland and has a long history of economic importance to the region."

Given the nature of the Proposed Development, the characteristics of these geological heritage sites, and their distance from the site, there is no potential for any adverse impact arising as a result of the Proposed Development.

Figure 5-8: Geological Heritage Areas in the Context of the Site (GSI, 2026)



5.3.6 Economic Geology

The EPA Extractive Industry Register and the GSI Mineral Database were reviewed to identify any mineral extraction sites in proximity to the study area. There are two (2) no. recorded mineral localities within a 2 km radius of the site. The closest identified is a non-metallic mineral locality (worked clay), located c. 560 m south-west of the site in the townland of Singland, while a metallic locality (outcrop of green ash with a vein of iron pyrites) is located c. 1.2 km west of the site in the townland of Park.

Based on the nature of the development and distance to these potential receptors there is no potential for any detrimental effect as a result of the Proposed Development.

5.3.7 Karst landforms

Karst refers to a distinctive type of landscape formed primarily through the dissolution of soluble rocks, most commonly carbonate rocks such as limestone. These processes create characteristic landforms including sinkholes, caves, enclosed depressions, disappearing streams, and springs. While karst can also occur on evaporite rocks (e.g., gypsum) and occasionally on siliceous rocks (e.g., quartzite), the majority of karst features in Ireland are associated with limestone bedrock.

A review of available geological data indicates that no karst landforms are present within the site boundary or in the immediate vicinity of the Proposed Development. The nearest recorded karst feature is the Loughmore Common Turlough, located approximately 7.1 km southwest of the site near Raheen, Co. Limerick (Historic GSI Karst Feature ID: 1415SWK001). This feature is hydrologically upgradient of the site and lies outside the local zone of influence of the aquifer underlying the development area. Consequently, the Proposed Development will not have any impact on this or other karst features.

5.3.8 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by anthropogenic activities such as building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

A landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility classification takes into account where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area).

The landslide susceptibility classification of the site ranges between 'Low' and 'Low Inferred' as shown in Figure 5-9 (GSI, 2026).

Figure 5-9: Landslide Susceptibility Classification (GSI, 2026)

5.3.9 Soil Quality

As part of the ground investigation carried out by OCB Geotechnical Ltd between 31st July and 30th September 2025, three samples were collected from Made Ground in trial pits TP03 (1.0–1.5 m), TP07 (0.4–0.7 m), and TP10 (0.7–1.2 m). These samples were submitted to Fitz Scientific Laboratory in Drogheda, Co. Louth for analysis. Testing was undertaken for a full Waste Acceptance Criteria (WAC) suite of parameters in accordance with regulatory requirements, including the following:

- Total Petroleum Hydrocarbons (TPH CWG);
- Polychlorinated biphenyls (PCBs);
- pH, Conductivity, total organic carbon (TOC), moisture content;
- Polycyclic Aromatic Hydrocarbons;
- Asbestos Containing Materials and
- Heavy Metals.

5.3.9.1 Generic Assessment Criteria – LQM/CIEH S4ULs

There are no legislated threshold values for soils in Ireland. Soil samples were compared to Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and ecology for residential and commercial/industrial end use.

GAC in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. Land Quality Management (LQM) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances, including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM / CIEH Suitable 4 Use Levels (S4UL). The LQM / CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant, S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance, the residential (without homegrown produce), commercial, allotments and public open space (near residential buildings) thresholds have been considered.

Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The UK values do not have any legal standing within the Republic of Ireland and no statutory guidance for assessing the significance of soil contamination currently exists. However, the values do provide a means of placing the data within context when considering magnitude of risk and have been used in that capacity in this assessment.

All recorded concentrations were below the most conservative LQM/CIEH threshold values. No exceedances were identified in any of the three soil samples for any parameter when assessed against residential (without homegrown produce), commercial, allotment, or public open space criteria.

Refer to Appendix 5.2 for complete laboratory report from Fitz Scientific Laboratory

The soil quality analysis is presented in Table 5-1 below, comparing results against the LQM/CIEH thresholds.

Table 5-1: Soil Quality Analysis - LQM S4ULs

						Sample Ref	TP03	TP10	TP07
						Depth	1.0-1.5	0.7-1.2	0.4-0.7
						Report Ref	7299/2508012/01	7299/2508012/02	7299/2508012/03
						Sample Date	05/08/2025	05/08/2025	05/08/2025
Parameters	**Units**	**LOD**	**LQM/CIEH S4ul for HHRA Residential (RwoHP) Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Allotments Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)**	**LQM/CIEH S4ul for HHRA POS(resi)Threshold (mg/kg)**			
							Result	**Result**	**Result**
Metals									
Antimony	mg/kg	<1	nv	nv	nv	nv	4.78	3.46	1.56
Arsenic	mg/kg	<0.5	40	43	640	79	7.42	11.29	6.21
Barium	mg/kg	<1	nv	nv	nv	nv	24.12	57.31	34.35
Boron	mg/kg		11,000	45	240,000	21,000	3.73	7.55	2.89
Cadmium	mg/kg	<0.1	85	1.9	190	120	0.54	0.61	0.41
Chromium III	mg/kg	<0.5	910	18,000	8,600	1,500	31.21	29.39	13.25
Chromium VI	mg/kg	<0.6	6	1.8	33	7.7	-	-	-
Copper	mg/kg	<1	7,100	520	68,000	12,000	15.65	18.10	17.87
Lead	mg/kg	<5	nv	nv	nv	nv	11.59	9.71	24.86
Mercury (Elemental)	mg/kg	<0.1	1.2	21.0	58Vap (25.8)	16.0	-	-	-
Molybdenum	mg/kg	<0.1	nv	nv	nv	nv	0.812	0.430	0.198
Nickel	mg/kg	<0.7	180	53	980	230	31.14	35.91	19.18
Selenium	mg/kg	<1	430	88	12,000	1,100	0.99	0.39	0.15
Zinc	mg/kg	<5	40,000	620	730,000	81,000	159.18	67.34	43.51
PAH MS									
1,1,1-Trichloroethane	mg/kg	<1	9	48	660	140,000	-	-	-
1,1,2,2 Tetrachloroethane	mg/kg	<1	4	0.42	270	1,400	-	-	-
1,2,3-Trichlorobenzene	mg/kg	<1	1.5	4.7	102	1,800.0	-	-	-
1,2,4-Trichlorobenzene	mg/kg	<1	2.6	55	220	15,000.0	-	-	-
1,2-Dichloroethane	mg/kg	<1	0.0092	0.0046	0.67	29	-	-	-
1,3-Dichlorobenzene	mg/kg	<1	0.44	0.25	30	300.0	-	-	-
1,4-Dichlorobenzene	mg/kg	<1	61	15	4400 (224)vap	17,000.0	-	-	-
Acenaphthene	mg/kg	<0.1	3000(57.0)sol	34	84000(57.0)	15000	-	-	-
Acenaphthylene	mg/kg	<0.1	2900(86.1)sol	28	83000(86.1)sol	15,000	-	-	-
Anthracene	mg/kg	<0.1	31000(1.17)vap	380	520,000	74,000	-	-	-
Benzo(a)anthracene	mg/kg	<0.10	11	2.9	170	29	-	-	-
Benzo(a)pyrene	mg/kg	<0.1	3.2	0.97	35	5.7	-	-	-
Benzo(b)fluoranthene	mg/kg	<0.1	3.9	0.99	44	7.1	-	-	-
Benzo(ghi)perylene	mg/kg	<0.1	360	290	3,900	640	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.1	110	37	1,200	190	-	-	-
Chlorobenzene	mg/kg	<1	0.46	5.9	56	11,000.0	-	-	-
Chloroethane (vinyl chloride)	mg/kg	<1	0.00077	0.00055	0.059	3.5	-	-	-
Chrysene	mg/kg	<0.1	30	4.1	350	57	-	-	-
Coronene	mg/kg	<0.1	nv	nv	nv	nv	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.1	0.31	0.14	3.5	0.57	-	-	-
Fluoranthene	mg/kg	<0.1	1500	52	23,000	3100	-	-	-
Fluorene	mg/kg	<0.1	2800 (30.9)sol	27	63000(30.9)sol	9900	-	-	-
Hexachlorobenzene	mg/kg	<2.5	4.1 (0.20)vap	0.47	110 (0.20)vap	16.0	-	-	-
Hexachlorobutdiene	mg/kg	<1	0.32	0.25	31	25	-	-	-
Indeno(123cd)pyrene	mg/kg	<0.1	45	9.5	500	82	-	-	-
Naphthalene	mg/kg	<1	2.3	4.1	190(76.4)sol	4900	-	-	-
Phenanthrene	mg/kg	<0.1	1300 (36.0)sol	15	22,000	3100	-	-	-
Pyrene	mg/kg	<0.1	3700	110	54,000	7400	-	-	-
Tetrachloromethane (Carbon Tetra	mg/kg	<1	0.026	0.45	2.9	890	-	-	-
Trichloromethane (Chloroform)	mg/kg	<1	1.2	0.42	99	2,500	-	-	-
PAH 17 Total	mg/kg	<0.1	nv	nv	nv	nv	-	-	-
TPH CWG									
Aliphatics									
>C8-C10	mg/kg	<0.1	27	320	2,000 (78)sol	13000	-	-	-
>C10-C12	mg/kg	<0.2	130vap (48)	2200	9,700 (48)sol	13000	-	-	-
>C12-C16	mg/kg	<4	1100sol (24)	11000	59,000 (24)sol	13000	-	-	-
>C16-C21	mg/kg	<7	65,000 (combined)	260,000 (combined)	1,600,000 (combined)	250000	-	-	-
>C21-C35	mg/kg	<7					-	-	-
>C35-C40	mg/kg	<7	65,000 (combined)	260,000	1,600,000	250,000	-	-	-
Total aliphatics C8-40	mg/kg	<26	nv	nv	nv	nv	-	-	-
Aromatics									
>EC8-EC10	mg/kg	<0.1	47	8.6	3,500(613)vap	5000	-	-	-
>EC10-EC12	mg/kg	<0.2	250	13	16,000(364)sol	5000	-	-	-
>EC12-EC16	mg/kg	<4	1800	23	36,000(169)sol	5100	-	-	-
>EC16-EC21	mg/kg	<7	1900	46	28,000	3800	-	-	-
>EC21-EC35	mg/kg	<7	1900	370	28,000	3800	-	-	-
>EC35-EC40	mg/kg	<7	1900	370	28,000	3800	-	-	-
Total aromatics C8-40	mg/kg	<26	nv	nv	nv	nv	-	-	-
Total aliphatics and aromatics(C8-40)	mg/kg	<52	nv	nv	nv	nv	-	-	-
Methyl Tertiary Butyl Ether	ug/kg	<2	nv	nv	nv	nv	-	-	-
Benzene	mg/kg	<3	0.38	0.017	27	72	-	-	-
Ethylbenzene	mg/kg	<3	83	16	5,700vap (518)	24000	-	-	-
m/p-Xylene	mg/kg	<5	m: 82 p: 79	m: 31 p: 29	m: 6,200(625)vap p: 5,900(576)sol	m: 41,000 p: 41,000	-	-	-
o-Xylene	mg/kg	<3	88	28	6,600(478)sol	41,000	-	-	-
Toluene	mg/kg	<3	880vap (869)	22	56,000vap (869)	56000	-	-	-
Mineral Oil (C10-C40)	mg/kg	<30	nv	nv	nv	nv	-	-	-
PCB 28	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 52	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 101	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 118	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 138	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 153	ug/kg	<5	nv	nv	nv	nv	-	-	-
PCB 180	ug/kg	<5	nv	nv	nv	nv	-	-	-
Total 7 PCBs	ug/kg	<35	nv	nv	nv	nv	-	-	-
Moisture Content (% Wet Weight)	%	<0.1	nv	nv	nv	nv	5.5	6.8	7.8
Dry Matter	%	<0.1	nv	nv	nv	nv	94.5	93.2	92.2
pH	pH units	<0.01	nv	nv	nv	nv	8.97	10.69	9.91
Total Organic Carbon	%	<0.02	nv	nv	nv	nv	-	-	-

Legend

0.45 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold without homegrown produce at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Allotments Threshold at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Commercial Residential Threshold at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for HHRA Public Open Space near Residential Housing Threshold at 1% SOM (mg/kg)

0.45 Results exceed LQM/CIEH S4ul for more than one HHRA Threshold at 1% SOM (mg/kg)

\- Results below LOD

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 1% Soil Organic Matter (SOM). Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour stauration limit which is presented in brackets

5.3.9.2 Waste Acceptance Criteria

In accordance with Council Decision 2003/33/EC, samples collected during the ground investigation were analysed for a suite of parameters to assess total pollutant content and classify the material as inert, non-hazardous, or hazardous under Waste Acceptance Criteria (WAC) for landfill acceptance. Testing was carried out on three samples, and results were compared against the relevant threshold values.

pH was found to exceed the 'Inert' threshold classifying the material as 'Non-Hazardous'. All other parameters were within the 'Inert' classification limits. A summary of the WAC results is presented in Table 5-2 below.

Table 5-2: WAC Results Summary

LabRef	7299/2508012/01	7299/2508012/02	7299/2508012/03						
Sample Reference	TP03	TP07	TP10						
Sample Date	05/08/2025	05/08/2025	05/08/2025						
Sample Depth	1.0-1.5	0.7-1.2	0.4-0.7	Inert	Non-Haz	Hazardous	LOD	Units	SOP
% Dry Matter	94.5	93.2	92.2	nv	nv	nv	63	%	302
% Loss on Ignition	0.65	1.17	0.8	nv	nv	10	0.2	%	310
BTEX Total (Solid) VOC	-	-	-	nv	nv	nv	1	mg/kg	203
Mineral Oil (Solid) C10-40 IEH--2D	-	-	-	500	nv	nv	10	mg/kg	572
PAHs Solid (Sum of 17)	-	-	-	100	nv	nv	0.1	mg/kg	200
PCBs Solid (Sum of 7)	-	-	-	1	nv	nv	0.005	mg/kg	323
pH (Solid)	8.97	10.69	9.91	nv	>6	nv	0	pH Units	110
TOC (Solid)	-	-	-	3	5	6	1	%	315
Acid Neutralisation Capacity (pH4)	-	-	-	nv	nv	nv	0.5	mol/kg	314
Acid Reserve	-	-	-	nv	nv	nv	0.05	g NaOH/100g	582
Acid Neutralisation Capacity (pH7)	-	-	-	nv	nv	nv	0.5	mol/kg	314
Alkali Reserve	-	-	-	nv	nv	nv	0.05	g NaOH/100g	582
Antimony (Leachate)	-	-	-	0.06	0.7	5	0.002	mg/kg	177
Arsenic (Leachate)	0.081	0.034	0.024	0.5	2	25	0.0007	mg/kg	177
Barium (Leachate)	0.498	0.177	0.187	20	100	300	0.0003	mg/kg	177
Cadmium (Leachate)	-	-	-	0.04	1	5	0.0001	mg/kg	177
Chloride (Leachate WAC)	22.6	24.4	22.2	800	15000	25000	0.5	mg/kg	190
Chromium (Leachate)	0.039	0.026	0.033	0.5	10	70	0.0001	mg/kg	177
Conductivity (Leachate) (Solid at 20C)	61	289	422	nv	nv	nv	21	uS/cm	112
Copper (Leachate)	0.033	0.042	0.017	2	50	100	0.0001	mg/kg	177
DOC (Leachate)	10	17.6	14	500	800	1000	22	mg/kg	621
Fluoride (Leachate WAC)	-	0.9	0.8	10	150	500	0.5	mg/kg	190
Lead (Leachate)	0.043	0.0025	0.0032	0.5	10	50	0.0001	mg/kg	177
Mercury (Leachate)	-	-	-	0.01	0.2	2	0.0001	mg/kg	178
Molybdenum (Leachate)	-	-	-	0.5	10	30	0.005	mg/kg	226
Nickel (Leachate)	0.035	0.017	0.012	0.4	10	40	0.0001	mg/kg	177
Phenol Index (Leachate)	-	-	-	1	nv	nv	0.01	mg/kg	128
Selenium (Leachate)	-	-	-	0.1	0.5	7	0.003	mg/kg	177
Solids (Total Dissolved) Leachate	640	980	1700	4000	60000	100000	54	mg/kg	105
Sulphate (Leachate WAC)	50	183.8	399.7	1000	20000	50000	0.5	mg/kg	190
Zinc (Leachate)	0.237	-	0.035	4	50	200	0.0005	mg/kg	177

There was no asbestos detected in any of the 3 no. samples tested.

The complete laboratory results are presented in Appendix 5.2.

5.3.10 Rating of Site Importance of the Geological Features

Based on the NRA/TII methodology, the criteria for rating the importance of geological features, the importance of the bedrock and soil features at this site is rated as 'Low' Importance (refer to Appendix 5.1). This is based on the assessment that the attribute has a low quality, significance or value on a local scale.

5.3.11 Conceptual Site Model

A Conceptual Site Model (CSM) has been prepared as part of this Environmental Impact Assessment Report (EIAR) to summarise the land, soils and geological setting of the Proposed Development. The CSM

integrates desk-based data, national geological mapping, and findings from the ground investigations to provide a clear understanding of subsurface conditions, potential contaminant pathways, and environmental receptors relevant to the project.

- The GSI/Teagasc mapping indicates that there are two soil types underlying the Proposed Development:
  - The western portion of the site is underlain by fine loamy drift derived from limestones, which is classified as a well-drained mineral soil which characteristically supports good permeability and is suitable for a range of land-uses.
  - The eastern portion of the site is underlain by tidal marsh deposits, which are characterized as poorly drained soils which is characteristically frequently saturated due to tidal influence, resulting in anaerobic conditions and high organic matter content.

- The GSI/Teagasc mapping database indicates that there are four subsoil types present across the Proposed Development:
  - Gravels derived from limestones (GLs), underlying the north-western portion of the site, which is associated with an area of high permeability.
  - Till derived from basic igneous rock (TBis), underlying the south-western corner of the site which is associated with an area of moderate permeability.
  - Till derived from limestones (TLs), underlying the central and northern portion of the site which is associated with an area of moderate permeability.
  - Estuarine silt and clays, underlying the eastern portion of the site which is associated with an area of low permeability.

- The GSI (2026) records show the site is underlain by Volcaniclastic Rocks (Rock Unit Code: LTVOLCC) from the Carboniferous and Palaeozoic age bracket. The bedrock encountered during the site investigation carried out by OCB Geotechnical was described as strong micritic limestone, with occasional thin calcite veins and fossil shell debris, and locally interbedded with rare volcaniclastic laminae.

- According to the GSI National Draft Bedrock Aquifer Map, the bedrock aquifer underlying the Proposed Development is classified as a 'Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones (LI)'. This aquifer is capable of supplying locally important supplies (e.g., smaller public water supplies, group schemes). The potential for vertical or horizontal migration within this type of aquifer is not significant and on local scale.

- The GSI (2026) mapping indicates that the aquifer vulnerability underlying the Proposed Development is classified as:
  - 'Low' in the eastern portion of the site indicating that the underlying aquifer is protected by >10 m of low permeability subsoil (estuarine silts and clays, poorly drained tidal marsh deposits).
  - 'Moderate' in the central and southern portion of the site indicating that the underlying aquifer is protected by >10 m of moderate permeability subsoil (Till derived from basic igneous rock and limestone).
  - 'High' in the west and southwest of the site indicating that the underlying aquifer is protected by >3 m of high permeability subsoil in the west and by 3-10 m of moderate permeability subsoil in the southwest.

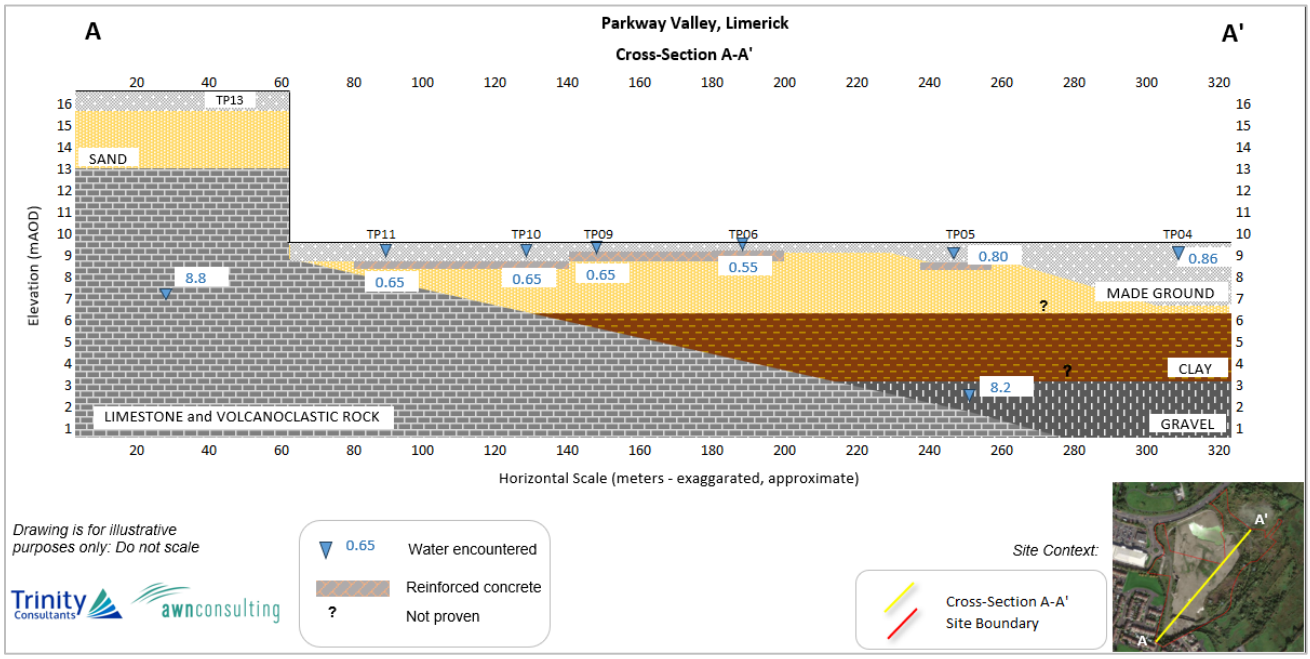
- The ground investigation carried out by OCB (2025) (Report Ref: 25-049) confirmed that:
  - Subsoil depths generally range from 3.75 m in the south to 8.7 m in the north, with bedrock encountered at these depths.
  - The subsoil consists primarily of made ground to a maximum depth of 3.2 m in the east, 1.8 m in the centre and 1.4 m in the southern portion of the site, cohesive deposits across the site of both silt and clay and glaciofluvial deposits in the north and centre of the site.

- Groundwater was encountered at 8.2 m in RC02 in the north of the site, at 5.8 m (which rose to 0.65 m after 20 minutes) in RC04 in the centre, and at approx. 8.8 m (which rose to 7.2 m overnight) in RC07 in the south of the site.
- Perched water was encountered in the made ground on site, retained by concrete slabs beneath the ground surface. This is not connected to the hydrogeological regime within the subject site.
- Three soil samples were analysed and were not found to be contaminated above the guideline values (refer to Section 5.3.9).

Refer to Chapter 6 (Hydrology and Hydrogeology) for further information on the hydrological and hydrogeological environment at the site.

A cross-section of the site was constructed based on the strata descriptions provided in the OCB Geotechnical site investigation report carried out from July to September 2025. This cross-section is presented in Figure 5-10 below.

Figure 5-10: Cross-Section A-A'



5.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package.

5.4.1 Construction Phase

The activities required for the construction phase of the Proposed Development represents the greatest risk of potential impact on the land, soils and geological environment. These activities primarily pertain to the site preparation / enabling works, excavation, and infilling activities required to facilitate construction of the Proposed Development.

Based on a review of the local information and historical and present-day knowledge on the ground conditions near the site, it is not anticipated that any exceptional or unusual risks are posed by the ground conditions which would cause difficulties during the construction phase at the site.

5.4.1.1 Accidental Spills, Leaks and Discharges

There is potential for pollutants associated with construction activity, such as hydrocarbons, oils, and other contaminants, to impact the site. If a spill occurs, contaminated water and collected surface water run-off from construction areas can pose a short-term risk to the underlying subsoil and rock if the contaminated water is allowed to percolate to the aquifer unmitigated contributing to localized contamination.

5.4.1.2 Site Levelling and Excavations

The Proposed Development requires soil and stones to be excavated to facilitate the construction and installation of foundations, underground car parks and services. The consultants at Mitchell McDermott have estimated that c. 41,275 m^3 of material will need to be excavated. An estimated volume of 37,000m^3 will be required for infilling. The potential to reuse excavated material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material. It is currently envisaged that around 10% of the excavated material, c. 4,127.5m^3, will be retained and reused onsite for landscaping and fill. Any material that is not reused will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

The maximum depth of excavation will be approximately 3.75 m below current ground levels in the southern portion of the site. Bedrock in this area was encountered during the site investigation carried out in 2025 at 3.50 m BGL by OCB Geotechnical. The borehole extended to 9.5 m BGL and encountered groundwater at approx. 8.8 m (which rose to 7.2 m overnight). The excavation will extend approx. 0.25 m into the bedrock in this area, but groundwater is not expected to be encountered at this depth. From the available site investigation data, bedrock or groundwater are not expected to be encountered in any other areas across the subject site at the planned excavation depths.

5.4.1.3 Storage of Hazardous Materials

Temporary storage of fuel will be required on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications – BS EN 1992-3:2006) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site. There is limited potential for leaks or spills of petroleum hydrocarbons during the construction phase. Unmitigated leaks or spills may lead to contamination of soil and/or groundwater.

5.4.1.4 Imported/Exported Materials

There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials including steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site via road.

A 'Just in Time' delivery system will operate, where possible, to minimise storage of materials. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials to prevent the escape of material along public roadways. Where possible it is proposed to source general construction materials from the local area to minimise transportation distances.

Soil requiring offsite removal will be removed from site regularly to ensure there is minimal need for stockpiling. Surplus excavated material will be transported off site and disposed of at a fully authorised soil recovery site. It is predicted that c. 37,147.5 m^3 of excavated material will be removed from the site.

5.4.2 Operational Phase

During the operational phase, the Proposed Development will introduce an increase in hardstanding areas across the site. This will alter the natural soil profile by permanently sealing sections of the ground surface, reducing permeability and limiting natural infiltration. No further excavation or disturbance of subsoil, or bedrock is anticipated during operation. The underlying geology consists of a Locally Important Aquifer (LI) – Bedrock Generally Productive in Local Zones, which is overlain by made ground and subsoils of varying thickness. The increase in hardstanding will have minor, localized effects on soil structure and land characteristics, confined to the development footprint.

It should be noted that there is no requirement for bulk fuels or diesel storage during the operational phase.

5.5 Potential Impacts of the Proposed Development

An analysis of the potential effects of the Proposed Development on the land, soils and geological environment during the construction and operational phases are outlined below. Due to the inter-relationship between land, soils, and geology, and hydrology and hydrogeology the following impacts discussed will be considered applicable to both Chapter 5 (Land, Soils and Geology) and 6 (Hydrology and Hydrogeology) of this EIA Report. Remediation and mitigation measures are included in the design of this project to address these potential impacts are presented in Section 5.6.1 (Construction Phase) and 5.6.2 (Operational Phase) below.

5.5.1 Construction Phase

5.5.1.1 Potential Impacts on Land, Soils and Geology

There is potential for the underlying soils and bedrock geology to become contaminated by pollutants associated with construction activities. In the event of a spill, contaminated water or surface water runoff generated on-site could pose a temporary risk to the underlying geology if allowed to percolate without appropriate controls. In the absence of mitigation measures, the construction phase could result in impacts related to excavation and infilling, accidental spills or leaks of hydrocarbons, alkaline water discharge, and the management of dewatering operations. These activities have the potential to alter soil structure, affect subsoil integrity, and introduce contaminants to the geological environment.

Soil requiring removal offsite will be removed regularly to ensure there is minimal need for stockpiling. Some of the material will be re-used on site for backfill. Any surplus material will be transported off site and disposed of at a fully authorised soil recovery site. It is predicted that c. 37,147.5 m^3 of soil will be excavated and transported off site.

The maximum depth of excavation will be approximately 3.75 m below current ground levels in the southern portion of the site, where bedrock was encountered in a borehole at 3.50 m BGL by OCB Geotechnical during the site investigation carried out in 2025. The borehole extended to 9.5 m BGL and encountered groundwater at approx. 8.8 m (which rose to 7.2 m overnight). The excavation will extend approx. 0.25 m into the bedrock in this area. From the available data collected during the site investigation, bedrock or groundwater are not expected to be encountered in any other areas across the subject site at the planned excavation depths.

As stated above, the excavation of made ground and subsoil will be required as part of the site preparation. Local removal and reinstatement (including infilling) of soil within the development area will increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and

services. Capping of significant areas of the site by hardstand/building following construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site.

Hydrocarbons or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plant and machinery will also be carried out in bunded areas to minimise risk of any potential being discharged from the site. If a storage tank ruptured or any plant or machinery leaked, this spill could have a negative impact on soil quality. The use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH which will impact soil quality if this water infiltrates through the subsoil.

Dewatering of the perched water, which is within the made ground, may be required. However, no significant long-term dewatering is expected. This perched water is not connected to the underlying groundwater body and as such this minor dewatering activity is unlikely to have an impact on groundwater quantity or quality. As stated above, groundwater is not expected to be encountered during construction activities.

Without the consideration and employment of mitigation measures the potential impacts during the construction phase on land, soils and geology are ***negative, significant*** and ***short term***.

5.5.1.2 Potential Impacts on Human Health and Populations

The potential for impacts on human health and populations during the construction phase primarily relates to the disturbance of soils and the possibility of encountering previously unidentified contamination. Excavation works may expose localized areas of pre-existing contamination, which would require appropriate handling and disposal at licensed facilities. If material exported from the site is not correctly managed or transported, it could pose health risks to workers and the wider population during handling and disposal.

Although no hazardous waste has been identified within the site boundary (see Section 5.3.9), there remains a risk of temporary impacts arising from accidental spills, leaks, or improper handling of fuels, oils, chemicals, or concrete during excavation and pipeline installation works. Runoff from concrete works can produce highly alkaline water, which, if unmitigated, may degrade soil quality and pose indirect health risks.

Uncontrolled soil contamination can negatively affect human health through inhalation of fumes or dust from hydrocarbons and petroleum products. Depending on the contaminant type and exposure level, such contamination can have serious health implications for workers and nearby populations.

Without the consideration and employment of mitigation measures the potential impacts during the construction phase on human health and populations due to the potential for soil contamination to occur are ***negative, not significant*** and ***short term***.

5.5.2 Operational Phase

5.5.2.1 Potential Impacts on Land, Soils and Geology

During the operational phase, the majority of the site will be capped by hardstanding and buildings, with stormwater drainage installed. This will significantly reduce the potential for direct contamination of soils, subsoils, and underlying geology. However, in the absence of mitigation measures, there remains a risk of localized impacts associated with accidental leaks or spills of hydrocarbons from vehicles in parking areas. If such spills infiltrate through subsoils, they could negatively affect soil quality.

The Proposed Development will increase the extent of hardstanding, reducing the site's capacity for natural surface water infiltration. Existing site conditions already exhibit areas of surface water pooling due to made ground, and perched water was encountered during site investigations retained by concrete layers

within infilled areas. These conditions indicate that infiltration pathways are already limited, and the operational phase will further reduce permeability across the site.

Without the consideration and employment of mitigation measures the potential impacts during the operational phase on land, soils and geology are ***negative, not significant*** and ***long term***.

5.5.2.2 Potential Impacts on Human Health and Populations

There are no sensitive economic or historical geological features within the site. During the operational phase, the majority of the site will be capped with hardstanding, eliminating pathways for direct contact with soils and subsoils. In addition, there is no requirement for bulk storage of chemicals or hazardous substances during the operational phase. As a result, there is no potential for impacts on human health or populations arising from changes in land, soils, or geology.

5.6 Mitigation Measures

These specific measures will provide protection to the receiving soil environment during the construction phase. These are work practices that are industry best practice measures that will be applied during the construction phase, and they are in no way included to avoid or reduce potential harmful effects to European sites.

5.6.1 Construction Phase

In order to reduce impacts on the land, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

A Construction & Environmental Management Plan (CEMP) has been prepared by Punch Consulting Engineers (May 2026), in respect of the Proposed Development. The CEMP outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Linear Construction Projects;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP will set out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required by the Project Manager, Environmental Clerk of Works, i.e. if unforeseen site conditions are encountered. where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

5.6.1.1 Land, Soils and Geology

5.6.1.1.1 Measures for the Reuse of Soils, and Sourcing of Aggregates

Where excavated soil is intended for reuse on site, made ground will be stockpiled separately to the subsoil at designated locations. Stockpiled materials will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction pending reuse across the site for backfilling and landscaping.

All excavated materials will be visually inspected by suitably qualified persons assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor. Suitable soils and stones will be retained and reused on-site as backfill where possible.

If any waste soil requires removal from site, it will be classified by an experienced and qualified environmental professional to ensure that the waste soil is correctly classified for transportation and recovery/disposal offsite.

Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)), allows material from one site to be reused on another site. By-product notifications are made to the EPA via their online notification form. This process requires certain conditions to be met, and excavated material should not be removed from site until approval from the EPA has been received. The potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material. Regulation 27 will also be investigated to see if material can be imported onto the site for beneficial reuse instead of using virgin materials.

Regulation 28 (End-of-waste status) as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 28 of the European Communities (Waste Directive)), allows certain specified waste to cease to be waste when it has undergone a recovery, including recycling, operation and complies with specific criteria. Regulation 28 will be considered for waste streams, where the regulation may be utilised.

Imported CL.503 material will be required to provide a suitable bedding layer that will be placed in accordance with IS 328:2021, GNI/AD/SP/007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book) and compacted in the trench before laying the pipeline. All imported fill and aggregate that may be required will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development,
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company

5.6.1.1.2 Measures for the Control of Pollution from Other Substances

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages of fuels and other construction chemicals and prevent any resulting discharge to the soil or geological environment:

- Hydrotreated Vegetable Oil (HVO) will be used to fuel vehicles and plant including generators and cranes.
- All plant and machinery will be regularly maintained and serviced to minimise the risk of release of hydrocarbons. This will only be undertaken by qualified personnel;
- Designation of bunded maintenance and refuelling areas on the Site;
- Provision of spill kit facilities across the site strategically located in high risk areas;
- Where mobile fuel bowsers are used, the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;
    - All bowsers to carry a spill kit and operatives must have spill response training;
    - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

The use of HVO, rather than diesel, means that there will be minimal potential for impact for contamination of surface water or groundwater bodies in the event of a spill / leak. HVO is considered less harmful than traditional fossil oils when it spills on the ground due to its renewable nature and biodegradability. When HVO spills, it tends to degrade rapidly through natural processes involving microorganisms, which can metabolize it into less harmful substances. This quick degradation helps minimize its impact on the hydrological environment, reducing the risk of contamination in water sources and soil. Additionally, HVO has a lower toxicity profile compared to fossil oils, making it less harmful to aquatic life and groundwater systems.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling and maintenance of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from watercourses. Emergency procedures and spill protection equipment such as oil booms, oil soakage pads, socks and sand will be available in clearly marked bins/silos and in construction vehicles to be used in the event of an accidental release during refuelling. This equipment will be checked weekly to ensure there is sufficient supply for the site. Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and disposed of in accordance with all relevant waste management legislation. Training will be given to site workers in how to manage a spill event. Prior to any work commencing on site, all construction equipment will be checked to ensure that it is mechanically sound, to avoid leaks of oil, hydraulic fluids and grease. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank.

The following measures will be put in place to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

- Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
- Any pump or valve will be fitted with a lock and will be secured when not in use.
- All bowsers to carry a spill kit and operatives must have spill response training; and Portable generators or similar fuel containing equipment will be placed on suitable drip trays.
- Weekly checks of spill kits will be carried out to ensure they are sufficiently stocked.

Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

5.6.1.1.3 Measures for the Use of Concrete

Any ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash water from cleaning ready-mix concrete wagons and mixers will be contaminated. Wagons and mixers must be washed off-site or in a bunded, impermeable designated washout area. Washout to be removed off site and disposed of appropriately at a licenced facility or reused for concrete

5.6.1.2 Human Health and Populations

No additional mitigation measures are required beyond standard construction good practice as set out in the CEMP. No hazardous waste has been identified within the site boundary (see Section 5.3.9), and therefore no significant risks to human health are predicted. To minimise the potential for spills or accidental releases during construction, fuels and oils will be handled and stored in designated areas and spill kits will be available at all work locations.

All excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor. All sampling and soil handling will be undertaken by suitably qualified and trained persons using suitable personal protective equipment to avoid risks to human health and populations.

5.6.2 Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the underlying soils, subsoils and geological environment during operation.

5.6.2.1 Land, Soils and Geology

As there is no requirement for bulk fuel or oil storage during the operational phase, the risk of soil or geological contamination is minimal. However, accidental discharge of hydrocarbons from vehicles in parking areas or along internal roads remains a possible source of localized contamination. To manage this risk, emergency response procedures and standard operating procedures should be implemented, including the provision of spill kits and training for operatives in their use. All employees should receive appropriate equipment, information, and supervision to ensure effective response to any fuel-related incidents.

The proposed increase in hardstanding is 1.41 ha (from c. 4.15 ha to 5.56 ha) will permanently alter the soil surface, reducing permeability and limiting natural infiltration. While this will have a minor effect on local recharge, the impact on the overall land, soils, and geological regime will be negligible given the small proportion of the site relative to the groundwater body.

The development incorporates several Sustainable Urban Drainage Systems (SuDS) features, including green roofs, rain gardens, infiltration trenches, engineered swales, tree root systems, permeable paving, and a nature-based attenuation pond. These measures will manage surface water effectively and minimize the risk of accidental discharge impacting soils or subsoils.

Surface water and groundwater management measures are detailed in Chapter 6 (Hydrology and Hydrogeology). No additional mitigation measures are required during the operational phase, as the risk of accidental discharge and associated impacts on soils and geology has been adequately addressed through design.

5.6.2.2 Human Health and Populations

There are no sensitive economic or historical geological features within the site. During the operational phase, the majority of the site will be capped with hardstanding, eliminating pathways for direct contact with soils and subsoils. Furthermore, as stated in Section 5.5.2.2 above, there is no requirement for bulk storage of chemicals or hazardous substances.

No additional measures are required for the protection of human health and populations.

5.7 Monitoring or Reinstatement Measures

5.7.1 Construction Phase

During construction phase the following monitoring measures will be considered:

- Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CEMP.
- Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.
- Excavated soil during construction may contain contaminants or pollutants that could pose a risk to the environment if not managed properly. Soil sampling involves collecting representative samples of the excavated soil and analysing them to determine their composition and potential contaminants to confirm disposal options.
- Construction sites involve numerous activities that can impact the environment, from pouring concrete to refuelling vehicles and equipment. Regular inspections of these activities ensure that mitigation measures are implemented to environmental effects.
- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 20 m from surface water receptors.

- Regular inspection of surface water run-off and any sediment control measures (e.g. silt traps) will be carried out during the construction phase. Inspection and maintenance of the silt fences during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire construction phase.
- Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life.
- Regular auditing of construction / mitigation measures will be undertaken, e.g. concrete pouring, refuelling in designated areas, etc.
- A log of the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

5.7.2 Operational Phase

During the operational phase, the potential for impacts on land, soils, and geology is minimal due to the extensive hardstanding and the incorporation of Sustainable Urban Drainage Systems (SuDS) within the site design. However, to ensure continued protection of the underlying soils and geological environment, regular maintenance of the surface water drainage system, including hydrocarbon interceptors and foul sewer infrastructure will be carried out.

Proper maintenance will prevent blockages, system failures, or deterioration that could otherwise lead to uncontrolled discharge of contaminated water to the subsoil. Interceptors should be inspected and cleaned at appropriate intervals to ensure they effectively capture hydrocarbons and other pollutants from vehicle parking areas and access roads. Similarly, foul sewers should be monitored to prevent leaks or infiltration that could compromise soil quality.

These measures will ensure that the operational phase does not introduce new contamination pathways and that the design minimises the potential for infiltration of pollutants into the ground and is maintained throughout the lifecycle of the development.

5.8 Residual Effects of the Proposed Development

5.8.1 Construction Phase

5.8.1.1 Land, Soils and Geology

The implementation of the mitigation and monitoring measures detailed in Section 5.6.1 and 5.7.1, will ensure that potential impacts on the land, soils and geological environment do not occur during the construction phase.

The residual effect on the soils and bedrock during the construction phase is considered to be ***neutral, imperceptible*** and ***short term***.

5.8.1.2 Human Health and Populations

The implementation of the mitigation and monitoring measures detailed in Section 5.6.1 and 5.7.1 will ensure that potential impacts on the human health and populations do not occur during the construction phase.

The residual effect on human health and populations arising from changes in land, soils, or geology during the construction phase is considered to be ***neutral, imperceptible*** and ***short term.***

5.8.2 Operational Phase

5.8.2.1 Land, Soils and Geology

The proposed development does not require any bulk chemical storage and therefore the potential for soil quality impact is ***negligible***. In the event of an accidental leakage of oil, this will be intercepted by the drainage infrastructure proposed.

The proposed surface water drainage system comprises multiple design measures that will be put in place including green roofs, rain gardens, infiltration trenches, engineered swales, tree root systems, permeable paving and an attenuation pond. Therefore, the risk of accidental discharge of hydrocarbons or contamination sources derived from the operational phase has been adequately addressed through design. No further mitigation measures are to be required during the operational phase.

The residual effect on land, soils and geology during the operational phase of the Proposed Development is considered to be ***neutral, imperceptible*** and ***long-term***.

5.8.2.2 Human Health and Populations

As set out in Section 5.5.2.2, there are no potential impacts to human health and populations arising from changes in land, soils, or geology during the operational phase of the Proposed Development, and therefore no residual effects.

5.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the Proposed Development with any relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8, and Appendix 2.1 of this EIA Report.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

5.9.1 Construction Phase

In relation to the potential for cumulative impacts on land, soils and geology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

A review of the planned and permitted developments set out in Appendix 2.1 of Chapter 2 has been undertaken to identify projects that could be under construction concurrently with the Proposed Development and that, by virtue of their scale and proximity, have the potential to result in cumulative effects on the land, soils and geological environment. The developments identified through this review are set out in Table 5-3, together with the relevant planning conditions attached to each grant of permission for the protection of soil, surface water and drainage infrastructure. While the conditions are framed

primarily in surface water and drainage terms, they are also relevant to the protection of the land, soils and geological environment.

Table 5-3: Identified Cumulative Developments and Construction Phase Planning Conditions

Development	Development Reference	Relevant Planning Condition
6 no. unit residential development at Rhebogue Road	LCCC Ref. Reg. No. 211395	Condition 10 – All surface water run-off from the public road which flows into the site shall continue to be accommodated within the site unless alternative arrangements acceptable the Planning Authority are carried out. Condition 12 – A revised Surface Water Drainage proposal shall be prepared and submitted for written agreement. Condition 18 – Each individual dwelling shall have its own separate service connection in accordance with Uisce Éireann Specifications. Connection Agreement(s) with Uisce Éireann.
LRD at Old Dublin Road, Rhebogue	LCC Ref. Reg. No. 221216	Condition 11b - Compliance with LCCC surface water and SuDS specifications. Condition 11c – The surface water disposal system and connection to the existing surface water system shall be certified by a bonded Charted Engineer prior to occupation.
7 no. Unit residential development at Bloodmill Road and Oakwood	LCC Ref. Reg. No. 23605	Condition 14a - Compliance with LCCC surface water and SuDS specifications. Condition 14d - All surface water run-off shall be disposed of appropriately. All surface water run-off from public road which flows into the site shall continue to be accommodated within the site unless alternative arrangements agreed with the Planning Authority are carried out.
Purpose-built Student Accommodation at Groody Road	LCC Ref. Reg. No. 2560113	Condition 16 - Compliance with LCCC surface water and SuDS specifications. Condition 23 - Connection Agreement(s) with Uisce Éireann

31 no. unit residential development at Sandybrook House	LCC Reg. Ref. No. 2560151	Condition 16 – Compliance with LCCC surface water and SuDS specifications.
25 no. unit residential development at Rhebogue Road	ACP Reg. Ref. No. PL91.321345 Planning Authority Case Ref. 2460713	Condition 19 - Connection Agreement(s) with Uisce Éireann
St. Brigid's National School Extension at Singland	LCC Ref. Reg. No. 2460575	Condition 4 – Compliance with LCCC surface water and SuDS specifications. Condition 5 – All surface water run-off shall be disposed of appropriately. All surface water run-off from public road which flows into the site shall continue to be accommodated within the site unless alternative arrangements agreed with the Planning Authority are carried out.
Bloodmill Road Extension Scheme at Ballysimon	ABP Case Ref. JP91.317686	Condition 7 - Drainage arrangements, including the attenuation and disposal of surface water, and flood risk management shall comply with the requirements of Irish Water and the planning authority for such works and services as appropriate. A 5m wide strip of land running parallel with Channel C1/2, should be provided to facilitate access and maintenance activities in the immediate area.

The planned and permitted developments identified in Table 5-3 are physically separated from the Proposed Development site and there are no direct land, soils or geological source pathway linkages between these sites and the Proposed Development site. Each development is required to construct within its own footprint, in accordance with the conditions attached to its grant of permission and with the relevant statutory requirements for the protection of soil and water quality, including the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010, as amended by S.I. No. 366 of 2016).

On this basis, and taking account of the embedded design measures and standard construction practices that each development is required to apply within its own site, there is no potential for the construction phase of the Proposed Development to act in combination with other planned or permitted developments to cause a change in soil quality, ground stability or the underlying geological environment. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments on land, soils and geology during the construction phase is therefore considered to be ***neutral, imperceptible*** and ***short term***.

5.9.2 Operational Phase

Once the Proposed Development is operational, the majority of the site will be capped by buildings, hardstanding and landscaped areas, and surface water runoff will be managed and treated within the integrated SuDS network embedded in the scheme design. As set out in Section 5.8.2, the residual effect of the Proposed Development on land, soils and geology during the operational phase is therefore considered to be *neutral, imperceptible* and *long term*.

The planned and permitted developments identified in Appendix 2.1 of Chapter 2 are physically separated from the Proposed Development site and there are no direct land, soils or geological source pathway linkages between these sites and the Proposed Development. Each development will operate within its own footprint, with surface water managed by its own drainage and SuDS infrastructure in accordance with the conditions attached to its grant of permission and the relevant statutory requirements, including the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010, as amended by S.I. No. 366 of 2016).

On this basis, there is no potential for the operational phase of the Proposed Development to act in combination with other planned or permitted developments to cause a change in soil quality, ground stability or the underlying geological environment. The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments on land, soils and geology during the operational phase is therefore considered to be *neutral, imperceptible* and *long term.*

5.10 References

- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (2000).
- Directive 2014/52/EU (16 April 2014) European Parliament.
- Environmental Protection Agency (EPA) Map Viewer (https://gis.epa.ie/EPAMaps/).
- Geological Survey Ireland Map Viewer (https://www.gsi.ie).
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009).
- Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (EPA, 2022).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Ordinance Survey of Ireland (2021) Geohive online mapping.
- Teagasc Map Viewer (http://gis.teagasc.ie/soils/map.php); and
- TII, (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; June 2009. Transport Infrastructure Ireland, Dublin

Chapter 6 – Hydrology and Hydrogeology

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6. HYDROLOGY AND HYDROGEOLOGY

6.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the Proposed Development will have on hydrology (surface water) and hydrogeology (groundwater). In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

6.2 Methodology

6.2.1 Relevant Legislation and Guidance

This assessment has been undertaken in accordance with the relevant EU and Irish legislation and includes consideration of the objectives as outlined in the Limerick Development Plan 2022-2028. Relevant legislation includes:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009, previously NRA). The TII criteria for rating the hydrogeological and hydrological related attributes are presented in Appendix 6.1 of this EIAR.
- Water Framework Directive 2000/60/EC.

The strategies and objectives of the Water Framework Directive (WFD) in Ireland have influenced a range of national legislation, regulations and guidelines. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2023 (S.I. 99 of 2023).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016).
- European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022 (S.I. No. 113 of 2022)
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988.
- Local Government (Water Pollution) Acts 1977-2007.
- (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and amendments) and European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and amendments).
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board)
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors
- CIRIA C648 Control of Water Pollution from Linear Construction Projects.
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008)
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

6.2.2 Sources of Information

Desk-based hydrological and hydrogeological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Latest EPA Envision water quality monitoring data for watercourses in the area.
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government, 2018).
- Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW, 2009).
- Office of Public Works (OPW) flood mapping data (www.floodinfo.ie).
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Limerick Development Plan (LDP) 2022-2028, Strategic Flood Risk Assessment (SFRA).

Site specific data was derived from the following sources:

- Various design site plans and drawings, as submitted with the planning documentation for this application.
- Stage 2 Flood Risk Assessment, Punch Consulting Engineers, May 2026.
- Planning Engineering Report, Punch Consulting Engineers, May 2026.
- Construction Environmental Management Plan (CEMP), Punch Consulting Engineers, May 2026.
- Parkway Valley Phase 1, Dublin Road, Singland, Limerick – Site Investigation, Report no. OCB25-049 (OCB Geotechnical, October 2025).
- Consultation with design architects and engineers.

The principal attributes (and effects) assessed include the following:

- Water Framework Directive (WFD) Status and potential for increased risk of deterioration of this status due to the activities of the site.
- River and aquifer water quality in the vicinity of the site (where available).
- Surface, transitional and coastal watercourses near the site and potential impact on surface water quality arising from Proposed Development related works including any discharge of surface water run-off.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any)
- Surface water features within the area of the site.
- High-yielding water supply springs/wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development.
- Classification (regionally important, locally important etc) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development e.g. removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality.
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and,
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporarily.

6.2.3 Forecasting Methods and Difficulties Encountered

No difficulties were encountered in the production of this chapter.

6.3 Receiving Environment

6.3.1 Existing and Historical Land Use and Topography

The Site is approximately 6.18 ha in extent and is located in the Singland area immediately to the east of the roundabout entrance to Parkway Retail Park off the Dublin Road (R445). The site is located adjacent to the Dublin Road (R445) approximately 2.5km east of Limerick City centre. There are existing semi-detached two storey houses and a retail park to the west, semi-detached two storey houses to the south, agricultural lands to the east, and agricultural lands, an apartment block, commercial units and an ESB substation to the north separated from the site by the Dublin Road (R445). The site location and surrounding land use for the present day is presented in Figure 6-1 below.

A review of early historical mapping records dated from 1829 to the early 20th century coupled with historical aerial imagery dated from 1995 to the present day indicated that the subject site was unoccupied by any building structures until 2007. A shopping centre was partially constructed in 2007 and was demolished in 2020, with reinforced concrete retaining walls left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground.

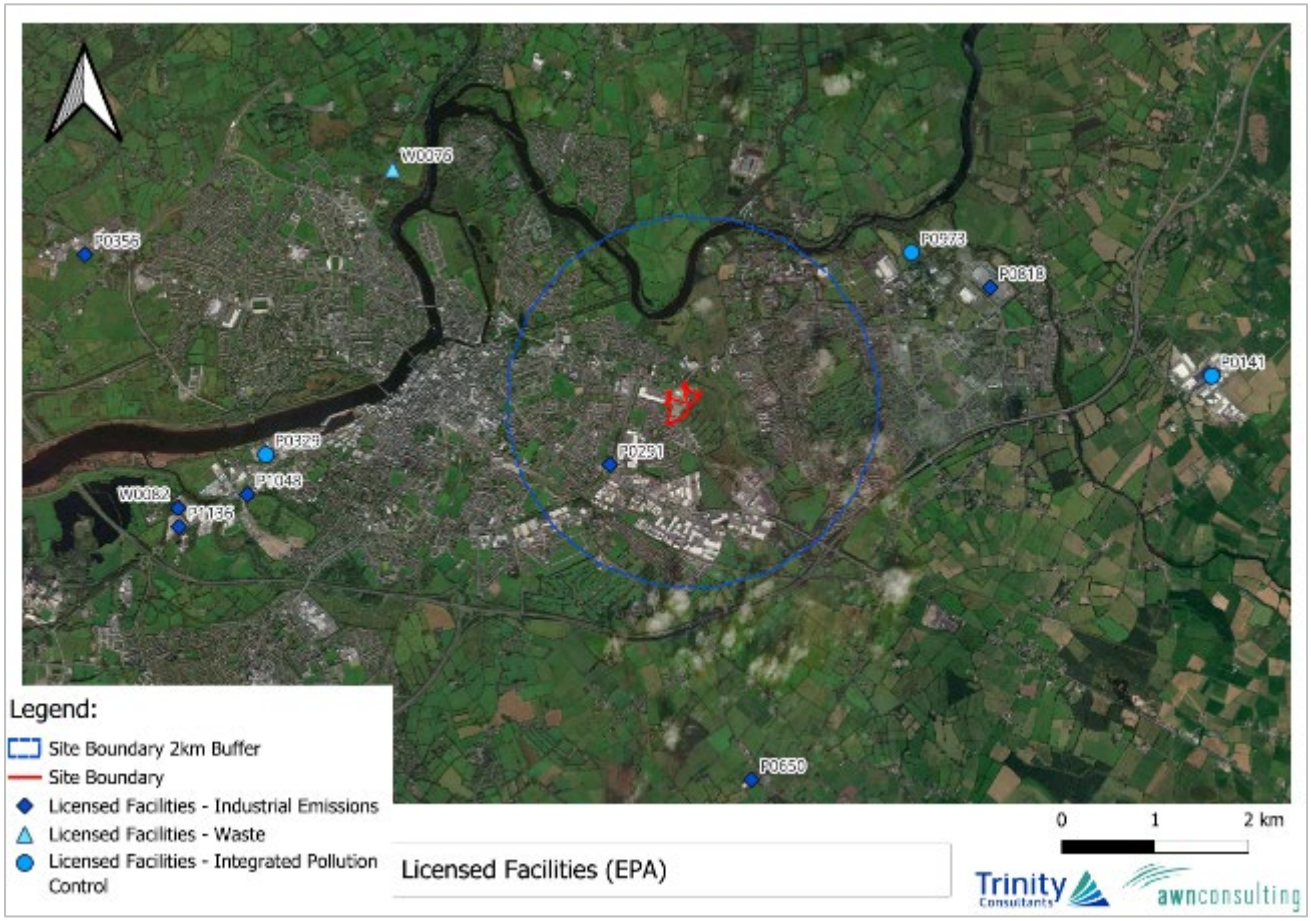
The subject site consists of a gravel footprint, buried concrete where the previous development was demolished in the centre, and some brownfield areas towards the southern and eastern boundaries which were likely reworked during the construction / demolition phase of the previous project. The reinforced concrete retaining walls are to be incorporated as part of the Proposed Development. The ground level of the site is elevated above the Groody River floodplain to the east. The current site sits at elevations between 5 m and 17 m above ordnance datum (AOD) Malin, with majority of the site generally flat (between 8.4 m and 9.64 mAOD) and falling to the east.

Figure 6-1: Site Location and Surrounding Land Use (Google Satellite, 2026)

6.3.2 Surrounding Land-Use

EPA Licensed facilities are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment. There are no licenced facilities within the site boundary. The closest Industrial Emissions (IE), Integrated Pollution Control (IPC) or Waste facility to the Proposed Development according to the EPA (2026) is Galvotech Ireland Limited (IEL: P0291) which is located 0.98 km southwest of the subject site. This is the only active licensed facility within a 2 km radius of the Proposed Development as shown in Figure 6-2 below. It is important to note that the proximity of a licensed facility does not necessarily mean that the Proposed Development will be impacted by their emissions.

Figure 6-2: Industrial Emissions and Integrated Pollution Control Facilities within 2km of the Proposed Development (EPA, Accessed: 14/04/2026)



6.3.3 Hydrology

6.3.3.1 Regional and Local Hydrological Environment

The Proposed Development site is located within the Shannon (International) River Basin District (Shannon IRBD), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). According to the EPA maps, the Proposed Development site is situated in Hydrometric Area No. 25 of the Irish River Network as defined by the EPA nomenclature (EPA, 2026) and is located within the Lower Shannon Catchment (Catchment ID: 25D) and the Shannon(Lower)_SC_090 Sub-Catchment (ID: 25D_9). The Lower Shannon Catchment encompasses an area of approximately 1041.27 km^2.

There is no existing artificial surface water drainage network within the proposed site. There is some low-level ponding evident in aerial photographs of the site which is due to the concrete beneath the surface limiting run-off and infiltration. However, there were no bodies of standing water or habitats which could be described as wetlands identified on site. Run-off from the area is drained via infiltration to ground in surrounding areas under the influence of gravity.

A review of EPA mapping shows two (2) no. unnamed surface watercourses within the Proposed Development Site boundary flowing in an easterly direction towards an OPW arterial drainage channel c. 160 m to the east referred to by the EPA as 'Industrial Estate/Galvone Stream' watercourse. However, based on the site walkovers and surveys undertaken, these are no longer evident on the site. As stated in the Engineering Planning Report prepared by Punch Consulting Engineers (May 2026), no upstream catchments are believed to connect to these drains as all upstream sites have been developed with their

own surface water networks which discharge into the main drainage network. There is an open drain at the eastern site boundary connected to Industrial Estate/Galvone Stream which ultimately discharges to the Groody River. The Groody River (EPA Code: IE_SH_25S012600), a tributary of the Shannon (Lower), is located c. 200 m to the east of the site and flows in a northerly direction.

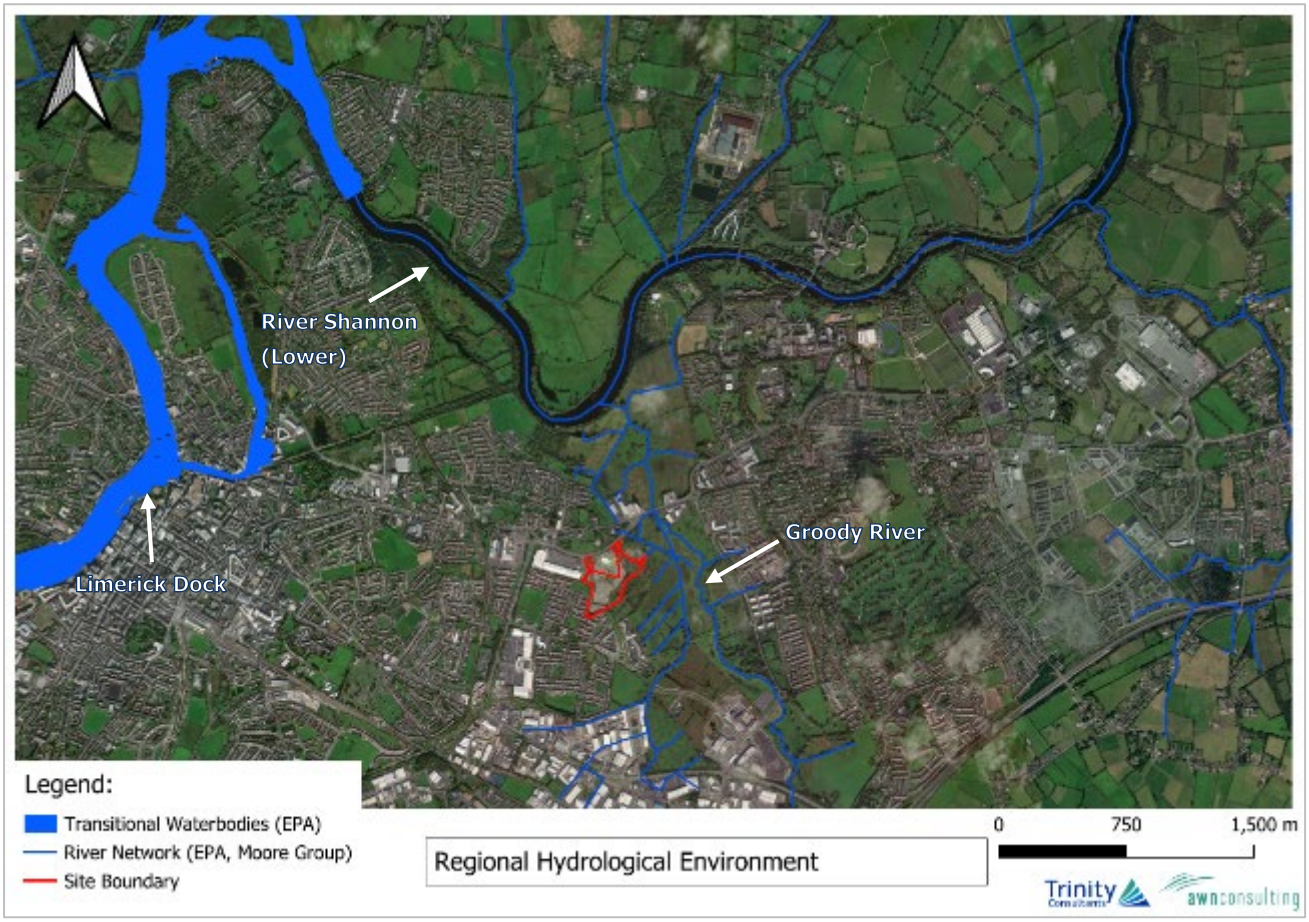
The Groody River (WFD Name: Shannon(Lower)_060) rises approx. 10 km south of the Proposed Development in Cahercornlish, Co. Limerick. Numerous streams merge into the Groody River as it flows from south to north through the Groody Valley, draining a number of Industrial Estates along the way, for approximately 1.4 km (hydrological distance) before discharging to the River Shannon (Lower) c. 705 m north-east of the site. The River Shannon (Lower) and the Groody River comprise the WFD Shannon(Lower)_060 surface waterbody.

The River Shannon (EU Code IE_SH_25S012600) is the main hydrological feature of the region and runs in an east-west direction in the region of the study area and is located approximately 705 m to the north of the site at the point of closest proximity. The River Shannon joins the Limerick Dock WFD Transitional Waterbody (EPA Code: IE_SH_060_0900) approx. 2.97 km downstream of the subject site. The watercourse then merges with the Upper, followed by the Lower Shannon Estuary WFD Transitional Waterbody (EPA Code: IE_SH_060_0800 and IE_SH_060_0300), prior to ultimately discharging into the Atlantic Ocean via the Lower Shannon Estuary (EPA Code: IE_SH_060_0300) on the west coast of Ireland via the Mouth of the Shannon between Loop Head and Kerry Head.

The local and regional hydrological environment are shown in Figure 6-3 and Figure 6-4 below, respectively.

Figure 6-3: Local Hydrological Environment (Moore Group, 2026)

Figure 6-4: Regional Hydrological Environment (EPA, 2026)



6.3.3.2 Bathing Waters and Recreational Waterbodies

A review of the Environmental Protection Agency's (EPA) online mapping that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters or Bathing Waterbodies located in the vicinity of the site or downstream environment. The nearest bathing waterbody is Ballycuggeran (BW ID: IESHBWL25_191a_0300) located c. 21 km north-east of the site and is located upstream of the River Shannon. While an indirect hydrological connection cannot be entirely discounted, the separation distance (c. 21 km) renders any such linkage highly attenuated and negligible in terms of potential impact.

6.3.3.3 Surface Water Quality

The Proposed Development site is located within the Shannon (International) River Basin District (Shannon IRBD), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). According to the EPA maps, the Proposed Development site as defined by the EPA nomenclature (EPA, 2026) is situated in Hydrometric Area No. 25 of the Irish River Network.

The WFD requires 'Good Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2027 at the latest. 'Good Status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP)

2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland (Dept. of Housing Local Government & Heritage, Sept 2024) has since been published.

During the development of this plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2027. During the catchment characterisation, the EPA has carried out an analysis of the likely water quality outcomes that may be achieved as a result of the measures outlined in the third-cycle River Basin Management Plan. The analysis forecasts the number of water bodies that are likely to achieve their 2027 status objectives, and those that are likely to show improvements, so that an assessment can be made of the gap to achieving Water Framework Directive (WFD) environmental objectives. The forecast analysis is a snapshot in time based on the best available information on the measures being implemented as of September 2023. It depends on assumptions being made about how the measures in the plan will be implemented, for example, where measures are voluntary. Improved information on the measures being implemented will allow the forecasts to be further refined over time. The 2021 characterisation assessment identified there were 2,610 water bodies, out of a total of 4,842 water bodies (54%), which had met their objectives. These water bodies require ongoing basic measures to protect water quality. Of the remainder, 1,649 (34% of the total) were categorised as being 'At Risk' of not achieving their objectives and had evidence available to determine the water quality issue(s) and the pressure(s) that needs to be addressed. These water bodies are prioritised in the Plan for measures to restore water quality. The other 583 water bodies are in 'Review', which means additional evidence is required to confirm the nature of any water quality issues and the impacts from any relevant pressures.

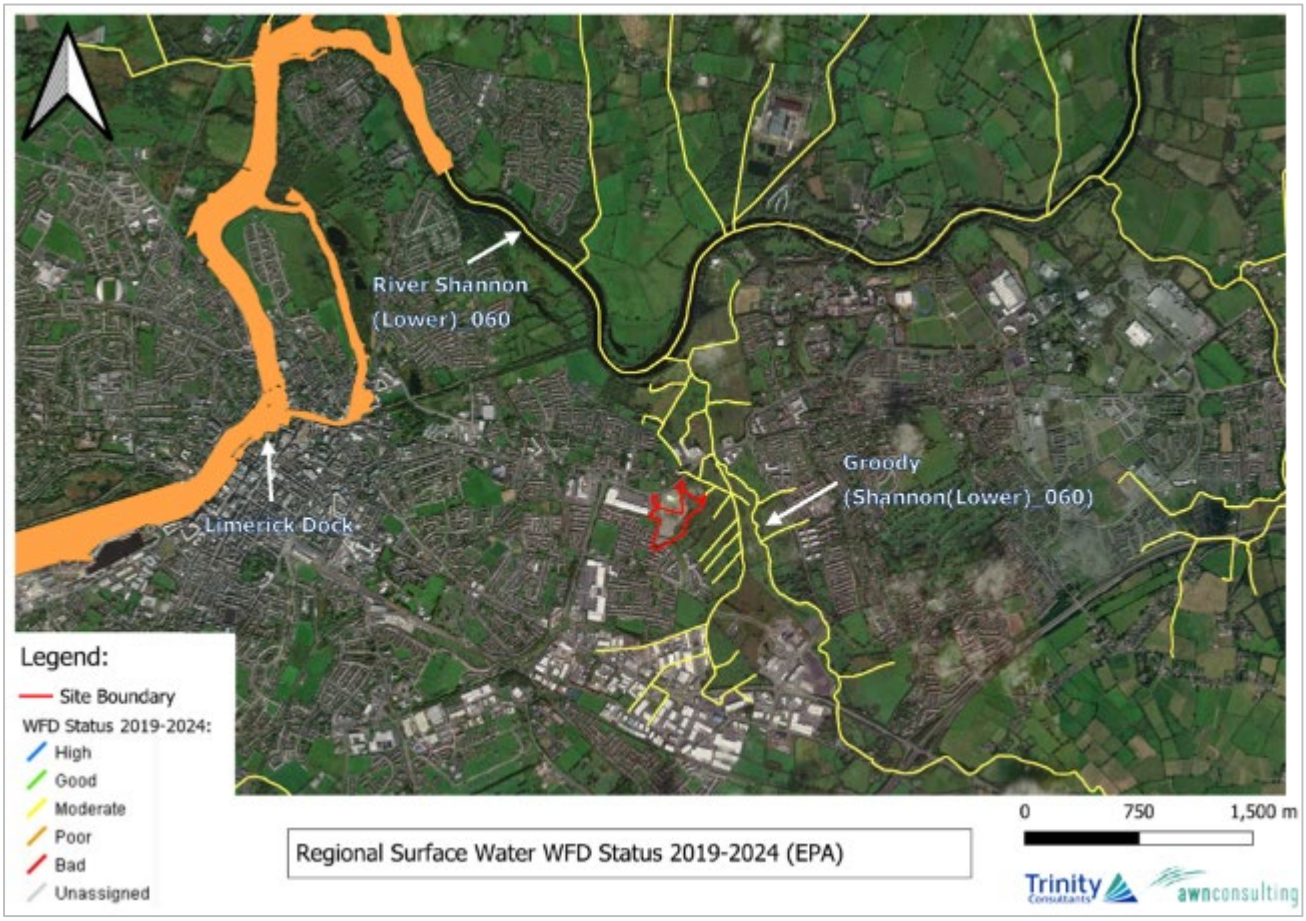
The third cycle river basin management plan (2022-2027) i.e. "Water Action Plan 2024 - A River Basin Management Plan for Ireland" has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Development.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations, including those set out in Section 6.2.1 of this Chapter.

The aforementioned surface waterbodies located to the north and east of the site, with a potential hydrological connection through the existing drainage as presented in Figure 6-3 above, are associated with the Shannon(Lower)_060 WFD river waterbody (European Code: IE_SH_25S012600). This waterbody has a most recent WFD surface water status (WFD Period: 2019-2024) of 'Moderate', indicating a slightly polluted waterbody and its WFD risk score is currently under 'Review'. This rating is attributed to and associated with the presently 'Moderate' ecological and biological status or potential as well as chemistry and nutrient conditions being reported as 'Pass' (www.catchments.ie). There is no data available on the Shannon(Lower)_060 WFD surface waterbody in the WFD Cycle 2 sub catchment assessment report carried out on the Shannon(Lower)_SC_090 (EPA, December 2018) or the CYCLE 3 – HA 25A Lower Shannon Catchment Report (EPA, May 2024) regarding significant pressures and issues for this waterbody.

The WFD Status for the regional hydrological environment is shown in Figure 6-4 below.

Figure 6-4: Regional Surface Water WFD Status 2019-2024 (EPA, 2026)



Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality, as presented in Table 6-1 below.

Table 6-1: EPA Biological Q Rating System

Q Value	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2	Bad	Seriously polluted	Unsatisfactory

The EPA online mapping presents the available water quality status information for water bodies in Ireland. Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. The nearest surface waterbody monitoring station along the subject catchment is situated upstream of the Proposed Development, located approximately 200 m to the east of the site (linear distance). This station is known as "GROODY - Groody Br (G1)" (Station Code: RS25G050300) located along the Groody River. However, the most recent Q-value from this station is

from 1993, recorded as 'Q3 – Poor – Moderately Polluted'. Upstream of this station, the "Br in Ballysimon (G2)" station (Station Code: RS25G050200) recorded a Q-value of 'Q3-4 – Moderate – Slightly Polluted' in 2021.

The locations of these EPA Q-Value monitoring stations and their most recent readings are presented in Figure 6-6 below.

Figure 6-5: EPA River Monitoring Stations (EPA, 2026)

6.3.3.4 Water Supplies

A review of the Environmental Protection Agency's (EPA) online mapping, which includes the Register of Protected Areas (RPA) established under the Water Framework Directive (WFD), indicates the Shannon(Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking RPA. This classification of drinking water river lines has been delineated in accordance with the European Communities (Drinking Water) (No. 2) Regulations 2007 (SI No. 278/2007). This regulatory framework aims to ensure the protection of water resources utilised for human consumption, thus safeguarding public health and the environment. The waterbody is protected under this framework due to a drinking water abstraction point upstream of the subject site in the River Shannon (Lower). The Proposed Development will have no impact on this abstraction as it is located downstream from the abstraction point.

6.3.4 Flood Risk

The EU Floods Directive (2007/60/EC) required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. Members States were also required to prepare catchment-based Flood Risk Management Plans by 2018 that will set out flood risk management objectives, actions and measures. The Office of Public

Works (OPW) in co-operation with various Local Authorities produced Preliminary Flood Risk Assessments (PFRAs) which aimed to map out current and possible future flood risk areas and develop risk assessment plans. As part of the National Catchment-based Flood Risk Assessment Management (CFRAM) programme, provisional flood maps had been produced by the OPW which have been used in this assessment.

Punch Consulting Engineers were appointed by the Applicant to carry out a Site-Specific Flood Risk Assessment (FRA) for the Proposed Development which is included as Appendix 6.2 of this Chapter. This Site-Specific FRA has been carried out in accordance with "*The Planning System & Flood Risk Management Guidelines*" published by the Department of the Environment, Heritage and Local Government in November 2009 and the Limerick Development Plan 2022-2028.

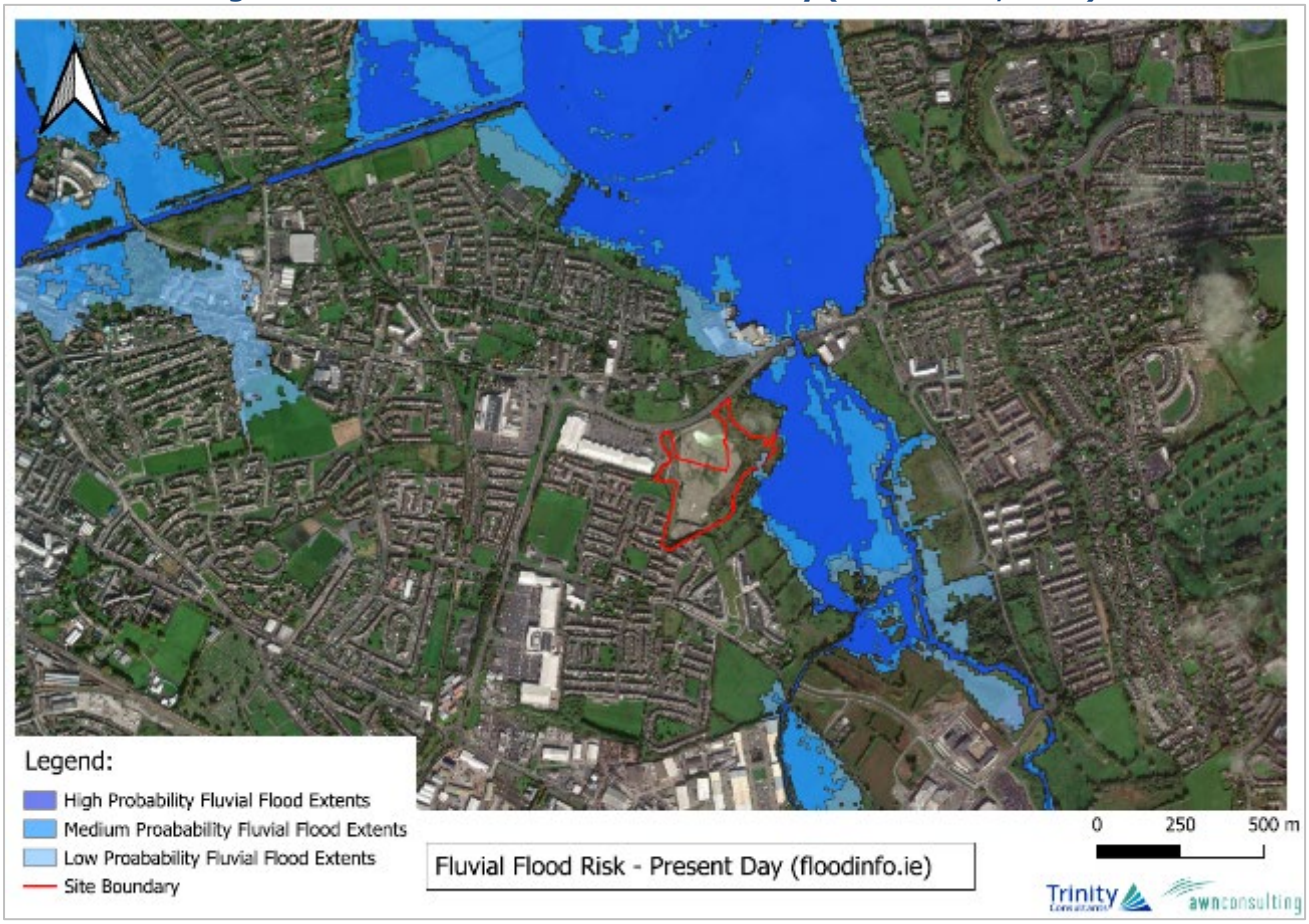
The following conclusions have been made in the Stage 2 Site-Specific FRA:

- Flood Maps and the Limerick Development Plan Strategic FRA were consulted to establish the Flood Zone as the site is located near the Groody River. It was determined that the site is primarily located in Flood Zone C. The surface water outfall pipe which discharges into the Groody River will be located within Flood Zone A with all other proposed works located in Flood Zone C for fluvial flooding. Flood Zone C indicates the probability of a 1-in-1000-year event or an event of less severity occurring (0.1% annual exceedance probability or AEP). Flood Zone A indicates the probability of a 1-in-100-year event or one of greater severity occurring (1% AEP).
- The Proposed Development is at a low risk of flooding and is deemed appropriate provided the residual risk of fluvial flooding is addressed by the following flood mitigation measures at a minimum:
  - The proposed lowest finished floor level for the Proposed Development is 13.30mAOD in accordance with best practice and 7.27m above the CFRAMS 1% AEP for the Mid-Range Flood Scenario fluvial water level.
  - Punch Consulting Engineers recommend that as part of the site maintenance plan, all future proprietors inspect all road gullies in the vicinity and report any blockages to the Local Authority and/or Irish Water. The proprietor should also inspect all surface water drainage within the site, in particular following heavy rain which may cause debris to obstruct the channel (ACO) drain and road gullies.
  - The Proposed Development will provide stormwater drainage in accordance with the Local Authority Development Plan to alleviate pluvial flooding risk.

When examined using the sequential approach proposed in the "*The Planning System & Flood Risk Management*" Guidelines, the Proposed Development is appropriate.

The fluvial flood risk map is presented below in Figure 6-6. Coastal flooding was not found to impact the Groody River in close proximity to the site and therefore will not have an impact on the Proposed Development. Refer to Punch Consulting Engineers' FRA for more detailed information.

Figure 6-6: Fluvial Flood Risk – Present Day (floodinfo.ie, 2026)



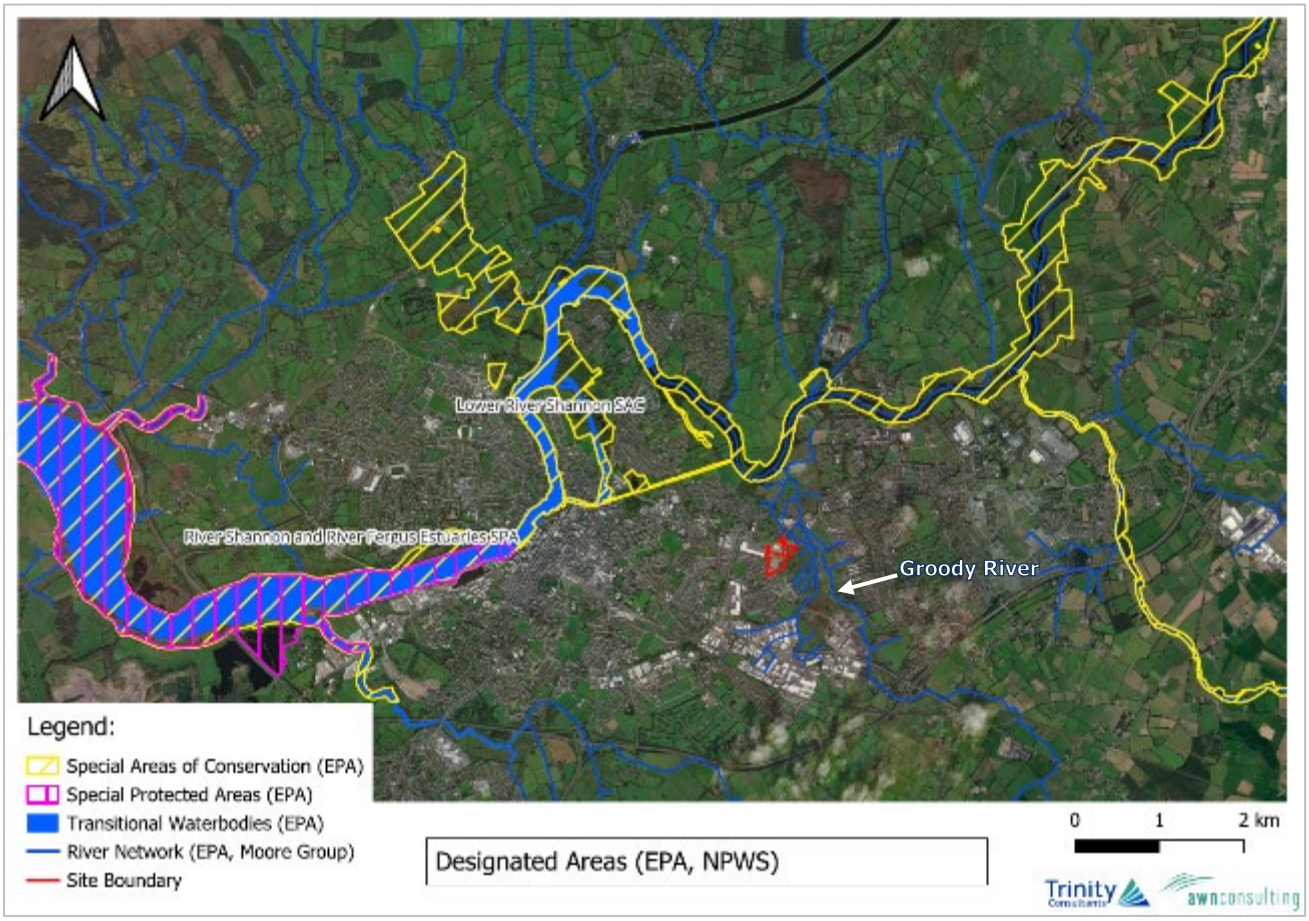
6.3.5 Designated Sites

The NPWS (2026) on-line database has been reviewed to determine the location of areas of conservation in proximity to the Proposed Development site, and there are no Special Protected Areas (SPA) established under the EU Birds Directive (79/409/EEC), or Special Areas of Conservation (SAC) established under the Habitats Directive within the boundary of the Proposed Development site. Furthermore, there are no Natural Heritage Areas (NHA) established under the Wildlife Acts, 1976 and 2000 (as amended) within the boundary of the subject site.

With reference to the subject site, the nearest designated site is the Lower River Shannon SAC (Site Code: 002165), located c. 705 m north of the site (linear distance) and c. 1.4 km downstream (hydrological distance). Approximately 4.6 km downstream (2.97 km linear distance), the River Shannon and River Fergus Estuaries SPA (Site Code: 004077) is located within the Limerick Dock transitional waterbody (European Code: IE_SH_060_0900).

Refer to Figure 6-7 below for location of the River Shannon SAC (Site Code: 002165) and the River Shannon and River Fergus Estuaries SPA (Site Code: 004077) in relation to the Proposed Development site. Further assessment is provided in the EIAR Chapter 7 (Biodiversity).

Figure 6-7: Natura 2000 Conservation and Protection Areas (EPA and NPWS, 2026)



6.3.6 Rating of Importance of Hydrological Attributes

Based on the review of the receiving environment undertaken (Section 6.3.1 through Section 6.3.5) and based on the TII methodology (2009) (See Appendix 6.1), the importance of the hydrological features at this site can be rated as '*Medium*' importance with high quality or value on a local scale, due to the status of the river waterbodies in the vicinity of the site (i.e. Groody River and River Shannon (Lower)) which are classified as '*Moderate*' status under the WFD and are '*Under Review*' (WFD Period: 2019-2024) and the hydrological pathway to the Lower River Shannon SAC (Site Code: 002165). There are no waterbodies within the site boundary, the site does not act as a floodplain, and the site is currently not in use.

6.3.7 Hydrogeology

6.3.7.1 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater transmissivity (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The GSI (2026) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

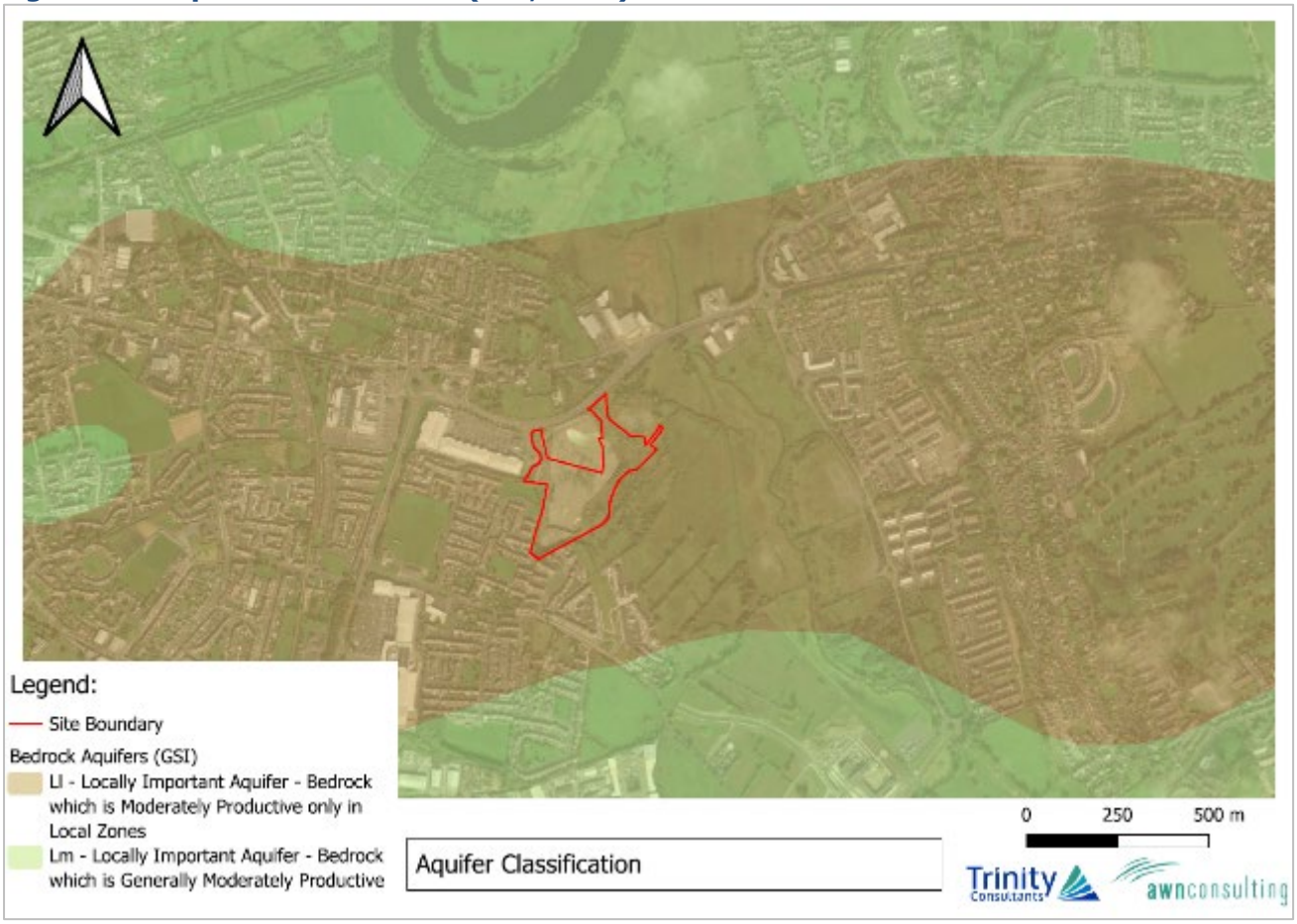
- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones
- PI – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is Generally Unproductive

Gravel Aquifer

- Lg - Locally Important Aquifer - Sand and Gravel
- Rg - Regionally Important Aquifer - Sand and Gravel

The bedrock aquifer underlying the Proposed Development site, according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map, is classified as a *"Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones"* as presented in Figure 6-8 below. This aquifer is capable of supplying locally important supplies (e.g., smaller public water supplies, group schemes). The potential for vertical or horizontal migration within this type of aquifer is not significant and is on a local scale. The GSI map does not identify any structural faults underneath the subject site.

Figure 6-8: Aquifer Classification (GSI, 2026)



6.3.7.2 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of mixtures of peat, sand, gravel, glacial till, clays or silts). Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

Refer to Table 6-2 below for the Geological Survey Ireland (GSI) aquifer vulnerability ratings, which are based on subsoil permeability, thickness, unsaturated zone characteristics, and the presence of karst features.

Table 6-2: Aquifer Vulnerability

Vulnerability Rating	Hydrogeological Condition				
	Subsoil Permeability (type) and Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/ gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)	(Sand / gravel aquifers only)	(<30 m radius)
Extreme (E)	0 – 3 m	0 – 3 m	0 – 3 m	0 – 3 m	-
High (H)	>3 m	3 – 10 m	3 – 5 m	>3 m	n/a
Moderate (M)	n/a	>10 m	5 – 10 m	n/a	n/a
Low (L)	n/a	n/a	>10 m	n/a	n/a
Notes: (1) n/a: Not applicable (2) Precise permeability values cannot be given at present (3) Release point of contaminants is assumed to be 1 – 2 m below ground surface					

The GSI currently denotes areas of 'Low', 'Moderate' and 'High' vulnerability across the site, as summarised below:

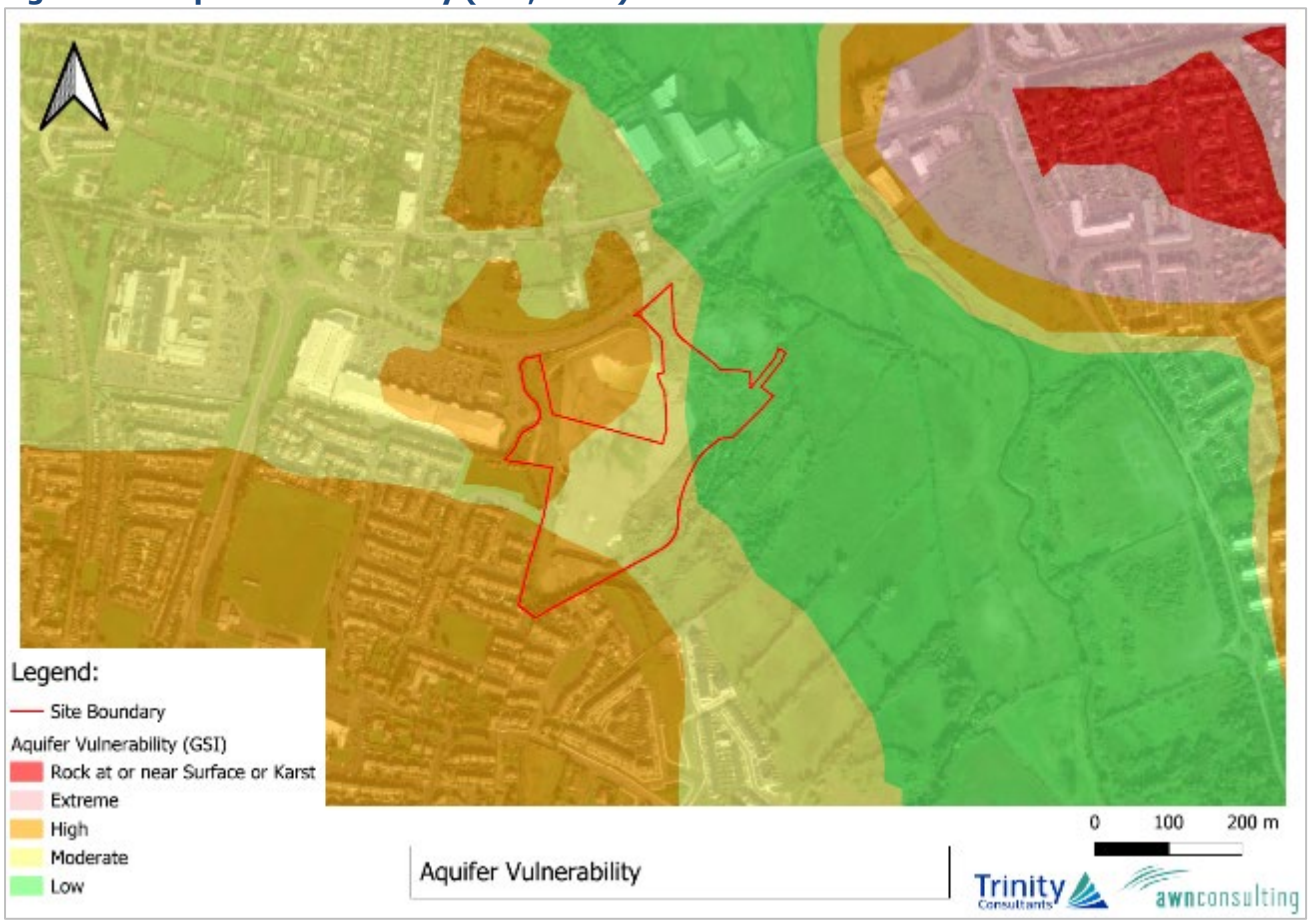
- An area of 'Low' groundwater vulnerability occurs beneath the eastern portion of the site and extends further east. This classification indicates that the underlying aquifer is highly protected by >10 m of low-permeability subsoil, which significantly restrict vertical water movement. This low vulnerability zone continues into tidal marshland (Teagasc, 2026), providing additional natural protection due to saturated conditions and organic-rich soils that act as a filter for potential contaminants.
- An area of 'Moderate' groundwater vulnerability underlies the central portion of the Proposed Development site. This classification indicates that the underlying aquifer is protected by >10 m of moderate permeability subsoil, typically sandy or silty deposits. These conditions provide a reasonable level of natural protection, reducing but not eliminating the potential for contaminant migration to groundwater. 'Moderate' vulnerability classification underlies the majority of the Proposed Development site.
- An area of 'High' groundwater vulnerability underlies the south-western and western portions of the site. This classification indicates limited natural protection for the underlying aquifer. In the south-western area, the aquifer is covered by approximately 3–10 m of moderate permeability subsoil, including loamy drift, glacial tills, and limestone gravels. In the western portion, protection consists of >3 m of high-permeability subsoil, which allows water and potential contaminants to move more easily toward the bedrock.

Site investigations carried out by OCB Geotechnical between July and September 2025 confirmed the thickness of made ground, overburden, and depth to bedrock within areas classified by the GSI as 'Moderate' and 'High' vulnerability. Investigations did not extend into the 'Low' vulnerability zone located in the undeveloped area in the eastern portion of the site. Recorded thicknesses ranged from 4.0-6.5 m in the central portion of the site (RC03 and RC04), 8.7 m in the north (RC02), and 3.5-4.1 m in the southern portion. These findings indicate that the underlying bedrock aquifer is moderately well protected by approximately 5-10 m of made ground and subsoil across most of the site. It should be noted that GSI vulnerability classifications are based on natural ground levels and do not account for areas that have been previously excavated or infilled, which may locally reduce aquifer protection.

Refer to Chapter 5 and Appendix 5.2 of this EIA for further information on site-specific ground conditions.

Refer to Figure 6-9 below for the aquifer vulnerability in the context of the Proposed Development site.

Figure 6-9: Aquifer Vulnerability (GSI, 2026)



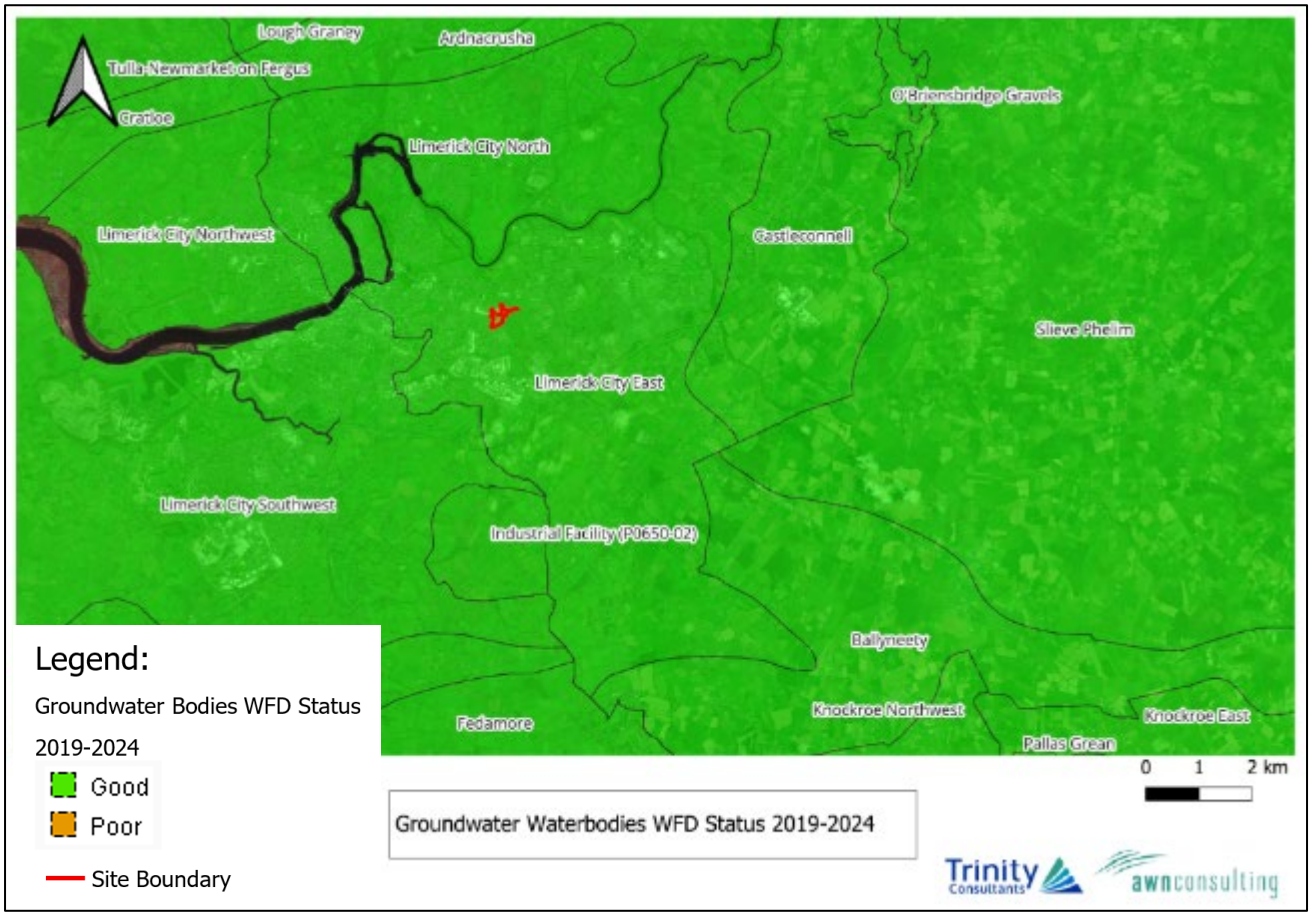
6.3.7.3 Regional Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the Directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

According to the EPA mapping database (2026), the site is located within the Limerick City East groundwater body (European Code: IE_SH_G_13). Presently, the groundwater body in the region of the

site (Limerick City East groundwater body - EU Code: IE_SH_G_13) for which the site is located entirely within, has a WFD status of 'Good' (WFD Period: 2019-2024) as shown in Figure 6-10 and a WFD risk score (3rd Cycle) of 'At Risk' of not achieving good status. This 'Good' status is related to the overall groundwater status i.e. quantitative groundwater status and chemical groundwater status.

Figure 6-10: Regional Groundwater WFD Status 2019-2024 (EPA, 2026)



6.3.7.4 GSI Groundwater Wells and Regional Flow Direction

The GSI Well Index is a record of known wells and springs in Ireland kept by the Geological Survey of Ireland. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in Ireland. While much useful information can be obtained from this index, it is important to note that it is by no means exhaustive as such no complete data set is available.

The current well index shows 2 no. wells are located within a 2km radius of the site. The well card data presented in Table 6-3 below shows these recorded wells information regarding the depth to bedrock, and hence the depth of overburden is noted for each well where available. Abstractions of up to 288 m^3/day are obtained from the bedrock aquifer at well 1415SEW047, which is located approximately 1.74 km to the west. Yield class at this location is classified as 'Good'. The second well 1415SEW001 is located to the north east and the usage is unknown. The site and the surrounding area are serviced by a public water supply so it not anticipated that it used a domestic water supply.

Figure 6-11 below presents the GSI well search for the area surrounding the Proposed Development site. The map shows the areas the wells are located within and are labelled with the level of accuracy GSI have on the exact location of each well.

Table 6-3: GSI Well Card Data for the Site Location and Surrounding Area (GSI, 2026)

GSI Name	Type	Usage	Yield Class	Yield m^3/d	Depth (m)	Depth to Bedrock	Townland
1415SEW001	Borehole	Unknown	Moderate	54.50	73.2	2.7	Newcastle
1415SEW047	Borehole	Industrial	Good	288	73.2	15.2	St. Johns

The well card data shows that the wells mentioned above indicate the depth of overburden to range from 2.7m to 15.2m below ground level (bgl), with an average depth of 8.95m bgl. The shallowest depth was recorded at well No. 1415SEW001 with a depth of 2.7m, which is located to the north-east.

Figure 6-11: Groundwater Wells and Springs (GSI, 2026)

6.3.7.5 Source Protection Areas

There are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the Proposed Development site. The nearest Group Scheme Preliminary Source Protection area is Ballybricken, located c. 9.5 km south-east of the site. The nearest Public Supply Source Protection area is Fedamore PWS located c. 12 km south of the site. Neither of these areas share a hydrological or hydrogeological connection to the site and are located within a separate catchment (Shannon Estuary South (Catchment ID: 24)).

6.3.7.6 Hydrogeological Features

There is no evidence of springs or karstification in the vicinity of the Proposed Development site according to the GSI Karst and well database.

6.3.8 Rating Site Importance of Hydrogeological Features

The review of the receiving environment undertaken (Section 6.3.9) and based on the TII methodology (2009) (Appendix 6.1) the importance of the hydrogeological features at this site can be rated as '*Medium*' importance with medium importance or value on a local scale, due to the aquifer beneath the site being classified as a "*Locally important aquifer - Bedrock which is Moderately Productive only in Local Zones*" and likely contributes to the baseflow of local streams and rivers (i.e. Groody River and River Shannon (Lower)).

6.3.9 Conceptual Site Model

A Conceptual Site Model (CSM) has been prepared as part of this Environmental Impact Assessment Report (EIAR) to summarise the hydrogeological and hydrological setting of the Proposed Development. The CSM integrates desk-based data, national geological mapping, and findings from the ground investigations to provide a clear understanding of subsurface conditions, potential contaminant pathways, and environmental receptors relevant to the project.

- Ther are no surface waterbodies located within the boundary of the Proposed Development. The site currently drains via an open drain connected to the Industrial Estate/Galvone Stream which discharges into the Groody River located 200 m east of the site boundary. The Groody River is a tributary of the River Shannon (Lower), and both waterbodies comprise the WFD Shannon(Lower)_060 surface waterbody. This waterbody has 'Moderate' WFD status and its WFD risk status is under 'Review'.

- The GSI/Teagasc mapping indicates that there are two soil types underlying the Proposed Development:
  - The western portion of the site is underlain by fine loamy drift derived from limestones, which is classified as a well-drained mineral soil which characteristically supports good permeability and is suitable for a range of land-uses.
  - The eastern portion of the site is underlain by tidal marsh deposits, which are characterized as poorly drained soils which is characteristically frequently saturated due to tidal influence, resulting in anaerobic conditions and high organic matter content.

- The GSI/Teagasc mapping database indicates that there are four subsoil types present across the Proposed Development:
  - Gravels derived from limestones (GLs), underlying the north-western portion of the site, which are associated with an area of high permeability.
  - Till derived from basic igneous rock (TBis), underlying the south-western corner of the site which is associated with an area of moderate permeability.
  - Till derived from limestones (TLs), underlying the central and northern portion of the site which is associated with an area of moderate permeability.
  - Estuarine silt and clays, underlying the eastern portion of the site which are associated with an area of low permeability.

- The GSI (2026) records show the site is underlain by Volcaniclastic Rocks (Rock Unit Code: LTVOLCC) from the Carboniferous and Palaeozoic age bracket. The bedrock encountered during the site investigation carried out by OCB Geotechnical was described as strong micritic limestone, with occasional thin calcite veins and fossil shell debris, and locally interbedded with rare volcaniclastic laminae.

- According to the GSI National Draft Bedrock Aquifer Map, the bedrock aquifer underlying the Proposed Development is classified as a 'Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones (LI)'. This aquifer is capable of supplying locally important supplies (e.g., smaller public water supplies, group schemes). The potential for vertical or horizontal migration within this type of aquifer is not significant and on local scale.

- The GSI (2026) mapping indicates that the aquifer vulnerability underlying the Proposed Development is classified as:
  - 'Low' in the eastern portion of the site indicating that the underlying aquifer is protected by >10 m of low permeability subsoil (estuarine silts and clays, poorly drained tidal marsh deposits).
  - 'Moderate' in the central and southern portion of the site indicating that the underlying aquifer is protected by >10 m of moderate permeability subsoil (Till derived from basic igneous rock and limestone).
  - 'High' in the west and southwest of the site indicating that the underlying aquifer is protected by >3 m of high permeability subsoil in the west and by 3-10 m of moderate permeability subsoil in the southwest.

- The site is underlain by the Limerick City East Groundwater body (GWB) which has a WFD status of 'Good' but is 'At Risk' of not achieving 'Good' status by 2027. This GWB flows towards surface water bodies (Shannon(Lower)_060 and Limerick Dock) locally. The GWB discharges to these local surface waterbodies and is recharged diffusely by infiltration through subsoil where possible or directly by outcrops.

- The Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA are located in the Shannon(Lower)_060 surface and Limerick Dock transitional waterbodies, respectively. The SAC is located c. 705 downstream linear distance (and 1.40 km downstream based on hydrological distance), and the SPA is 2.97 km downstream linear distance and c. 4.6 km downstream hydrological distance from the Proposed Development.

- The subject site and its associated works will be located in Flood Zone C (0.1% AEP) with the exception of the outfall pipe which will be located in Flood Zone A along the eastern boundary of the site, near the Groody River.

- The ground investigation carried out by OCB (2025) (Report Ref: 25-049) confirmed that:
  - Subsoil depths generally range from 3.5 m in the south to 8.7 m towards the north, with bedrock encountered at these depths.
  - The subsoil consists primarily of made ground to a maximum depth of 3.2 m in the east, 1.8 m in the centre and 1.4 m in the southern portion of the site, cohesive deposits across the site of both silt and clay with glaciofluvial deposits in the north and centre of the site.
  - Groundwater was encountered at 8.2 m in RC02 in the north of the site, at 5.8 m (which rose to 0.65 m after 20 minutes) in RC04 in the centre, and at approx. 8.8 m (which rose to 7.2 m overnight) in RC07 in the south of the site.
  - Perched water was encountered in the made ground on site, retained by concrete slabs beneath the ground surface. This is not connected to the hydrogeological regime within the subject site.
  - Three soil samples were analysed and were not found to be contaminated above the guideline values (refer to Section 5.3.9).

Refer to Chapter 5 (Land, Soils and Geology) for further information on the geological environment at the site.

6.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package.

6.4.1 Construction Phase

The activities required for the construction phase of the Proposed Development present the greatest risk of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the Proposed Development.

Based on a review of the local information and historical and present-day knowledge on the ground conditions near the site, it is not anticipated that any exceptional or unusual risks are posed by the ground conditions which would cause difficulties during the construction phase at the site.

6.4.1.1 Accidental Spills, Leaks and Discharges

There is potential for pollutants associated with construction activity, such as hydrocarbons, oils, and other contaminants, to impact the underlying aquifer and groundwater body and surrounding hydrological environment. If a spill occurs, contaminated water and collected surface water run-off from construction areas can pose a short-term risk if the contaminated water is allowed to percolate to the aquifer unmitigated which could contribute to localized contamination. Run-off of contaminated surface water from the site could also pose a risk to the downstream surface waterbodies.

6.4.1.2 Site Levelling and Excavations

The Proposed Development requires soil and stones to be excavated to facilitate the construction and installation of foundations, underground car parks and services. The consultants at Mitchell McDermott have estimated that c. 41,275 m^3 of material will need to be excavated. An estimated volume of c. 37,000 m^3 will be required for infilling. The potential to reuse excavated material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material. It is currently envisaged that around 10% of the excavated material, c. 4,127.5 m^3, will be retained and reused onsite for landscaping and fill. Any material that is not reused will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

The maximum depth of excavation will be approximately 3.75 m below current ground levels in the southern portion of the site. Bedrock in this area was encountered during the site investigation carried out in 2025 at 3.50 m BGL by OCB Geotechnical. The borehole extended to 9.5 m BGL and encountered groundwater at approx. 8.8 m (which rose to 7.2 m overnight). The excavation will extend approx. 0.25 m into the bedrock in this area, but groundwater is not expected to be encountered at this depth. From the available site investigation data, bedrock or groundwater are not expected to be encountered in any other areas across the subject site at the planned excavation depths.

As stated above, it is estimated that c. 41,275 m^3 of material will be excavated and the majority of this material will be removed and transported off site. This will temporarily increase the aquifer vulnerability which is classified by the GSI as 'Low', 'Moderate' and 'High' within the site, prior to paving and installation of stormwater drainage and services. The area which requires the most excavation is classified as 'High' vulnerability by the GSI.

Dewatering of the perched water within the made ground may be required. However, no significant long-term dewatering is expected. This perched water is not connected to the underlying groundwater body

and as such this minor dewatering activity is unlikely to have an impact on groundwater quantity or quality. As stated above, groundwater is not expected to be encountered during construction activities.

6.4.1.3 Piling for Foundations / Use of Concrete

With regard to the construction of foundations, piles will be bored displacement (CFA methodology) which will have an average depth of 5 m bgl. This foundation construction method extracts a core of soil and replaces it with concrete cast in-situ; a continuous helical auger drills into the subsoil/rock to the required depth; concrete is then pumped steadily through the hollow stem, forming a continuous cast-in-place concrete pile. Since the core is never left open, CFA piling effectively prevents soil collapse and groundwater ingress. Reinforcement cages are installed immediately after concreting while the concrete remains workable, since the in-situ casting creates a water-tight seal against the geology over the length of the pile.

This methodology ensures that the contact time between the concrete and any potential groundwater is minimal and, given the low connectivity of the underlying bedrock aquifer, this contact is limited to the duration of the concrete seal and spatially, only to the potential groundwater in contact with the hollow stem during this brief period.

Any interaction between fresh concrete and groundwater would be highly localised and short-lived during placement. The surrounding soils and bedrock provide buffering and dilution, and the low permeability means migration beyond the immediate pile location is considered highly unlikely. On this basis, impacts to groundwater quality from piling are considered negligible and this pathway can be excluded.

6.4.1.4 Storage of Soils/Aggregates

The employment of good construction management practices and full adherence to a Construction Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within or adjacent to the contractors' compound on site. Temporary storage of spoil will be managed to prevent accidental release of dust emissions and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

6.4.1.5 Storage of Hazardous Material

Temporary storage of fuel will be required on site for construction traffic. Liquid materials i.e., fuel storage will be located within the site compound in temporary designated bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS EN 1992-3:2006) to prevent spillage.

Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site. There is limited potential for leaks or spills of petroleum hydrocarbons during the construction phase. Unmitigated leaks or spills may lead to contamination of groundwater and/or surface water.

6.4.2 Operational Phase

The Proposed Development characteristics which relate to the hydrological and hydrogeological environment during operation are summarised below.

6.4.2.1 Surface Water Drainage Infrastructure

A new fully separated surface water sewer network is proposed for the development. In accordance with the Limerick Development Plan 2022–2028 and the Greater Dublin Strategic Drainage Study (GDSDS), surface water discharge will be restricted to the greater of 2 l/s/ha or Qbar. The system is designed to manage the 1% AEP (1:100-year) storm event, including a 30% allowance for climate change.

Discharge from the site will be controlled via a hydrobrake located upstream of the stormwater outfall, which will convey flows by gravity to the Industrial Estate/Galvone Stream, which discharges to the Groody River (refer to Section 6.3.3.1 above).

The drainage system has been designed using Causeway Flow software, in line with *Recommendations for Site Development Works for Housing Areas* (DoEHLG), the GDSDS, CIRIA guidance (C644 and C753), and Limerick City & County Council requirements. Modelling applied an M5-60 of 16.5 mm, a ratio (R) of 0.307, a 30% climate change uplift, and 10% additional area for urban creep. All finished floor levels are at least 500 mm above the 1:100-year drainage water level.

The design prioritises Sustainable Drainage Systems (SuDS) to minimise impact on the receiving environment. SuDS features include green roofs, bioretention areas (rain gardens), permeable paving, porous asphalt, swales, infiltration trenches, tree-pit attenuation and attenuation pond. These measures promote infiltration, evapotranspiration, pollutant removal, and runoff reduction ensuring that, during typical low-intensity storms, most rainfall is retained within SuDS features rather than entering the public network.

- **Green Roofs:** Extensive sedum green roofs will be provided across large areas of the proposed buildings. These offer visual and ecological benefits, reduce runoff, and are widely recognised as an effective SuDS measure.
- **Permeable Paving and Porous Asphalt:** Courtyards and limited surface parking areas will use permeable paving, while internal roads will use porous asphalt. These provide filtration, biodegradation, adsorption of pollutants, and settlement of solids, avoiding the need for traditional oil interceptors.
- **Rain Gardens (Bioretention Areas):** Rain gardens will treat runoff from low-intensity storms through filtration and evapotranspiration within high-permeability soil (900 mm depth), supported by perforated sub-drains that overflow to the main stormwater network when required. Their extent and layout follow landscape architectural design.
- **Infiltration Trenches and Swales:** These features provide additional attenuation through void storage within lined stone trenches, with high-level overflows to the drainage network. Swales incorporate interception storage and can achieve zero runoff for the first 5 mm of rainfall in line with CIRIA C753 guidance.
- **Tree-Root SuDS Systems:** Where feasible, hard-landscaped areas will drain to tree pits designed with drainage stone/subsoil to provide interception and attenuation. These systems also follow CIRIA C753 guidance for bioretention performance.
- **Attenuation Pond:** A landscaped open attenuation pond will provide the primary storage for the 1-in-100-year event, with 0.5 m freeboard. It is designed to integrate naturally within the site's landscape and further reduce peak runoff.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed surface water management and design.

6.4.2.2 Wastewater Infrastructure

The foul water network for the Proposed Development has been designed using Causeway Flow software, in accordance with the DOEHLG Recommendations for Site Development Works for Housing Areas and the Uisce Éireann Code of Practice for Wastewater Infrastructure. The foul water system is fully separated from the proposed surface water network.

A new internal foul sewer network will collect flows and convey them to a proposed pumping station located within the eastern boundary of the site. The pumping station and rising main have been designed in accordance with Uisce Éireann requirements. It is proposed that the foul sewer will discharge by gravity to the proposed pumping station. The rising main will discharge into the existing drainage in the Parkway Retail Park which ultimately discharges into a combined sewer on Childers Road, with the final connection point to be agreed with Uisce Éireann.

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann on 9th June 2025, and a Confirmation of Feasibility (COF) was received from Uisce Éireann on 30th October 2025 which confirms the feasibility of the proposed wastewater connection (COF Ref. DS25006639).

The foul water design is based on the following parameters extracted from the Engineering Report prepared by Punch Consulting Engineers (May 2026):

- Occupancy rate: 2.7 persons per dwelling
- Residential flow rate: 150 L/person/day
- Medical facility flow rate: 450 L/person/day
- Crèche flow rate: 100 L/person/day
- Average demand: 1.25 DWF
- Peaking factor: 6 DWF (Residential) and 4.5 DWF (Creche and Medical Centre)
- Minimum self-cleansing velocity: 0.75 m/s
- Minimum pipe diameter: 150 mm

These parameters inform the hydraulic design to ensure adequate capacity, self-cleansing conditions, and compliance with national wastewater infrastructure standards.

The foul sewer for the Proposed Development eventually discharges to Limerick Wastewater Treatment Plant (WWTP) (D0013) for full treatment. According to the 2024 Annual Environmental Report (AER), WWTP currently has adequate operational capacity to accommodate the additional flows generated by the Proposed Development. Following treatment, the final effluent from Limerick WWTP is discharged into Limerick Dock transitional waterbody.

There will be a hydrological connection the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA sites through the wastewater effluent from the wastewater treatment plant (WWTP). However, the WWTP operates under an EPA licence with defined emission limit values and compliance conditions to ensure that treated effluent discharges do not compromise the achievement of WFD environmental objectives in the receiving waterbody.

The WWTP is also underlain by Limerick City Southwest Groundwater Body which currently has a 'Good' WFD status (2019-2024) and is 'At Risk' of not achieving 'Good' status by 2027. The facility is underlain by low permeability estuarine silts and clays (cohesive deposits) and a Locally Important Bedrock Aquifer which is Generally Moderately Productive, classified as having low vulnerability. The effluent is unlikely to impact the status of the groundwater body as it is treated as per the requirements associated with the facility's license. Additionally, there is low likelihood of discharge to groundwater through this pathway due to the low permeability cohesive material underlying the area and the infrastructure associated with the WWTP discharge process.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed foul water management and design.

6.4.2.3 Water Supply

The potable water demand for the development has been estimated using standard design loading for foul drainage as an acceptable proxy for water usage. In accordance with the Uisce Éireann Code of Practice for Water Infrastructure, average daily demand is calculated as the number of persons multiplied

by the per-capita flow rate. An average day peak-week factor of 1.25 and a peaking factor of 5 are applied to determine peak demand.

Based on these design criteria, the development will generate:

- Average water demand: 3.177 L/s
- Peak water demand: 19.845 L/s

To accommodate this demand, a 300 mm diameter watermain will be constructed to serve the development. This main will connect to the existing 300 mm ductile iron watermain on Dublin Road (R445) and will provide the full potable water supply to the site. A bulk water meter will be installed at the boundary connection point. All watermain design and construction will comply with the Uisce Éireann Code of Practice for Water Infrastructure and Local Authority requirements. Flow testing will be undertaken to verify fire-fighting storage needs. Water-efficiency measures will be included throughout the commercial and retail areas to reduce potable water demand and associated foul discharge. These measures will include dual-flush toilets, low-volume push-button taps and waterless urinals.

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann on 9th June 2025, and a Confirmation of Feasibility (COF) was received from Uisce Éireann on 30th October 2025 which confirms the feasibility of the proposed water supply connection subject to upgrades of 57 m of existing watermain from 200 mm to 350 mm, to be funded by the applicant (COF Ref. DS25006639).

Further details on potable water design are provided in the Engineering Report prepared by Punch Consulting Engineers (May 2026), submitted with the planning application.

6.5 Potential Impacts of the Proposed Development

An analysis of the potential impacts of the Proposed Development on the hydrological and hydrogeological environment during the construction and operational phases are outlined below. Due to the inter-relationship between land, soils and geology with hydrogeology and hydrology the following impacts discussed will be considered applicable to both Chapter 5 (Land, Soils and Geology) and 6 (Hydrology and Hydrogeology) of the EIA Report. Remediation and mitigation measures are included in the design of this project to address these potential impacts are presented in Section 6.6.1 (Construction Phase) and 6.6.2 (Operational Phase) below.

AWN Consulting have prepared a Hydrological and Hydrogeological Qualitative Risk Assessment Screening Report (Appendix 6.4 of this Chapter of the EIAR) to assess the potential for any likely significant impacts on receiving waters and protected areas during construction or post development once operational, in the absence of taking into account any measures intended to avoid or reduce harmful effects of the proposed project (i.e. standard control measures) which supports the findings of this Chapter.

6.5.1 Construction Phase

6.5.1.1 Potential Impacts on Surface Water and Groundwater Quality

There is potential for run-off water to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the hydrological and hydrogeological environment through the existing drainage on site, which eventually discharges to the Industrial Estate/Galvone Stream located c. 160 m to the east, merging with the Groody River c. 200 m north-east, which discharges to the Shannon (Lower) c. 705 m north of the site, and the underlying 'Locally Important Aquifer' i.e. Limerick City East groundwater body (GWB). During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Excavations/ soil stripping- Increase sediment run off (erosion during rainfall periods), Pollutant mobilisation (heavy metal runoff), Loss of vegetation;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will discharge to the Local Authority foul drainage system via a temporary connection.

In the absence of mitigation, rainfall run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, downstream infrastructure or watercourses.

Concreting operations pose a potential risk of discharging concrete materials into exposed surfaces and percolate to the underlying groundwater. Concrete, especially the cement component, has a high alkalinity level. As detailed in Section 6.4.1.3, the proposed piling methodology ensures that the contact time between the concrete and any potential groundwater is minimal and, given the low connectivity of the underlying bedrock aquifer, this contact is limited to the duration of the concrete seal and spatially, only to the potential groundwater in contact with the hollow stem during this brief period. Any interaction between fresh concrete and groundwater would be highly localised and short-lived during placement. The surrounding soils and bedrock provide buffering and dilution, and the low permeability means migration beyond the immediate pile location is considered highly unlikely. On this basis, impacts to groundwater quality from piling are considered negligible and this pathway can be excluded.

With regard to the use of cement and concrete on site other than for piling, mitigation measures will be implemented to minimise the potential for any interaction with groundwater. These measures will include controlled concrete pouring practices, prevention of direct discharge to ground, appropriate containment of washout water, and designated areas for concrete handling and curing. In addition, any surplus materials and wash waters will be managed and disposed of in accordance with best practice and relevant guidance. These measures will ensure that the potential for contact between fresh concrete and groundwater is effectively minimised. As a result, any incidental interaction that may occur would be limited in extent, temporary in duration, and unlikely to give rise to measurable effects on groundwater quality.

There is also the potential risk of unintentional discharge of stored materials like fuels, oils, and paints, which could have negative impacts on surface water bodies on-site and downstream, and the underlying groundwater.

There are no potential impacts from wastewater during construction on the hydrological and hydrogeological environment as this will be discharged of appropriately. Welfare facilities (canteens, toilets etc.) will be available within the construction compound, and this will remain in place for the construction of the Proposed Development. Water required for welfare use and for general construction activities will be sourced from the existing public piped supplies on the Dublin Road (R445), in consultation with Uisce Eireann.

In the absence of mitigation measures, the potential impacts during the construction phase on surface water quality and groundwater quality are ***negative***, ***slight*** and ***short term.***

6.5.1.2 Potential Impacts on Surface Water and Groundwater Flow and Quantity

Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities. Runoff containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from dewatering excavations, exposed ground, stockpiles and access roads.

Although areas of the site are already capped with existing hardstanding, construction activities will still introduce areas of new impermeable surfaces and may cause additional soil compaction during localised excavation and earthworks. These activities can further reduce infiltration capacity and increase the rate and volume of surface water runoff from exposed or disturbed areas. If not appropriately managed, the resulting increase in runoff and sediment mobilisation could lead to elevated sediment loading, scouring of local drainage features, and adverse downstream impacts on the receiving surface water network.

There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed diversions of any waterbodies as part of the Proposed Development.

In the absence of mitigation measures the potential impacts during the construction phase on surface water and groundwater quantity and flow are ***negative***, ***slight*** and ***short term*****.**

6.5.1.3 Potential Impacts on Human Health and Populations

A reduction in water quality arising from unmitigated pollutants has the potential to affect the receiving hydrological and hydrogeological environment. Contaminants entering the onsite drainage system could migrate toward the Industrial Estate/ Galvone Stream (approximately 160 m east), subsequently discharging to the Groody River (c. 200 m north-east) and ultimately to the Shannon (Lower), located approximately 705 m north. In addition, infiltration of contaminated water could pose a risk to the underlying Locally Important Aquifer (Limerick City East GWB).

Degradation of water quality could result in negative impacts on human health and local populations if the receiving waterbodies were used as drinking water supplies or for bathing/recreation. However, it is noted that there are no recorded Recreational Waters or Bathing Waterbodies located in the immediate downstream environment. The nearest bathing waterbody is Ballycuggeran (BW ID: IESHBWL25_191a_0300) located c. 21 km north of the site, upstream of the where the Groody River merges with the River Shannon (Lower). While an indirect hydrological connection cannot be entirely discounted, the separation distance (c. 21 km) renders any such linkage highly attenuated and negligible in terms of potential impact. The Shannon(Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking Register of Protected Areas (RPA), but the abstraction point relating to this protection is located upstream of the subject site. The Proposed Development will have no impact on this RPA.

In addition, there are no recorded public groundwater supplies or group schemes, groundwater source protection zones, public supply source protection area or group scheme preliminary source protection areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the site.

Therefore, on this basis in the absence of mitigation measures there are no potential impacts during the construction phase of the Proposed Development on human health and populations.

6.5.1.4 Potential Impacts on Water Framework Directive Status

Accidental discharges during the construction phase (as outlined in Section 6.5.1.1) could occur in the absence of mitigation; however, these events would be temporary and short-lived. They are not expected

to result in any measurable deterioration of the WFD status of the Shannon(Lower)_060 WFD river waterbody (i.e. Groody River and Industrial Estate/Galvone Stream waterbodies), nor of the underlying 'Locally Important Aquifer' i.e. Limerick City East groundwater body (GWB). The short duration and localised nature of potential discharges, combined with the implementation of mitigation measures, ensure that there will be no long-term impact on water quality trends or overall WFD status assessment.

As such the Proposed Development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland. The potential effect on Water Framework Directive status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Report (Appendix 6.3 of the EIAR) which provides a more detailed assessment.

6.5.2 Operational Phase

6.5.2.1 Potential Impacts on Surface Water and Groundwater Quality

The surface water runoff during the operational phase will more likely impact stormwater drainage, rather than directly impact the hydrological and hydrogeological environment due to the hardstand and drainage infrastructure proposed.

During the operational phase, surface water runoff from trafficked and hardstanding areas may contain low concentrations of contaminants such as hydrocarbons, suspended solids, and trace pollutants. If uncontrolled, these contaminants could enter the Industrial Estate/Galvone Stream (approx. 160 m east), before discharging to the Groody River (approx. 200 m north-east) and ultimately the Shannon (Lower) (approx. 705 m north). Discharge from the site will be controlled via a hydrobrake located upstream of the stormwater outfall, which will convey flows by gravity to the Industrial Estate/Galvone Stream, which discharges to the Groody River (refer to Section 6.3.3.1 above). There is also a potential pathway to the underlying Locally Important Aquifer (Limerick City East GWB) via infiltration.

However, the potential for these impacts to occur is substantially reduced due to the design approach adopted. The site is already predominantly covered by hardstanding, limiting direct infiltration pathways. In addition, the Proposed Development incorporates a fully separated drainage network and an extensive SuDS strategy including green roofs, permeable paving, bioretention areas, swales, infiltration trenches, tree-pit attenuation and an attenuation pond which together manage, treat and attenuate runoff generated on site. As a result, contaminants are captured, broken down or filtered within the SuDS system, meaning only highly treated water enters the drainage network.

Similarly, as stated in Section 6.4.2.2 above, the proposed foul drainage system will be fully separate to the storm water network and routed to a pumping station designed in accordance with Uisce Éireann standards, eliminating any potential for foul-surface water cross-contamination.

Overall, while potential pathways exist, the operational design ensures that significant impacts on surface water and groundwater quality are unlikely to occur.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed surface water and foul water management and design.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater quality are ***negative***, ***significant*** and ***long-term***.

6.5.2.2 Potential Impacts on Surface Water and Groundwater Flow and Quantity

The Proposed Development will introduce additional areas of hardstanding and modify surface water pathways across the site. While these changes have the potential to increase surface water runoff and reduce localised infiltration, the majority of the site is already covered by existing hardstanding, which significantly limits the scope for further alteration of natural recharge conditions.

Given this existing baseline, any reduction in groundwater recharge is expected to be minor and will not materially affect the wider groundwater regime. The site overlies a Locally Important Aquifer (Limerick City East GWB), which possesses sufficient capacity and resilience such that changes in infiltration from a site of this scale are unlikely to influence groundwater levels in any measurable way.

In the absence of appropriate controls, increased runoff could have adverse downstream effects, including elevated discharge volumes, localised flooding, or increased hydraulic loading on receiving watercourses. Excess runoff entering the existing drainage network could also exacerbate downstream inundation risks. However, as outlined in Section 6.3.4 and the Stage 2 Site-Specific Flood Risk Assessment, Punch Consulting Engineers submitted as part of the development package, there are no recorded historic flood events at the site.

The proposed design incorporates measures to ensure that operational runoff rates do not exceed greenfield runoff. The surface water strategy includes a comprehensive network of SuDS features and attenuation systems (see Section 6.4.2.1), designed to manage and regulate flows. The design includes a 30% climate change allowance, 10% additional area for urban creep, and ensures all finished floor levels are set at least 500 mm above the 1:100-year drainage water level.

No surface water or groundwater abstractions are proposed during the operational phase. Therefore, no impacts on water quantity from resource consumption or depletion are anticipated.

With these measures in place, the Proposed Development is not expected to result in significant impacts on surface water or groundwater flow regimes, nor is it expected to be adversely affected by predicted future flood events.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater flow and quantity are ***negative***, ***slight***, and ***long term***.

6.5.2.3 Potential Impacts on Human Health and Populations

Given the proposed design and drainage infrastructure, there is no potential for unmitigated off-site flooding arising from the increased hardstanding areas, as operational runoff will be managed and attenuated through the proposed drainage design and SuDS measures.

There is also no potential for off-site contamination from car parking or trafficked areas, including hydrocarbons, as all runoff from these areas will be intercepted, treated, and attenuated within the integrated SuDS network (e.g. permeable paving, bioretention areas, swales, attenuation pond) prior to entering the controlled drainage system.

There are no recorded recreational waters, bathing water bodies, or surface water abstraction points located downstream of or directly hydrologically connected to the site that could be impacted by changes in water quality or flow. In addition, the Geological Survey Ireland (GSI) records no Public Supply Source Protection Areas or Group Scheme Preliminary Source Protection Areas within the zone of influence of the Proposed Development.

As a result, there are no identifiable pathways linking the development to receptors used for drinking water supply, recreation, or other human uses. Consequently, no significant impacts on human health or local populations are anticipated during the operational phase.

6.5.2.4 Potential Impacts on Water Framework Directive Status

During the operational phase, only limited and highly controlled surface water discharges will occur from the Proposed Development. Runoff will be regulated by a hydrobrake located upstream of the stormwater outfall, conveying flows by gravity to the Industrial Estate/Galvone Stream, which subsequently discharges to the Groody River (see Section 6.3.3.1).

There is a potential pathway for operational runoff to reach the Shannon (Lower)_060 WFD river water body, via the Industrial Estate/Galvone Stream watercourse and the Groody River. In the absence of appropriate controls, pollutants or increased flows could adversely affect the ecological and chemical status of these downstream water bodies, as well as the underlying Locally Important Aquifer (Limerick City East GWB).

However, the potential for such impacts is very low, due to the incorporation of a robust SuDS network across the development. During typical low-intensity rainfall events, runoff from roofs, roads and hardstanding areas will be retained within SuDS features such as green roofs, bioretention areas, permeable paving, swales, infiltration trenches, tree pits, and the attenuation pond. These systems support infiltration, evapotranspiration, and pollutant removal, ensuring that the volume and quality of water discharged off site is tightly controlled.

Overflows from SuDS devices will only occur during higher-intensity events, and even then, water entering the drainage system will be attenuated, treated and released at greenfield-equivalent discharge rates, preventing hydromorphological or hydraulic deterioration of the receiving watercourse.

Given the level of treatment, attenuation and flow control provided by the SuDS infrastructure, the Proposed Development will not cause deterioration of WFD status for the Shannon (Lower)_060 WFD river waterbody i.e. the Groody River and the Industrial Estate/Galvone Stream watercourse or the underlying Locally Important Aquifer (Limerick City East GWB) via infiltration.

The foul sewer for the Proposed Development eventually discharges to Limerick Wastewater Treatment Plant (WWTP) (D0013) for full treatment. According to Uisce Eireann's 2024 Annual Environmental Report (AER), WWTP currently has adequate operational capacity to accommodate the additional flows generated by the Proposed Development. Following treatment, the final effluent from Limerick WWTP is discharged into Limerick Dock transitional waterbody.

Based on the current design and understanding of the operational regime, there is no potential for adverse impacts on Water Framework Directive status. Refer to the Water Framework Directive (WFD) Screening Report prepared by AWN (Appendix 6.3 of the EIAR) which provides a more detailed assessment.

6.6 Mitigation Measures

These specific measures will provide protection to the receiving soil environment during the construction phase. These are work practices that are industry best practice measures that will be applied during the construction phase, and they are in no way included to avoid or reduce potential harmful effects to European sites.

6.6.1 Construction Phase

A Construction & Environmental Management Plan (CEMP) has been prepared by Punch Consulting Engineers (May 2026) in respect of the Proposed Development. The CEMP outlines and explains the construction techniques and methodologies which will be implemented during construction of the Proposed Development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board);
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers;
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors;
- CIRIA C648 Control of Water Pollution from Linear Construction Projects;
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2008); and
- Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

The CEMP will set out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

6.6.1.1 Surface Water and Groundwater Quality

6.6.1.1.1 Measures for the Control of Suspended Solids

As there is potential for run-off to indirectly discharge to a watercourse i.e. Industrial Estate/Galvone Stream located c. 160 m to the east, merging with the Groody River c. 200 m north-east, which discharges to the Shannon (Lower) c. 705 m north of the site,).in order to manage the potential impact associated with sediment and sediment runoff the following mitigation measures will be implemented during the construction phase.

- Prior to commencement of construction the appointed contractor(s) will prepare and adhere to a method statement identifying the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.
- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.

- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A stabilised entranceway consisting of an aggregate on a Geotech mesh/fabric base that will be located at any entry or exit point of the construction site. Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m.
- Where stockpiling is required, temporary stockpiles will be located a minimum of 20m from any temporary or permanent surface water drainage features. Three sides will be surrounded with silt fencing with access from the fourth (uphill) side. Sides will be smoothened, and runoff directed toward drainage ditches. Stockpiles shall be stored on level terrain and be covered during heavy rainfall periods. To prevent run off from stripped ground, banks are to be placed on the downstream side of stockpiles. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.
- Hard surface site roads and public roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- Silt fencing will be installed along the perimeter of the low-lying boundary of the site. The purpose of the silt fencing is to prevent silt laden water leaving the site with the potential to impact nearby watercourses. It will consist of a double layer of geotextile membrane fixed to wooden stakes approximately 600mm high. The membrane will be anchored into the ground to form a continuous barrier to silt laden water from the works site.
- Silt fences will be monitored via a silt inspection log to be maintained by the construction manager and periodically maintained during the construction period. Typical maintenance will consist of repairs to damaged sections of membrane and removal of a build-up of silt on the upslope side of the fence.
- Daily silt fence inspections are recommended as part of their operation ensuring that any necessary repairs can be expedited.
- Drainage ditches will be installed to intercept surface water where there is a risk of significant water flow into excavations or on to adjoining lands. All collected surface water will have to be treated prior to discharge. The run-off will be directed through appropriately sized settlement ponds to remove suspended solids. Each pond will contain a forebay equivalent to 10% of the overall plan area of the pond. The forebay receives incoming surface water into the pond and provides settlement of the larger sediment material from the runoff. The forebay prevents these larger sediment materials progressing further in the pond. The ponds will contain a permanent water level below the outfall location allowing sediment to settle to the bottom while allowing the clean water at the top of the pond to discharge to the existing surface water sewer. Settlement tanks by Siltbuster or similar may be utilised.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Excavations will remain open for as little time as possible before placement of fill and reinstatement. This will help to minimise the potential for water ingress into excavations.
- Reinstatement will be carried out as soon as practicable after pipeline installation.
- Regular inspection of surface water run-off and sediment control measures will be carried out during the construction phase. A log the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

6.6.1.1.2 Measures for the Control and Treatment of Construction Surface Water

No water that has gathered on-site from any source (groundwater, surface water, or precipitation) will be pumped directly to surface water or ground. All water intercepted on-site will be managed as and controlled for the duration of the construction works to prevent flow of silt-laden surface water flowing into watercourses.

The discharges of groundwater, surface water, or precipitation ('construction water') from the construction site will be managed and controlled for the duration of the construction works. Construction water that

contains a high sediment load and potential for other pollutants will require removal. All discharges to surface waters will be suitably treated prior to discharge. There will be no direct discharge of untreated, silty, or contaminated water from any element of the works without appropriate attenuation, settlement and silt trapping.

Dewatering may be required to create a dry working environment - construction water will arise from localised pumping of surface water run-off, rainfall, and groundwater ingresses in excavation areas. Dewatering from the excavations will be managed as required to assist with creating a dry working environment and prevent water flooding the construction site.

The control and treatment measures for construction water to be implemented include:

- Surface water, rainfall or groundwater within excavations, or rainfall on other parts of the working area will not be pumped or discharged directly (without treatment) into watercourses or drains but will be treated prior to discharge to ensure the removal of pollutants and sediments.
- Discharge of treated water during construction will occur only after appropriate testing and will depend on the quality of the construction water. Where suitable, water may be discharged to the existing stormwater network following attenuation in the settlement ponds (refer to Section 6.6.1.1 above), subject to agreement with Limerick County Council. All discharges will comply with relevant regulations and permit conditions. In the event of contamination or exceedances of discharge limits, water will either be re-treated on site or removed to a licensed facility via tankers.
- Whenever possible, water pumped out from excavations will be discharged onto permeable vegetated areas after undergoing sediment removal through filtration.
- When discharging clean water into watercourses, measures like baffles, geotextiles, sediment mat, or riprap will be set up at the discharge point to avoid disturbing the watercourse. The design of the outfalls and the construction method statements for their installation shall be agreed with IFI prior to construction.
- Excavation works will halt during continuous heavy rainfall (extreme weather events), giving the ground time to drain and excess water to dissipate.

For the avoidance of doubt, there shall not be discharge of untreated, silty, or contaminated water from the works to any watercourse or stormwater network. Should any discharge of contaminated construction water be required during the construction phase, discharge will be to foul sewer with agreement of the Uisce Eireann, or tankered off site to a licenced liquid waste facility.

6.6.1.1.3 Measures for the Control of Pollution from Other Substances

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages of fuels and other construction chemicals and prevent any resulting discharge of pollutants to soil, surface water or groundwater systems:

- Hydrotreated Vegetable Oil (HVO) will be used to fuel vehicles and plant including generators and cranes.
- All plant and machinery will be regularly maintained and serviced to minimise the risk of release of fuel. This will only be undertaken by qualified personnel;
- Designation of bunded maintenance and refuelling areas on the Site;
- Provision of spill kit facilities across the Site, strategically located in high-risk areas;
- Where mobile fuel bowsers are used, the following measures will be undertaken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit and operatives must have spill response training;
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

The use of HVO, rather than diesel, means that there will be minimal potential for impact for contamination of surface water or groundwater bodies in the event of a spill / leak. HVO is considered less harmful than traditional fossil oils when it spills on the ground due to its renewable nature and biodegradability. When HVO spills, it tends to degrade rapidly through natural processes involving microorganisms, which can metabolize it into less harmful substances. This quick degradation helps minimize its impact on the hydrological environment, reducing the risk of contamination in water sources and soil. Additionally, HVO has a lower toxicity profile compared to fossil oils, making it less harmful to aquatic life and groundwater systems.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling and maintenance of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area within the construction compound (or where possible off the site) which is in the north western corner of the site (Refer to Figure 3-1 of the CEMP), a significant distance from watercourses.

Emergency procedures and spill protection equipment such as oil booms, oil soakage pads, socks and sand will be available in clearly marked bins/silos and in construction vehicles to be used in the event of an accidental release during refuelling. This equipment will be checked weekly to ensure there is sufficient supply for the site. Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and disposed of in accordance with all relevant waste management legislation. Training will be given to site workers in how to manage a spill event. Prior to any work commencing on site, all construction equipment will be checked to ensure that it is mechanically sound, to avoid leaks of oil, hydraulic fluids and grease. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank.

The following measures will be put in place to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

- Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
- Any pump or valve will be fitted with a lock and will be secured when not in use.
- All bowsers to carry a spill kit and operatives must have spill response training; and Portable generators or similar fuel containing equipment will be placed on suitable drip trays.
- Weekly checks of spill kits will be carried out to ensure they are sufficiently stocked.

Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

6.6.1.1.4 Wastewater Management

Foul wastewater generated during the construction phase will be fully managed and controlled throughout the works. Welfare facilities including toilets, wash areas and canteens will be provided within the

designated construction compound, which will remain in place for the duration of the development. The compound will be located within the application site boundary and will not be positioned within Flood Zone A.

Water required for welfare use and for general construction activities will be supplied from the existing public watermain on Dublin Road (R445), following consultation with Uisce Éireann.

Foul effluent arising from site offices and welfare facilities will be discharged to the Local Authority foul drainage system via a temporary connection, following consultation with Uisce Éireann.

The appointed contractor will implement a site-specific Emergency Response Plan, consistent with relevant industry guidance. All site personnel will receive appropriate training in emergency procedures, including the management of accidental spills or sanitary system failures, to prevent any risk of contamination to surrounding surface water or groundwater environments.

6.6.1.2 Surface Water and Groundwater Flow and Quantity

6.6.1.2.1 Measures Relating to Works in Proximity to Watercourses

In combination with the measures outlined above, the following specific controls will be implemented during construction works undertaken in proximity to existing surface water drainage features on site, which ultimately discharge to the Industrial Estate/Galvone Stream drainage network and the Groody River. These measures are required to ensure that surface water quality and downstream hydrological receptors are not adversely affected.

- Work areas will be kept to the minimum footprint necessary to complete the construction activities. All working zones will be clearly marked and cordoned off in advance of commencement to prevent unnecessary ground disturbance.
- No vehicles or machinery will enter or track within drainage channels or low-lying flow paths. Where access across minor drainage features is required, temporary culverts or bridging structures will be installed to avoid disrupting natural drainage patterns and to protect water quality.
- Unnecessary tracking or excavation across vegetated or grassed areas will be avoided to minimise the risk of sediment-laden runoff entering drainage pathways.
- Silt fencing will be installed along working areas adjacent to drainage features for the duration of construction. The fencing will be securely embedded to ensure effective retention of silts and prevent sediment mobilisation to downstream receptors.
- On completion of construction, all silt fencing will be removed and disposed of at a licensed facility.
- Temporary stockpiles will be located at least 20 m from any drainage feature.
- Stockpiles will be compacted, covered during heavy rainfall, and surrounded on three sides with silt fencing.
- Banks will be installed on the downslope side to prevent runoff from stripped areas entering drainage lines.
- Earthworks will be managed to minimise erosion.
- Exposed soil will be stabilised where possible.
- Movement of excavated material will be reduced to limit soil degradation.
- Excavation works will cease during periods of continuous heavy rainfall, allowing surface water to dissipate before works recommence.
- Drainage ditches will be installed where necessary to intercept surface water flows and prevent water entering excavations or adjacent lands.
- Dewatering may be required following heavy rainfall. Any dewatering discharge will occur to a vegetated area at least 20 m from drainage features, via silt bags and/or settlement tanks. Silt fencing will be installed around the discharge area to ensure no sediment-laden water infiltrates into the drainage system.
- Collected surface water requiring treatment will be directed to settlement ponds or mobile settlement units (e.g., Siltbuster or equivalent). Settlement ponds will incorporate a forebay equal to 10% of the

pond footprint to capture coarse sediment. Ponds will maintain a permanent water level to promote fine sediment settlement before discharge to the existing surface water drainage network.

Best practice guidance will be followed for the proposed works including "Control of Water Pollution from Construction Sites and Guidance for Consultants and Contractors" (CIRIA 532, 2001) and Inland Fisheries Ireland Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016).

6.6.1.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies located in the immediate downstream environment. The Shannon(Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking RPA, but the abstraction point relating to this protection is located upstream of the subject site. The Proposed Development will have no impact on this RPA.

As there is no source pathway linkage, no further mitigation is required.

6.6.1.4 Water Framework Directive Status

It has been established (refer to Section 6.5.1.4 above) that there is a potential of accidental discharges during the construction phase. However, these are temporary short-lived events that will not impact on the WFD status of the Shannon(Lower)_060 WFD river waterbody (i.e. Groody River, & Industrial Estate/Galvone Stream waterbodies), nor of the underlying 'Locally Important Aquifer' i.e. Limerick City East groundwater body (GWB) in the long-term. As such the Proposed Development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

On a precautionary basis, the mitigation measures set out in Section 6.6.1.1 and Section 6.6.1.2 will be implemented during the construction works for the protection of surface water and groundwater quality.

For further information, refer to the Water Framework Directive Assessment Report prepared by AWN Consulting (2026) presented in Appendix 6.3 of this EIAR.

6.6.2 Operational Phase

6.6.2.1 Surface Water and Groundwater Quality

The design has taken account of the potential impacts of the development on surface water and groundwater quality; measures have been incorporated in the design to mitigate these potential impacts.

The proposed surface water management design establishes a hydrological connection to the Groody River, where discharge from the site will be controlled via a hydrobrake located upstream of the stormwater outfall, conveying flows by gravity to the Industrial Estate/Galvone Stream, which discharges to the Groody River (refer to Section 6.3.3.1 above)

To mitigate potential contamination from surface water runoff, which may originate from roads, car parks, and hardstanding areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting the hydrological and hydrogeological environment.

As stated in Section 6.4.2.1 above, the proposed drainage system has been designed using Causeway Flow software, in line with *Recommendations for Site Development Works for Housing Areas* (DoEHLG), the GDSDS, CIRIA guidance (C644 and C753), and Limerick City & County Council requirements.

A new fully separated surface water sewer network is proposed for the development. In accordance with the Limerick Development Plan 2022–2028 and the Greater Dublin Strategic Drainage Study (GDSDS), surface water discharge will be restricted to the greater of 2 l/s/ha or Qbar. The system is designed to manage the 1% AEP (1:100-year) storm event, including a 30% allowance for climate change.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed surface water management and design.

6.6.2.2 Surface Water and Groundwater Flow and Quantity

During the operational phase, the introduction of additional hardstanding has the potential to marginally reduce local groundwater recharge and increase surface water runoff if not appropriately controlled. However, the majority of the site is already capped with existing hardstanding and made ground, meaning that the Proposed Development will not significantly alter current infiltration patterns. As a result, any further reduction in recharge to the underlying Locally Important Aquifer (Limerick City East GWB) will be very minor and not hydrologically significant.

In the absence of mitigation, increased surface water runoff could potentially contribute to downstream hydraulic pressures or localised flooding. However, the site is predominantly located within Flood Zone C, where the probability of fluvial flooding is low. All elements of the Proposed Development have been positioned outside areas identified as susceptible to localised flooding, effectively eliminating residual flood risk to the development itself.

To ensure runoff is properly managed and does not exceed pre-development conditions, the proposed drainage system incorporates a suite of Sustainable Drainage Systems (SuDS) and attenuation features. These measures regulate, treat, and attenuate flows before discharge, ensuring that:

- Runoff rates remain restricted to greenfield-equivalent conditions;
- Peak flows are contained on-site;
- Downstream drainage networks are not hydraulically overloaded; and
- Groundwater recharge patterns remain broadly unchanged.

The system has been designed to manage the 1% AEP (1:100-year) storm event, with an additional 30% climate change allowance and 10% urban creep allowance, providing robust long-term resilience under future climate scenarios.

No surface water or groundwater abstractions are proposed during the operational phase. Therefore, no impacts on the quantity of local water resources are anticipated.

Overall, with the proposed SuDS measures, attenuation systems, and the fact that the site is already predominantly hardstanding, no perceptible operational impacts on surface water or groundwater flow or quantity are expected.

6.6.2.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies located in the immediate downstream environment. The nearest bathing waterbody is Ballycuggeran (BW ID: IESHBWL25_191a_0300) located c. 21 km north of the site, upstream of the where the Groody River merges with the River Shannon (Lower). While an indirect hydrological connection cannot be entirely discounted, the separation distance (c. 21 km) renders any such linkage highly attenuated and negligible in terms of potential impact.

The Shannon(Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking RPA, but the abstraction point relating to this protection is located upstream of the subject site. The Proposed Development will have no impact on this RPA. In addition, there are no recorded public

groundwater supplies or group schemes, groundwater source protection zones, public supply source protection area or group scheme preliminary source protection areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the Proposed Development site.

As there is no source pathway linkage, no further mitigation is required.

6.6.2.4 Water Framework Directive Status

There is a potential risk of accidental discharges during the operational phase from car parking areas and roads (as detailed in Section 6.5.2). However, these events are temporary and short-lived, with no long-term impacts. Given the level of treatment, attenuation and flow control provided by the SuDS infrastructure, the Proposed Development will not cause deterioration of WFD status for the Shannon (Lower)_060 WFD river waterbody i.e. the Groody River and the Industrial Estate/Galvone Stream watercourse or the underlying Locally Important Aquifer (Limerick City East GWB) via infiltration.

During the operational phase, only limited and highly controlled surface water discharges will occur from the Proposed Development. Runoff will be regulated by a hydrobrake located upstream of the stormwater outfall, conveying flows by gravity to the Industrial Estate/Galvone Stream, which subsequently discharges to the Groody River (see Section 6.3.3.1).

Consequently, the Proposed Development will not lead to any significant deterioration or changes in water quality status, nor will it hinder the achievement of the Water Framework Directive (WFD) objectives or the goals outlined in the third cycle river basin management plan (2022-2027), specifically the Water Action Plan 2024 for Ireland.

According to Uiscé Éireann's (Irish Water) Wastewater Treatment Capacity Register (April 2026), there is capacity available at Limerick WWTP. Therefore, the proposed peak effluent discharge calculated for the Proposed Development at 17.13 l/s is not likely to have an impact on the capacity at the WWTP or the overall water quality within Limerick Dock transitional waterbody, the Lower River Shannon SAC, River Shannon and River Fergus Estuaries SPA or the underlying Limerick City Southwest GWB and therefore would likely not have any impact on the current Water Body Status (as defined within the Water Framework Directive). In addition, the Proposed Development will not contribute any additional stormwater drainage to Limerick WWTP.

No further mitigation is required.

6.7 Monitoring or Reinstatement Measures

6.7.1 Construction Phase

During construction phase the following monitoring measures will be considered.

- Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CEMP.
- Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping.
- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all materials storage is located at least 20 m from surface water receptors.
- Regular inspection of surface water run-off and any sediment control measures (e.g. silt traps) will be carried out during the construction phase. Inspection and maintenance of the silt fences during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire construction phase.
- Runoff diversion channels/bunds need regular maintenance to keep functioning throughout the project.

- Regular auditing of construction / mitigation measures will be undertaken, e.g. concrete pouring, refuelling in designated areas, etc.
- A log of the regular inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

6.7.2 Operational Phase

No future surface water monitoring is proposed for the Proposed Development due to the low hazard potential at the site.

Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

6.8 Residual Effects of the Proposed Development

6.8.1 Construction Phase

6.8.1.1 Surface Water and Groundwater Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water and groundwater quality during the construction phase are adequately mitigated. There will be no change to overall quality within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater quality during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term.***

6.8.1.2 Surface Water and Groundwater Flow and Quantity

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on surface water and groundwater flow and quantity during the construction phase are adequately mitigated. There will be no change to overall flow and quantity within the hydrological and hydrogeological regime as a result of construction.

The residual effect on surface water and groundwater flow and quantity during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term.***

6.8.1.3 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies or surface water abstraction points located downstream in the Shannon(Lower)_060 surface waterbody that will be impacted by the Proposed Development. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the Proposed Development site.

As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

6.8.1.4 Water Framework Directive Status

The implementation of the mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1, will ensure that the potential impacts on the status of the Shannon(Lower)_060 surface waterbody, Limerick Dock transitional waterbody, The Lower River Shannon SAC (Site Code: 002165) or the underlying Limerick City East groundwater body (GWB) in the long-term (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

The residual effect on Water Framework Directive status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

6.8.2 Operational Phase

6.8.2.1 Surface Water and Groundwater Quality, Flow and Quantity

The proposed development does not require any bulk chemical storage and therefore the potential for surface water or groundwater quality impact is ***negligible***. In the event of an accidental leakage of oil, this will be intercepted by the drainage infrastructure proposed.

The proposed surface water drainage system comprises multiple design measures that will be put in place including green roofs, rain gardens, infiltration trenches, engineered swales, tree root systems, permeable paving and an attenuation pond. Therefore, the risk of accidental discharge of hydrocarbons or contamination sources derived from the operational phase has been adequately addressed through design. No further mitigation measures are to be required during the operational phase.

The residual effect on surface water and groundwater quality, flow and quantity during the operational phase is considered to be ***neutral, imperceptible*** and ***long-term***.

6.8.2.2 Human Health and Populations

It has been established (refer to Section 6.5.1.3 above) that there are no recorded Recreational Waters, Bathing Waterbodies located in the immediate downstream environment. The Shannon(Lower)_060 WFD river waterbody is located entirely within a designated Surface Water Drinking RPA, but the abstraction point relating to this protection is located upstream of the subject site. The Proposed Development will have no impact on this RPA. In addition, there are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas defined by the GSI within which development is limited in order to protect drinking water supplies from potential pollution located in the vicinity of the Proposed Development site.

As there is no source pathway linkage, no residual impacts are anticipated on human health and populations.

6.8.2.3 Water Framework Directive Status

The implementation of the mitigation and monitoring measures detailed in Section 6.6.2 and 6.7.2, will ensure that the potential impacts on the status of the Shannon(Lower)_060 surface waterbody, Limerick Dock transitional waterbody, The Lower River Shannon SAC (Site Code: 002165) or the underlying Limerick City East groundwater body (GWB) in the long-term (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

There are measures incorporated into the design to protect the hydrological and hydrogeological environment. There is a potential of accidental discharges during the operational phase, however these

are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

Therefore, no residual impacts are anticipated on the Water Framework Directive status.

6.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the Proposed Development with any relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2, Section 2.8, and Appendix 2.1 of this EIA Report.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

6.9.1 Construction Phase

In relation to the potential for cumulative impacts on land, soils and geology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Stockpiled material will be stored on hardstand away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

A review of the permitted and Proposed Developments set out in Chapter 2, Section 2.8 and Appendix 2.1 of this EIAR has been undertaken to identify any substantial projects that are concurrent with the construction phase of the Proposed Development that may result in cumulative effects in respect of hydrological and hydrogeological environment.

This review identified the permitted/planned developments outlined in Table 6-4, which are capable of combining with the Proposed Development and have the potential to result in significant cumulative effects due to their scale and close proximity to the Proposed Development site. Table 6-4 sets out these developments; the table also outlines a review of their relevant planning conditions / mitigation measures for the protection of the hydrological and hydrogeological environment.

Table 6-4: Identified Cumulative Developments and Construction Phase Planning Conditions

Development	Development Reference	Relevant Planning Condition
6 no. unit residential development at Rhebogue Road	LCCC Ref. Reg. No. 211395	Condition 10 – All surface water run-off from the public road which flows into the site shall continue to be accommodated within the site unless alternative arrangements acceptable the Planning Authority are carried out.

		Condition 12 – A revised Surface Water Drainage proposal shall be prepared and submitted for written agreement. Condition 18 – Each individual dwelling shall have its own separate service connection in accordance with Uisce Éireann Specifications. Connection Agreement(s) with Uisce Éireann.
LRD at Old Dublin Road, Rhebogue	LCC Ref. Reg. No. 221216	Condition 11b - Compliance with LCCC surface water and SuDS specifications. Condition 11c – The surface water disposal system and connection to the existing surface water system shall be certified by a bonded Charted Engineer prior to occupation.
7 no. Unit residential development at Bloodmill Road and Oakwood	LCC Ref. Reg. No. 23605	Condition 14a - Compliance with LCCC surface water and SuDS specifications. Condition 14d - All surface water run-off shall be disposed of appropriately. All surface water run-off from public road which flows into the site shall continue to be accommodated within the site unless alternative arrangements agreed with the Planning Authority are carried out.
Purpose-built Student Accommodation at Groody Road	LCC Ref. Reg. No. 2560113	Condition 16 - Compliance with LCCC surface water and SuDS specifications. Condition 23 - Connection Agreement(s) with Uisce Éireann
31 no. unit residential development at Sandybrook House	LCC Reg. Ref. No. 2560151	Condition 16 – Compliance with LCCC surface water and SuDS specifications.
25 no. unit residential development at Rhebogue Road	ACP Reg. Ref. No. PL91.321345 Planning Authority Case Ref. 2460713	Condition 19 - Connection Agreement(s) with Uisce Éireann
St. Brigid's National School Extension at Singland	LCC Ref. Reg. No. 2460575	Condition 4 – Compliance with LCCC surface water and SuDS specifications. Condition 5 – All surface water run-off shall be disposed of appropriately. All surface water run-off from public road which flows into the site shall continue

		to be accommodated within the site unless alternative arrangements agreed with the Planning Authority are carried out.
Bloodmill Road Extension Scheme at Ballysimon	ABP Case Ref. JP91.317686	Condition 7 - Drainage arrangements, including the attenuation and disposal of surface water, and flood risk management shall comply with the requirements of Irish Water and the planning authority for such works and services as appropriate. A 5m wide strip of land running parallel with Channel C1/2, should be provided to facilitate access and maintenance activities in the immediate area.

The implementation of mitigation and monitoring measures detailed in Section 6.6.1 and 6.7.1; as well as the compliance of the above permitted/planned developments (Table 6-4) and any future permitted developments with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the hydrological and hydrogeological environment during the construction phase of the Proposed Development.

It is also acknowledged that the works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016)).

The residual cumulative impact of the Proposed Development in combination with other planned or permitted developments can therefore be considered to be ***neutral***, ***imperceptible*** and ***short-term***.

6.9.2 Operational Phase

The operational phase of the Proposed Development, in combination with other permitted and reasonably foreseeable developments in the wider catchment, has the potential to give rise to the following cumulative source/pathway/receptor linkages:

- Incremental increase in impermeable surfaces across the sub-catchment, with a corresponding reduction in diffuse recharge to the underlying Limerick City East Groundwater Body and an increase in surface water run-off volumes and rates if not appropriately attenuated.
- Incremental loading on the receiving surface waters (Industrial Estate/Galvone Stream, Groody River and Shannon (Lower)_060 WFD river waterbody) from controlled stormwater discharges, including the potential for low-level cumulative contamination from hydrocarbons and other typical urban run-off contaminants if SuDS treatment were not provided.
- Cumulative loading on Limerick WWTP (D0013) from foul effluent generated by the Proposed Development and other connecting developments, with associated final effluent discharge to the Limerick Dock transitional waterbody and ultimately the Lower River Shannon SAC (Site Code: 002165) and the River Shannon and River Fergus Estuaries SPA (Site Code: 004077).

The potential for these linkages to result in significant cumulative effects has been assessed against the embedded design, mitigation and monitoring measures presented in Sections 6.6.2 and 6.7.2, and against the regulatory framework governing other developments in the catchment.

In relation to run-off and recharge, the Proposed Development will restrict surface water discharge to the greater of 2 l/s/ha or Qbar in accordance with the LDP and the Greater Dublin Strategic Drainage Study, and will incorporate an extensive SuDS treatment train (green roofs, permeable paving, bioretention areas, swales, infiltration trenches, tree-pit attenuation and an attenuation pond). Other permitted developments in the catchment are subject to equivalent planning conditions requiring compliance with LCCC SuDS specifications and attenuation to greenfield run-off rates. Cumulatively, therefore, the relevant developments will not result in any measurable change in the surface water flow regime of the Shannon (Lower)_060 WFD river waterbody, nor in any measurable reduction in recharge to the Limerick City East Groundwater Body. The natural recharge capacity of the underlying Locally Important Aquifer is such that local changes in infiltration of the magnitude associated with the assessed developments will not affect groundwater levels or quantitative status.

In relation to water quality, all developments in the catchment are required to comply with the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009, as amended) and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010, as amended), and with the WFD environmental objectives set out in the Water Action Plan 2024: A River Basin Management Plan for Ireland (2022 to 2027). The SuDS treatment train proposed for the Site will provide pollutant interception, attenuation and biological treatment prior to discharge, ensuring that the operational phase contribution to cumulative contaminant loading in the Industrial Estate/Galvone Stream, Groody River and Shannon (Lower)_060 waterbody is negligible.

In relation to foul drainage, the foul effluent generated by the Proposed Development will discharge to Limerick WWTP (D0013), which operates under an EPA Licence with defined emission limit values designed to protect the WFD status of the receiving Limerick Dock transitional waterbody and downstream Natura 2000 sites. The Uisce Éireann Wastewater Treatment Capacity Register (April 2026) and the 2024 Annual Environmental Report for the plant confirm that there is sufficient operational capacity to accommodate the additional peak effluent discharge of 17.13 l/s from the Proposed Development, in combination with other committed developments in the wastewater catchment. Accordingly, no cumulative deterioration in the chemical, ecological or quantitative status of the Limerick Dock transitional waterbody, the Lower River Shannon SAC, the River Shannon and River Fergus Estuaries SPA, or the underlying Limerick City Southwest Groundwater Body is anticipated.

Taking account of the embedded design measures, the SuDS strategy, the regulatory framework governing other developments in the sub-catchment, and the documented capacity of the receiving wastewater infrastructure, the Proposed Development will not contribute to any significant cumulative deterioration of the hydrological and hydrogeological environment, nor will it prevent the attainment of the WFD objectives or the objectives of the third cycle River Basin Management Plan (Water Action Plan 2024).

Residual cumulative effect on the hydrological and hydrogeological environment during the operational phase is considered to be ***neutral***, ***imperceptible*** and ***long-term***.

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Chapter 7 – Biodiversity

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7. BIODIVERSITY

7.1 Introduction

This chapter provides an assessment of the effects of the Proposed Development on the ecological environment, i.e., Biodiversity, flora and fauna. It has been compiled in compliance with 2014 EIA Directive, the Planning and Development Act 2000 as amended, and the European Commission's *Guidance on the preparation of the Environmental Impact Assessment Report* (2017) and follows the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022).

7.1.1 Legislation, Policy & Guidance

7.1.1.1 EU Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union. The Habitats Directive provides for the designation, conservation and protection of sites comprising Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), collectively forming the Natura 2000 network of 'European sites'. Article 3 of the Habitats Directive obliges Member States to designate as SACs sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive. Article 10 of the Habitats Directive requires that Member States endeavour to improve the ecological coherence of the Natura 2000 network to manage and conserve features of the landscape which are of major importance for wild fauna and flora, for example ecological corridors or stepping-stones which are important for the migration, dispersal and genetic exchange of species.

Article 6(2) obliges Member States to take the necessary measures to avoid the deterioration of an SAC, or disturbance of a species for which the site is designated. Article 6(3) sets out the requirement for an "Appropriate Assessment", to ensure that a proposed plan or project will not have an adverse effect on the integrity of a SAC. Article 7 applies the requirements of Article 6(2) and 6(3) of the Habitats Directive to SPAs designated under the Birds Directive.

In addition, and separate to the Appropriate Assessment requirements, Article 12 of the Habitats Directive obliges Member States to establish a regime of strict protection for certain species listed in Annex IV of the Directive, wherever they occur within their natural range. The protection for species under Article 12 of the Habitats Directive is not confined to the boundary of SACs. Species listed in Annex IV include the otter and certain species of bat.

7.1.1.2 EU Birds Directive

The "Birds Directive" (European Council (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds) confers legal protection to all naturally occurring wild birds within the EU territory. Member States are obliged to adopt the necessary measures to maintain the population of bird species, and that includes, in accordance with Article 3, an obligation to create, maintain and manage habitats for birds, and specifically for the species of Bird listed in Annex I of the Directive, Article 4 requires Member States to create SPAs which, by virtue of Article 7 of the Habitats Directive, form part of the Natura 2000 network of European sites and are subject to the Appropriate Assessment requirements under Article 6(3) of the Habitats Directive.

Additionally, Article 5 of the Birds Directive requires that Member States establish a general system of protection for all naturally occurring wild birds within the EU territory, similar to the system of strict protection required for Annex IV species under the Habitats Directive.

7.1.1.3 Wildlife Act 1976 - 2024[1]

The primary domestic legislation providing for the protection of wildlife in general, and wild birds in particular, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976, as amended. The aims of the Wildlife Act, according to the National Parks and Wildlife Service (NPWS) are "... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims." All wild bird species are protected under the Act. The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) made significant amendments to the Wildlife Acts to ensure consistency with the Habitats and Birds Directives.

7.1.1.4 Birds and Natural Habitats Regulations

The European Communities (Birds and Natural Habitats) Regulations 2011 are also a key piece of legislation (S.I. No. 477/2011) included in the Planning and Development Acts containing legal direction on the protection of flora and fauna. The Planning and Development Acts also incorporates the AA requirements into the planning regime.

The Habitats Directive and the Birds Directive have been transposed into Irish law by Part XAB of the Planning and Development Acts and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

7.2 Methodology

This chapter of the EIA Report concentrates on ecological features within the development area of significance, primarily designated habitats and species. This includes habitats / species listed in Annex I, II and IV of the EU Habitats Directive, rare plants listed in the Flora Protection Order and other semi-natural habitats of conservation value.

The objectives of the assessment are achieved by:

- Identifying baseline conditions of the site and its environs.
- Identifying the sensitivity of receptors with potential to be affected by changes in the baseline conditions.
- Predicting the magnitude of likely changes to the baseline receiving environment.
- Assessing the significance of effect taking into account sensitivity of receptors and magnitude of effect.
- Identifying and assessing appropriate mitigation measures, including alternatives.
- Assessing the significance of residual effects, taking account of any mitigation measures.

The surveys undertaken comprised habitat surveys; non-volant mammals including badgers and amphibian surveys; and otter, bat and bird surveys for both the winter and the breeding seasons.

Éire Ecology was commissioned to carry out an assessment of bat and bird usage of lands located at the Parkway Valley site. A site-specific report is presented as an Appendix 7.1 to this Chapter which details specific methodology for the bats and bird surveys undertaken.

Desktop research to determine existing records in relation to habitats and species present in the study areas was firstly undertaken. This included research on the NPWS metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the Proposed Development study areas.

[1] Wildlife Act 1976, as amended. Administrative consolidation of the Wildlife Act 1976, Law Reform Commission (2024)

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology (Chapter 5 and Chapter 6 of this EIA Report). Interactions in terms of the Chapters on these topics presented in this EIA Report were important in the determination of source vector pathways and links with potentially hydrologically connected areas outside the Proposed Development site. For example, the determination of water courses and pathways to offsite water bodies or pathways to ground and potentially sensitive aquifers, if present.

The potential effects on European sites are assessed in this chapter of the EIA Report in relation to the requirements of the EIA Directive and Irish legislation and does not purport to comprise information for the purposes of the screening assessment to be carried out by the competent authority or authorities pursuant to Article 6(3) of the Habitats Directive. The obligation to undertake appropriate assessment derives from Article 6(3) of the Habitats Directive and is the subject of an Appropriate Assessment Screening Report (Appendix 7.2) and Stage Two Appropriate Assessment, for which a Natura Impact Report has been prepared (Appendix 7.3).

7.2.1 Study Area

While the main focus of biodiversity was on the Proposed Development site within the red line boundary, see Figure 7.1 below. The surrounding environment extending from the redline boundary was taken into account in addition to potential biological and hydrological connectivity in relation to European sites in a Zone of Influence (ZoI) which is detailed further in Section 7.2.2 below.

The ecological surveys were designed based upon the characteristics of the Proposed Development and its likely significant impacts on the baseline environment during construction and/or operation. The study areas are described as follows.

7.2.1.1.1 Habitats

The area within or immediately adjacent to the Proposed Development footprint where fauna species could be directly or indirectly affected during construction/operation.

The study areas of this assessment are shown on Figure 7.1 below.

7.2.1.1.2 Rare and/or Protected Flora

The area within or immediately adjacent to the Proposed Development footprint where rare and/or protected flora could be directly or indirectly affected during construction/operation.

Species considered to be Key Ecological Receptors (KER); including floral and faunal species of conservation concern of the Proposed Development include the following:

- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) (Gilbert *et al.* 2021)[2] species listed for their breeding populations.
- Bats
- Otters

Fauna species

Other than those listed below (includes badger, otter, amphibians)

The area within or immediately adjacent to the Proposed Scheme footprint where fauna species could be directly or indirectly affected during construction/operation.

[2] Gilbert, G., Stanbury, A., Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 9: 523-544.

7.2.1.1.3 Bats

The area suitable for roosting, foraging and/or commuting bats (e.g. bridges, hedgerows, treelines, woodland and/or watercourses) within or immediately adjacent to the Proposed Development footprint where bats could be directly or indirectly affected during construction/operation.

7.2.1.1.4 Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites.

Figure 7-1 Site Location and redline boundary of the Proposed Development

7.2.2 Zone of Influence

The ZoI, or distance over which a likely significant effect may occur will differ across the subject ecological receptors, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present along the Proposed Development. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Development. In some instances, the ZoI extends beyond the study area (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream). For example, the pollution of a water course by a significant quantity of a substance that could have an effect on a sensitive habitat or species where the substance was carried downstream to a receiving environment such as a protected coastal estuary.

The ZoI of the Proposed Development in relation to terrestrial habitats is generally limited to the footprint of the Proposed Development and the immediate environs (to take account of shading or other indirect

impacts, such as air quality). Hydrogeological / hydrological linkages (e.g. rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The ZoI of air quality effects is generally local to the Proposed Development construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m (refer to Chapter 8 (Air Quality) for more detail).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters.

The ZoI of the Proposed Development in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Development.

7.2.3 Ecological Surveys

7.2.3.1 Habitat Surveys

The habitat assessment was carried out in two stages. The first stage comprised desktop research to determine existing records in relation to habitats and species present in the study area as defined by the area of the Proposed Development, site boundaries and surrounding buffer zones up to 150m away. This distance referred to by the standard ecological impact assessment guidance[3] is adequate to include address potential effects on mobile species such as otters or badgers, if present.

The second stage involves an evaluation of the site to establish the existing environment in the footprint of the Proposed Development area.

Habitat types were identified during fieldwork on 18 June 2025 and 11 September 2025. Areas which were highlighted during desktop assessment were investigated in closer detail according to the Heritage Council Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.*, 2011). Habitats in the Proposed Development area were classified according to the Heritage Council publication "A Guide to Habitats in Ireland" (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of "An Irish Flora" (Parnell & Curtis, 2012).

7.2.3.2 Mammals (Excluding Bats)

Signs of mammals such as badgers and otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries.

Badger Survey Methodology

The following methodology used during fieldwork and site surveying was adopted from Scottish Nature and included information provided in Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes by Transport Infrastructure Ireland formerly NRA (2006).

[3] Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

Initial Field Surveys

Badger surveys should be undertaken within an area of search extending 1km from the periphery of the Proposed Development area. Within this area of search all fence lines, woodland and scrub habitats should be systematically surveyed for evidence of badgers in the form of:

- Faeces: badgers usually deposit faeces in characteristic excavated pits, concentrations of which (latrine sites) are typically found at home range boundaries.
- Setts, comprising either single isolated holes or a series of holes, likely to be interconnected underground.
- Paths between setts or leading to feeding areas.
- Scratching posts at the base of tree trunks.
- Snuffle holes (small scrapes where badgers have searched for insects, earthworms and plant tubers).
- Day nests (bundles of grass and other vegetation where badgers may sleep above ground).
- Hair traces.
- Footprints

When found, activity levels at setts should be scored using the following criteria:

- Number of well used holes (with one or more of the features : well-worn entrance; freshly excavated soil; bedding material)
- Number of partially used holes (leaves or twigs in entrance and/or mosses and other plants growing in or around entrance)
- Number of disused holes (partially or completely blocked, with considerable amount of excavation required for reoccupation).

Setts should also be classified using the conventions shown in the following criteria.

Sett Type	**Definition**
Main	Several holes with large spoil heaps and obvious paths emanating from and between sett entrances
Annexe	Normally less than 150m from main sett, comprising several holes. May not be in use all the time, even if main sett is very active.
Subsidiary	Usually at least 50m from main sett with no obvious paths connecting to other setts. May only be used intermittently
Outlier	Little spoil outside holes. No obvious paths connecting to other setts and only used sporadically. May be used by foxes and rabbits.

Otter Survey Methodology

The following methodology used during fieldwork and site surveying was adopted from Guidelines for the treatment of otters prior to the construction of national road schemes by Transport Infrastructure Ireland formerly NRA (2006).

A walkover otter survey was undertaken on watercourses within the vicinity of the proposed development. The survey area comprised 1km of linear water course habitat (inclusive of both banks where accessible) of drainage ditches leading to the Groody River (none of these are within the application boundary).

The survey was completed during optimal conditions (dry, mild, bright and settled) which ensured that a good representation of habitat marked by otter could be recorded in the field, including territorial marking or marking of feeding areas. The survey also deliberately coincided with a prolonged dry period to minimise rain washout of otter signs (spraint, smears etc.). Water levels were low (at base flows) during the survey period.

Any otter sign is logged by type, location (GPS), condition and approximate age for later interpretation to distinguish differences in habitat use and activity. Spraints were subjectively assessed as either fresh (very recent), mixed-age (recent & older spraints, typically indicative of a regular marking site) or old (spraint degrading and not recently deposited). Furthermore, indicative counts of spraint (i.e. number of individual spraints) and the number of sprainting sites (often separate clusters in one area) are noted. This helps indicate the frequency of otter marking that can clarify preferential use of habitat over time. High marking frequency often demarcates important territory.

7.2.3.3 Bats

A Ground Level Tree Assessment (GLTA) was conducted on the 10th of February and the 12th of March 2025. Trees that were likely to contain Potential Roost Features (PRF's), or those that have been noted to contain PRF's were recorded within the site following guidelines set out in (Collins, Bat Surveys for Professional Eccologists: Good Practice Guidelines (4th edition), 2023) with additional reference to the Bat Tree Habitat Key (Andrews, 2016) and BCT Guidelines ed 2 and 3 (Collins, 2016) & (Hundt., 2012).

Two Song Meter Mini full spectrum bat recorders were deployed within suitable habitat for bats from the 06th to the 20th of May, and again from the 29th of August to the 4th of September, within the bat active season.

Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

Per SNH (2019) guidance, static units (Song Meter SM4BAT and SM-Mini) were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded.

The data was analysed with Wildlife Acoustic's Kaleidoscope Pro; version 5.6.8). This software identifies many of the calls made by Irish bats. All calls were manually verified. Results below show some Myotis calls were recorded. Distinguishing between Myotis species recordings is difficult (unless distinctive social calls are recorded thus several calls are recorded to genus level only). These could be either Whiskered, Daubenton's or Natterer's bat. Similarly, several Pipistrelle calls were recorded with a peak frequency of around 40kHz. These calls are lower than expected for Common Pipistrelle but higher than typical for Nathusius's.

7.2.3.4 Breeding and Wintering Birds

Breeding Birds were surveyed using standard walked transects and signs were recorded where encountered during the field walkover survey. A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter birds located within or directly adjacent to the Proposed Development areas. Breeding and wintering bird surveys were conducted from January to October 2025.

7.2.4 Categorisation of the Baseline Environment

Desktop research to determine existing records in relation to habitats and species present in the study areas included research on the National Parks and Wildlife Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database. The following resources assisted in the production of this chapter of the report.

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
- National Parks & Wildlife (NPWS) protected site boundary data;
- Ordnance Survey of Ireland (OSI) mapping and aerial photography;
- OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
- Digital Elevation Model over Europe (EU-DEM);
- Google Earth and Bing aerial photography 1995-2026;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
  - National Biodiversity Data Centre records:
  - Online database of rare, threatened and protected species;
- Publicly accessible biodiversity datasets.
  - Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019) ; and
- Relevant Development Plans;
  - Limerick City and County Development Plan 2022-2028

7.2.5 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on the flora and fauna of the area is based on the following guidelines and publications:

- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Guidelines for Ecological Impact Assessment in the UK And Ireland Terrestrial, Freshwater, Coastal and Marine Version 1.3 - Updated September 2024 (CIEEM, 2024).

7.2.6 Forecasting Methods and Difficulties Encountered

There were no difficulties encountered during the habitat or fauna surveys.

7.3 Receiving Environment

The site comprises largely brownfield habitats, principally the footprint of a now demolished, partly constructed development and adjacent disturbed ground and scrub.

The following is a description description of relevant environmental designations, flora and fauna of the existing environment in the study area.

7.3.1 Designated Conservation Areas

The Department of Housing, Planning and Local Government (previously DoEHLG)'s Guidance on Appropriate Assessment (2009) recommends an assessment of European sites within a Zone of Influence (ZoI) of 15km. This distance is a guidance only and a potential 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 15km).

The Zone of Influence may be determined by connectivity to the Proposed Development in terms of:

- Nature, scale, timing and duration of works and possible impacts, nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Sensitivity and location of ecological features.

The potential for source pathway receptor connectivity is firstly identified and detailed information is then provided on sites with connectivity. European sites that are located within the potential Zone of Influence of the Proposed Development are listed in Table 7.1 and presented in Figure 7.2 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 22 September 2025.

Table 7-1 Details of European sites within the potential zone of influence of the project

Site Code	Site name	Distance (km)[4]
002165	Lower River Shannon SAC	0.705
004077	River Shannon and River Fergus Estuaries SPA	2.97

The Proposed Development is situated on a largely brownfield site in the eastern suburbs of Limerick City. The Groody River, which discharges to the River Shannon to the north, flows past c. 200m to the east.

The nearest European sites to the Proposed Development, and the only sites considered to lie within its potential Zone of Influence are the Lower River Shannon SAC (Site Code 002165), c. 705m to the north, and the River Shannon and River Fergus Estuaries SPA (Site Code 004077), c. 2.97km to the west.

There is no direct source pathway linkage between the Proposed Development site and any Natura 2000 sites. There is indirect source pathway linkage from the Proposed Development through the surface water drainage design which discharges to an open drain which flows into an OPW arterial drainage channel,

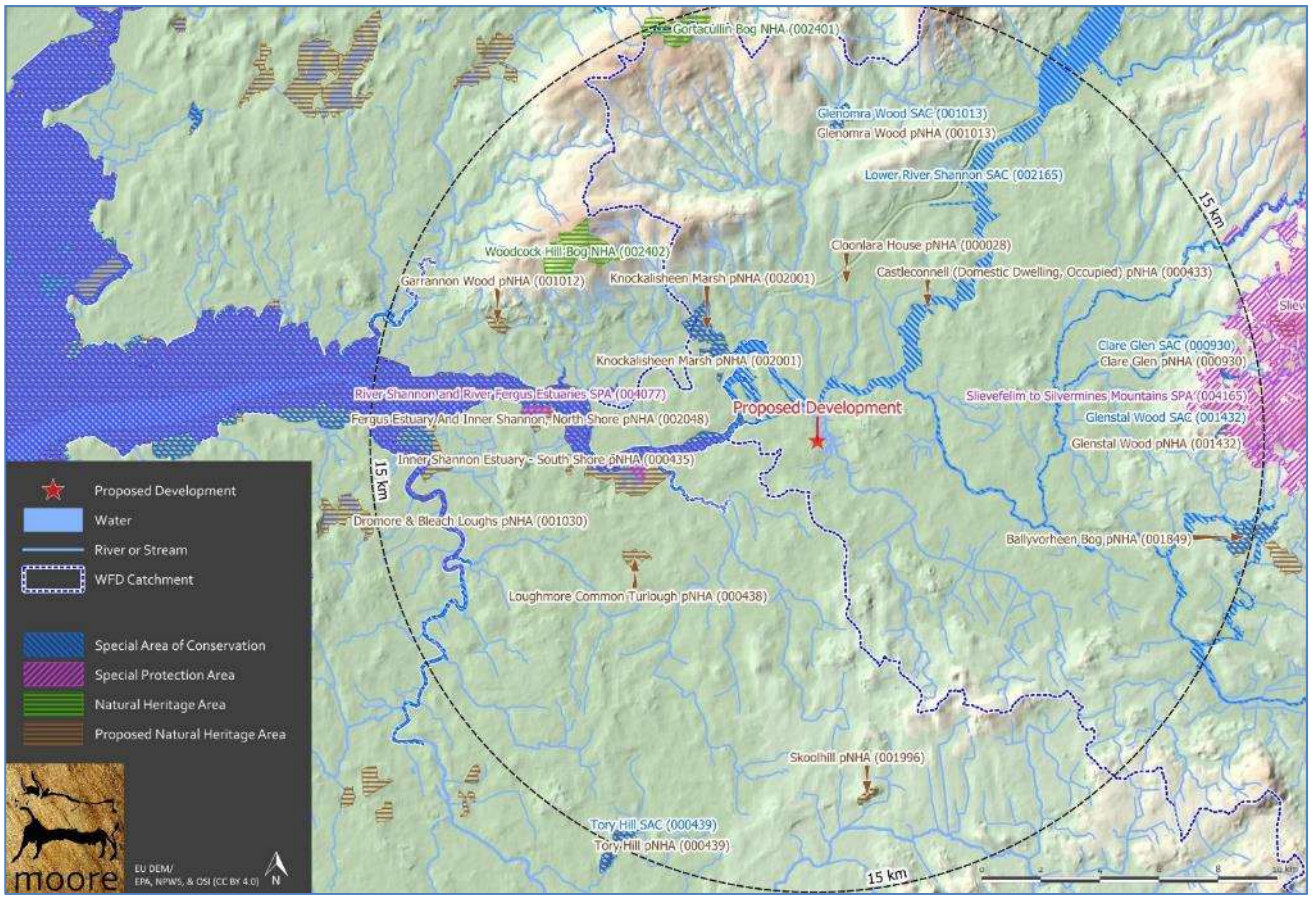
[4] Distances indicated are the closest geographical distance between the proposed development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

ultimately discharging to the Groody River and eventually to the River Shannon. The potential for indirect significant adverse effects on the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA is uncertain in the absence of control of potential pollution on surface water during construction.

The Overall Development will require the implementation of measures set out in an Construction Environmental Management Plan to avoid potential impacts on the drainage network leading to the Groody River and onto the River Shannon, and it is concluded that in line with Departmental Guidance and having regard to ECJ case law and the 'Precautionary Principle', a Natura Impact Statement must be prepared for the purpose of Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act, 2000, as amended.

There is no connectivity to any other European sites.

Figure 7-2 Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Proposed Development.



7.3.2 Non-Designated Habitats

The site comprises the footprint of a now demolished structure, with some remaining concrete surfaces (BL3) within a large area of Scrub (WS1), bare and recolonising ground (ED2/ED3), with smaller areas of Dry grassland (GS2) and reed swamp (FS1). The main habitats are presented in Figure 7.3. A list of habitats recorded, and their corresponding Fossitt codes is presented in Table 7.2.

Table 7-2 Details of habitats recorded and their corresponding Fossitt codes

Habitat	Habitat Category	Habitat Type
(B) Cultivated and built land	(BL) Built land	(BL3) Buildings and artificial surfaces
(G) Grassland	(GS) Semi-natural grassland	(GS2) Dry meadows and grassy verges
	(WS) Scrub/Transitional Woodland	(WS1) Scrub
(E) Exposed rock and disturbed ground	(ED) Disturbed ground	(ED2) Spoil and bare ground
		(ED3) Recolonising bare ground
(F) Freshwater	(FS) Swamps	(FS1) Reed and large sedge swamps

7.3.2.1 Dry meadows and grassy verges (GS2)

This habitat occurs principally in the northeastern section of the site, adjacent to the R445 road, as well as small scattered patches along tracks. It generally occurs intermixed with scattered Scrub (WS1). Species present include Cock's Foot (*Dactylis glomerata*), Red Fescue (*Festuca rubra*), Oxeye Daisy (*Leucanthemum vulgare*), Ribwort Plantain (*Plantago lanceolata*) and Bird's foot Trefoil (*Lotus corniculatus*).

7.3.2.2 Scrub (WS1)

Scrub occurs around the margins of the entire site, both as large stands and scattered patches among other transitional habitats. Where it is longest established, for example along the southwestern boundary, it comprises stands of fast growing trees and shrubs, including Downy Birch (*Betula pubescens*), Grey Willow (*Salix cinerea*), Goat Willow (*Salix caprea*), Gorse (*Ulex europaeus*), Rowan (*Sorbus aucuparia*), Swedish Whitebeam (*Sorbus intermedia*), and *Buddleia*.

7.3.2.3 Spoil and bare ground (ED2)

This habitat occurs throughout the site, often in an intimate mosaic with WS1 and ED3 habitats. The substrate is largely crushed stone, with smaller areas of barish earth and spoil heaps. A broad range of species occur on this habitat across the site, including Red Valerian (*Centranthus ruber*), Fox and Cubs (*Pilosella aurantiaca*), Bilbao's Fleabane (*Erigeron floribundus*), Grey Willow saplings and Charlock (*Sinapis arvensis*).

7.3.2.4 Recolonising bare ground (ED3)

This category refers to habitats with greater vegetation cover than the previous category; both habitats are intermixed throughout the site however. A large suite of ruderal species occupy this habitat, with Common Centaury (*Centaurium erythraea*), Yellowwort (*Blackstonia perfoliata*), Broad-leaved Willowherb (*Epilobium montanum*), Self Heal (*Prunella vulgaris*), Scarlet Pimpernel (*Lysimachia arvensis*), Cat's Ear (*Hypochaeris radicata*), Hawksbeards (*Crepis* sp.), Creeping Bent (*Agrostis stolonifera*) and Yorkshire Fog (*Holcus lanatus*).

7.3.2.5 Reed and large sedge swamps (FS1)

This category refers to a small hollow adjacent to a pylon in the northeastern section of the site. Bulrush (*Typha latifolia*) is the dominant species.

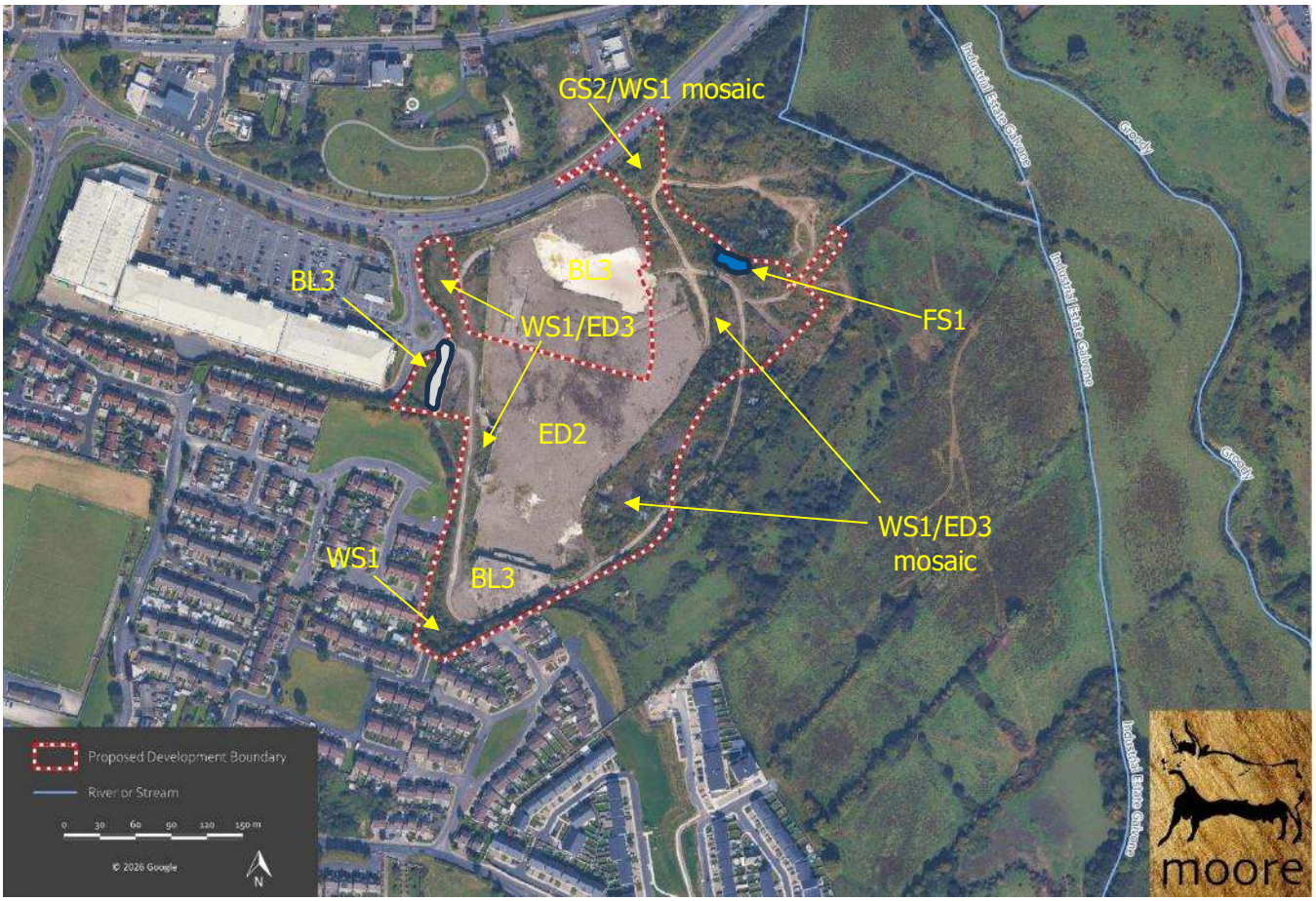
7.3.2.6 Buildings and artificial surfaces (BL3)

This category refers to hard surfaces on site. This includes the paved section of access road on the western side of the site, the concrete basement walls, and the raised concrete surface at the southwestern section of the site.

7.3.2.7 Invasive Species

There were no Third Schedule invasive species recorded at the proposed development site. Buddleia is widespread on the site and considered a low-level threat.

Figure 7-3 Habitat Types in the Area of the Proposed Development.



a. Habitat types as per Fossitt Codes, see Table 7-2 above for description of habitat types.

7.3.3 Fauna

7.3.3.1 *Badgers*

The NBDC database was consulted for details on badger records held for the Proposed Development area. The database was consulted on the 22/09/2025 for details on historical records from the site. There is a single record for a roadkill badger from the R445 immediately north of the proposed development site (McLoughlin, 2012). There were no signs of badgers or setts within the proposed development area. The area is heavily disturbed brownfield, curtailed by intervening wire mesh fences and road development restricting badger movement into the site.

7.3.3.2 *Otters*

There were no signs of otters in the study area. The nearest NBDC records refer to records on the River Shannon 1km to the north downstream, from 13/12/2012. The drainage ditch leading off the site is relatively small and falls over variable gradients with no value to fisheries or otters. It leads to wider stagnant drainage ditches on lower flatter ground. However, these ditches are relatively shallow and have limited fisheries value and limited value to otters.

The primary concern for otters is water quality further downstream in the Groody River and River Shannon where greater opportunities for prey availability occurs.

7.3.3.3 *Bats*

In total, 27 trees and clumps of trees were assessed, of which 13 no. are within the site boundary and 14 no. are in the immediate vicinity of the site to the east. All were categorised as having no roosting potential.

Results of the static detectors show number of registrations and Bat passes per hour (Bp/Hr) and divides results per species and detector. An overall average of 77.8 Bp/Hr was recorded from the Spring period, reducing to 8.2 Bp/Hr in Autumn.

Both detectors recorded Lesser Horseshoe bat during the spring period, one registration at each detector. No Lesser Horseshoe Bats were recorded during the Autumn Survey Period.

Activity across the site was high in Spring, with the highest areas of bat activity being by the R445, along the northern boundary of the site. The most common species recorded was Common Pipistrelle with 13,888 registrations (81%) followed by Leisler's Bat (9.7%) and Common Pipistrelle with 859 (4.2%). Unidentified Myotis species comprised <1% of recordings each with other species recording at similarly low levels.

It should be noted that a single bat continuously circling a small stand of trees will produce numerous recordings, thus the number of registrations cannot quantify abundance, rather activity.

Six species of bat were positively identified during the various bat surveys: Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Nathusius Pipistrelle (*Pipistrellus nathusii*), Brown Long-eared bat (*Plecotus auritus*), Leisler's bat (*Nyctalus leisleri*) and Lesser Horseshoe bat (*Rhinolophus hipposideros*). In addition, five unidentified Myotis bat species were recorded, these being either Whiskered, Natterers or Daubenton's bats. Finally several Pipistrelle calls recorded from the static detectors had a peak frequency of 40kHz thus could be either Common or Nathusius Pipistrelle.

Surveys reveal the site is unsuitable for roosting bats but is used for feeding purposes. Detectors were placed in areas of highest bat potential; thus these results should be interpreted as a conservative result. Predominantly, Pipistrelle species and Leisler's were most frequently recorded thus mitigation and enhancement will reflect this. The presence of Lesser Horseshoe bats, albeit at very low numbers confirms the wider area is usable by this species and a corridor probably exists along the Groody River. While the site itself is of relatively low value for the species it is important the site does not impact the potential north-south corridor by creating excessive light spill outside the site.

7.3.3.4 *Birds*

The following provides a synopsis of the salient findings of Bird Surveys undertaken by Éire Ecology, presented in full in Appendix 7.1.

Vantage point (VP) Surveys

Six days of Vantage point (VP) surveys alongside wintering transects were conducted on the site during the winter season. In addition, to better understand the relationship between the site and the surrounding areas, hinterland point counts were conducted during the wintering periods. Target species for the surveys included all migratory birds such as swans and geese given the close proximity to an estuary and grassland as these species graze on grass. In addition, birds of prey, ducks, plovers, lapwings, sandpipers, gulls and terns. For the purposes of the survey raptors were also considered to be target species. In line with I-WeBS methodology, Cormorant, Shag, Little Egret, Grey Heron, and Kingfisher were also included (Lewis L. J., 2017).

Herring gull, Common gull, Great Black-backed Gull, Lesser Black-backed Gull, Black-headed Gull, Mute Swan, Mallard, Snipe, Lapwing, Kestrel and Oystercatcher were the only species of note recorded within the site. Of these the majority of gull sightings were of overflying birds not interacting with the site.

Seven, three-hour vantage point surveys were conducted from February 2025 to January 2026. Table 5-5 summaries results from the VP surveys showing number of times species were observed and highest numbers recorded. Only five species of interest were noted interacting with the site; Oystercatcher, Herring Gull, Mew Gull, Kestrel, Snipe and Northern Lapwing. No Nationally important flock numbers were recorded. Lapwing were not present in February 2025 but were seen 10 times in wintering surveys between October 2025 and January 2026, with a max flock size of 165. Lapwing presence onsite is consistent with historical data, with a record of this species from within the site noted on the NBDC, dated in January. This species is a Conservation objective of the River Shannon and River Fergus Estuaries SPA which is 2.5km away and Loughmore Common Turlough pNHA (6.8km) notes Lapwing, Snipe and Golden Plover are noted as being present on site during Winter months.

Wintering Transect

A wintering transect was conducted on the 10th of February 2025 within the site. During the wintering transect 4 oyster catchers, a single snipe and a single heron were recorded within the site alongside song thrush, hooded crow and rook. The 12th of March transect recorded wren, robin, magpie and rook.

Wintering Surveys Resumed in October 2025. Transects on the 29th of October recorded no species making use of the Phase 1 site. Bird activity was concentrated in the lands to the East of the site, with 16 species being noted outside the site, including Buzzard, Kestrel, Snipe and Winter Wren.

In November, Wren and Snipe were found onsite during transects. Wren was found to the Northeast of the site, in scrubby areas bordering more suitable lands further East. Snipe was flushed from the built land near the Eastern boundary of the site.

In December, 7 species were found within the site during transect surveys, they were; Blackbird Chaffinch, Robin, Reed Bunting, Snipe, Song Thrush and Winter Wren. Snipe was seen in the largest numbers, with a flock of 22 roosting in the center of the site on built land. Three observations of Lapwing were made within the boundary of the Phase 2 site outline. Two of these observations noted Lapwing roosting onsite and the other noted a flock circling the site overhead.

The final transect was conducted in January 2026 and species observed onsite were Blackbird, Chaffinch, Dunnock, Great tit, Long-tailed Tit, Meadow Pipit, Raven and Wintering Wren. All bird sightings on site were made at the Eastern boundary of the Phase 1 site, adjacent to more favorable habitat to the east.

Breeding Birds

Breeding transect surveys were conducted on the 06th and 20th of May 2025. No definite evidence of breeding was found however blackbird, blue tit, house sparrow (probably breeding adjacent to site), and wren are probably breeding in or close to the site.

Hinterland Survey

During the wintering surveys the fields located to the north and east were checked for flocks of wintering birds. Surveys were conducted using binoculars and spotting scope. Hinterland Survey in February focused on lands to the north of the site and activity was very low, with no species of interest found to be making use of these lands. A single observation of Snipe was made to the South-east of the site.

Wintering Surveys resumed in October where focus was placed on the lands immediately surrounding the site, where habitats were more favourable and in housing estates adjacent to the site. Species observed during Hinterland survey included; Buzzard, Grey Wagtail, Kestrel, Mew Gull and Snipe. The majority of these were noted using lands to the east of the site boundary, with Buzzard, Common Mew gull and Wigeon noted on lands south of the site and a single observation of Mew Gull over housing estates to the West of site. During the November survey; Black-headed Gull, Buzzard, Herring Gull and Snipe were noted over southern fields. Buzzard was observed during this survey flying along the river to the Southeast. December Hinterland Survey noted Great-Crested Grebe and Snipe. The final Hinterland survey was conducted in January 2026. Species noted during this survey include; Kestrel, Meadow Pipit, Snipe, and Sparrowhawk. A male Sparrowhawk hunting along hedgerow and Kestrel hunting over open habitat were both noted using lands to the South of the site.

Overall no large flocks of species of interest were noted in the surrounding wet grassland meadows. This is likely due to management and height of vegetation. Short cropped grass is favoured by wintering waterbirds such as lapwing and golden plover while geese and swans favour improved grassland fields.

Lapwing was the primary species of interest noted in Wintering surveys at the Parkway Valley development. Lapwing was observed 10 times during VP surveys between October 2025 and January 2026. The largest flock observed was made up of 165 individuals was noted in January 2026.

This species was most noted perched on an area of bare, built land, south of ponding water, located within the previously developed concrete area, but outside the boundary of the current planning proposal (refer to Figure 7-3). Figure 7-1The ponded area is screened from the Dublin Road (R445) by the existing large fence, effectively isolating the site from road traffic.

While this is not a Nationally important flock (c. 850), it can be considered of regional importance. It should be noted regionally important numbers were recorded only once and are likely to represent small flocks gathering in preparation to move north. Lapwing was not found to be present on site in February 2025 despite January 2026 showing highest levels of activity. This shows the current site is of highest value at mid-winter.

This Lapwing flock recorded east of Limerick City is unlikely to represent an *ex-situ* component of the River Shannon and River Fergus Estuaries SPA population. The SPA Supporting Document and associated distribution mapping indicate that SPA-linked Lapwing are concentrated west of the city, associated with estuarine margins and adjacent supratidal grasslands. The observed inland flock is therefore best interpreted as a discrete, non-SPA-dependent wintering group.

Loughmore Common Turlough, located 6.8km SW from the site is noted as having populations of Lapwing present. Given the Lapwing on site were seen entering from the North and East, and that Limerick City is located between the site and pNHA, it is highly unlikely that birds present on site represent an *ex-situ* population of Lapwing associated with the pNHA.

7.3.3.5 *Aquatic Species*

There are no water courses with flowing water on site. The site has large areas of pooled standing water which is ephemeral in nature depending on rainfall. Drainage is generally to ground or diffuse to distant

drainage ditches on the eastern side of the site. These drainage ditches were observed in September 2025 to be stagnant, but they have distant connectivity to the Groody River in that they link to the floodplain of the river and/or to more established water courses such as the EPA named Industrial Estate/Galvone Stream.

The ditches nearest the site were observed to have shallow stagnant stands of water with no instream flora and heavy/dense vegetation cover. They do not have fisheries value and have sub-optimal value to amphibians such as newts and frogs.

There are no plans to directly affect these drainage ditches. The proposed development does include surface water drainage design to link to one drainage ditch in the east to discharge treated surface water. Thus, the primary concern for aquatic species is upholding good water quality.

There are records from the Flora Pretection Order 2022 Map Viewer for Opposite-leaved pondweed (*Groenlandia densa*) from 2003, 2005 and 2006 from varying descriptions including 'W Side of Groody River, near Groody Bridge' to 'On the E side of the city, in a ditch only metres from a huge infill and a new main road' to 'Just S of new main road and W of Goody Bridge'. During site surveys undertake there were no signs of instream vegetation in the lower wider drainage ditch (into which surface water from the subject development is proposed to discharge) leading southeast to another drainage ditch and then leading to the Groody River.

There are no plans for any development of the adjacent drainage ditches and so the primary concern is maintaining good water quality during construction and operation.

7.3.4 Habitat Evaluation

The ecological value of the site was assessed following the guidelines set out in the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (2019) and according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004) in the TII Guidelines (formerly NRA) for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) which outlines the methodology for evaluating ecological impacts Judgements on the evaluation were made using geographic frames of reference, e.g. European, National, Regional or Local outlined as follows:

Ecological valuation: Examples –

- International Importance:

  - 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
  - Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
  - Features essential to maintaining the coherence of the Natura 2000 Network.
  - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
  - Resident or regularly occurring populations (assessed to be important at the national level) of the following:
    - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
    - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
  - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
  - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
  - Biosphere Reserve (UNESCO Man & The Biosphere Programme).
  - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).

- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

► National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
- Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive County Importance:
- Area of Special Amenity.
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

► Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;

- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

► Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

Due cognisance of features of the landscape which are of major importance for wild flora and fauna, such as those with a "*stepping stone*" and ecological corridors function, as referenced in Article 10 of the Habitats Directive were considered in this assessment.

7.4 Characteristics of the Proposed Development

The Proposed Development consists of the construction and operation of a large residential development comprising 403 no. residential units over 5 no. apartment blocks, a crèche and medical centre and all associated and ancillary development.

For a detailed description of the development proposals, please refer to Chapter 2 (Description of the Proposed Development) and Chapter 6 (Hydrology and Hydrogeology) for the characteristics related to the surface water and groundwater environment.

7.5 Potential Impacts of the Proposed Development

There are no rare or protected habitats recorded in the study area inside the proposed development boundary. The development area may be considered of Low Local Ecological Value.

There is no direct source pathway linkage between the Proposed Development site and any Natura 2000 sites. There is indirect source pathway linkage from the Proposed Development through the surface water drainage design which discharges to an open drain at the eastern site boundary, which flows in the Industrial Estate/Galvone Stream and eventually to the Groody River, and then the River Shannon. The potential for indirect significant adverse effects on the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA is uncertain in the absence of control of potential pollution on surface water during construction.

In addition to the identified surface water pathways, there is potential for indirect effects on the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA arising from disturbance of groundwater during the construction phase. Excavation works, including foundation construction and localised bedrock excavation, present a potential pathway for contaminants (e.g. hydrocarbons, suspended solids or cementitious materials) to enter the underlying aquifer in the absence of mitigation. In a worst-case unmitigated scenario, this represents a potential indirect pathway for effects on sensitive habitats within the SAC and SPA; however, the magnitude of such effects would be limited by the localised nature of groundwater flow, attenuation within subsoils, and dilution within the receiving river system.

The proposed piling methodology (CFA) forms a sealed, in-situ concrete pile that limits groundwater interaction to a very short, localised period, meaning any potential effects on groundwater (and therefore downstream Natura 2000 sites) are negligible.

The Overall Development will require the implementation of measures set out in the CEMP to avoid potential impacts on the drainage network and groundwater leading to the Groody River and onto the River Shannon, and it is concluded that in line with Departmental Guidance and having regard to ECJ case law and the 'Precautionary Principle', a Natura Impact Statement must be prepared for the purpose of Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act, 2000, as amended.

With reference to the Natura Impact Statement (Moore Group, 2026; Appendix 7.3), there are no predicted negative effects to European sites from the Proposed Development operational phase.

7.5.1 Construction Phase

7.5.1.1 *Construction Phase Effects on Habitats*

7.5.1.1.1 Dry meadows and grassy verges (GS2)

There will be a loss of small scattered areas of GS2 grassland. Given the scale of these habitats, and the proposed landscaping, effects on local ecology are predicted to be ***negative*** and ***slight*** for the construction phase.

7.5.1.1.2 Scrub (WS1)

There will be a loss of associated woodland fringe scrub on the proposed development site. The potential effects on local ecology are ***negative*** and ***imperceptible*** for the construction phase.

7.5.1.1.3 Spoil and bare ground (ED2)

Recolonising bare ground is of low ecological value. The potential effects on local ecology are ***neutral*** and ***imperceptible*** for the construction phase.

7.5.1.1.4 Recolonising bare ground (ED3)

Recolonising bare ground is of low ecological value. The potential effects on local ecology are ***neutral*** and ***imperceptible*** for the construction phase.

7.5.1.1.5 Buildings and artificial surfaces (BL3)

The site tracks are of low ecological value. The potential effects on local ecology are ***negative*** and ***imperceptible*** for the construction phase.

7.5.1.1.6 Invasive Species

No Third Schedule Invasive Species were recorded during survey. Buddleia on site can be disposed of with site waste.

7.5.1.2 *Construction Phase Effects on Fauna*

7.5.1.2.1 Badgers

There were no badgers recorded on site and there are no predicted negative effects on badgers during the construction phase.

7.5.1.2.2 Otters

There were no otters recorded, and no suitable otter habitats recorded on site and there are no predicted negative effects on otters during the construction phase.

7.5.1.2.3 Bats

No potential roost features in trees were identified within the site boundary.

Potential effects on bat populations are reiterated from the Éire Ecology Bird and Bat Survey Report in Appendix 7.1 as follows.

Common Pipistrelle

Direct Habitat Loss - The proposed development will see the transformation of predominantly bare ground and recolonising scrub to built lands, along with amenity grassland, additional treelines and the creation of a wildlife pond. No roosting habitat was found. The wider habitat, particularly to the east has good feeding habitat while buildings to the west provide good roosting potential. Common Pipistrelle was the most frequently recorded species within the site (average of 41BpHr) thus significance is increased for this species. The proposal will see the creation of roosting habitat, the creation of treelines and a wildlife pond will alleviate the loss of some feeding habitat (see mitigation section).

The magnitude of the impact is assessed as Medium. Low sensitivity species + Medium Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - It is unlikely construction activity will occur during nighttime within the bat active season. As such it is highly unlikely the construction phase will have an impact on this species. Lighting during the operational phase can impact bats, however Common Pipistrelle is less impacted than woodland species (see mitigation section on wildlife friendly lighting measures).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Nathusius Pipistrelle

Direct Habitat Loss - The proposed development will see the transformation of predominantly bare ground and recolonising scrub to built lands, along with amenity grassland, additional treelines and the creation of a wildlife pond. No roosting habitat was found. The wider habitat, particularly to the east has good feeding habitat while buildings to the west provide good roosting potential. The proposal will see the creation of roosting habitat, the creation of treelines and a wildlife pond will alleviate the loss of some feeding habitat (see mitigation section).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - It is unlikely construction activity will occur during nighttime within the bat active season. As such it is highly unlikely the construction phase will have an impact on this species. Lighting during the operational phase can impact bats however Nathusius Pipistrelle is less impacted than woodland species (see mitigation section on wildlife friendly lighting measures).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Soprano Pipistrelle

Direct Habitat Loss - The proposed development will see the transformation of predominantly bare ground and recolonising scrub to built lands, along with amenity grassland, additional treelines and the creation of a wildlife pond. No roosting habitat was found. The wider habitat, particularly to the east has good feeding habitat while buildings to the west provide good roosting potential. The proposal will see the creation of roosting habitat, the creation of treelines and a wildlife pond will alleviate the loss of some feeding habitat (see mitigation section).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - It is unlikely construction activity will occur during night time within the bat active season. As such it is highly unlikely the construction phase will have an impact on this species. Lighting during the operational phase can impact bats however Soprano Pipistrelle is less impacted than woodland species (see mitigation section on wildlife friendly lighting measures).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Leisler's Bat

Direct Habitat Loss - The proposed development will see the transformation of predominantly bare ground and recolonising scrub to built lands, along with amenity grassland, additional treelines and the creation of a wildlife pond. No roosting habitat was found. The wider habitat, particularly to the east has good feeding habitat while buildings to the west provide good roosting potential. The proposal will see the creation of roosting habitat, the creation of treelines and a wildlife pond will alleviate the loss of some feeding habitat (see mitigation section).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - It is unlikely construction activity will occur during night time within the bat active season. As such it is highly unlikely the construction phase will have an impact on this species. Lighting during the operational phase can impact bats however Soprano Pipistrelle is less impacted than woodland species (see mitigation section on wildlife friendly lighting measures).

The magnitude of the impact is assessed as Very Low. Low sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Lesser Horseshoe Bat

Direct Habitat Loss - While the development will see the transformation of bare ground and portions of scrub, the subject site is not a suitable feeding ground for this species. No feeding buzzes were recorded during static surveys. The proposed development will see an eastern scrubland protected which will maintain a North-South (N-S) corridor for passing Lesser Horseshoe.

The magnitude of the impact is assessed as Very Low. Medium sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - While the subject site is of low potential the increase in lighting could adversely impact this species ability to travel between the Limerick and Clare ranges via the Groody River. This potential impact is increased with the potential in-combination effect of more developments along the Groody and the current lights along the R445. Mitigation is required to ensure light spill does not occur on eastern scrub.

The magnitude of the impact is assessed as Very Low. Medium sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

7.5.1.2.4 Birds

The site is of low ecological value for birds except for Lapwing which the site is of county importance (while acknowledging that in February numbers increase to regional importance). It should be noted, the area of value to the species lies outside the current site outline. The site is also of value to Oystercatcher where low numbers were observed in the winter of 2025.

Potential Effects are described as follows.

Oystercatcher

Displacement and barrier effect - While the subject site is of low potential the increase in lighting could adversely impact this species ability to travel between the Limerick and Clare ranges via the Groody River. This potential impact is increased with the potential in-combination effect of more developments along the Groody and the current lights along the R445. Mitigation is required to ensure light spill does not occur on eastern scrub.

The magnitude of the impact is assessed as Very Low. Medium sensitivity species + Low Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

Direct Habitat Loss - Based on baseline data the proposed development will have a negligible impact on the local Oystercatcher population. While wintering oystercatcher resting habitat will be lost as a result of the proposed development the city has numerous suitable habitat for this species. The site is not a suitable breeding or feeding site. The creation of a wildlife pond could create good suitable alternative habitat for this species while green short cropped areas can be utilised by this species.

The magnitude of the impact is assessed as Very Low. Medium sensitivity species + Negligible Impact = Very Low effect significance. No likely significant effects at a local level are predicted.

The IECS Toolkit26 suggests that oystercatcher is of moderate sensitivity to disturbance. There is the potential of disturbance to wintering oystercatcher through construction phase activities that could disturb birds and displace them from the area. It is likely oystercatchers are attracted to the open areas of site when ponded water sits on site. This will not be allowed to occur in the construction phase which will reduce the potential of the site for wintering waterbirds. An Ecological Clerk of Works (ECoW) will conduct regular checks during the wintering seasons and if oystercatchers are present a no construction buffer of 150m will be implemented on areas used by the species (Goodship 2022).

The magnitude of impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted.

Lapwing

Direct Habitat Loss - Based on baseline data the proposed development (phase 1 current boundary) was not utilised by this species, rather a ponded area of bare ground to the north of the site (within the phase 2 area). Much of the site is becoming increasingly scrub dominated, and this natural succession is progressively encroaching on the remaining open ground. In the absence of active management, the extent of suitable roosting habitat is expected to decline further, reducing the site's value for Lapwing in the short to medium term. To address this, the proposed works include the creation of a new pond and areas of managed grassland to the east of the site, which will provide more sustainable open habitat conditions and maintain the availability of suitable roosting and foraging areas for Lapwing into the future.

The magnitude of the impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted.

Displacement and barrier effect - The IECS Toolkit26 suggests that lapwing is of moderate sensitivity to disturbance. There is the potential of disturbance to wintering lapwing through construction phase activities that could disturb birds and displace them from the area. It is likely lapwing are attracted to the open areas of site when ponded water sits on site. This will not be allowed to occur in the construction phase which will reduce the potential of the site for wintering waterbirds. An ECoW will conduct regular checks during the wintering seasons and if Lapwing are present a no construction buffer of 150m will be implemented on areas used by the species.

The magnitude of impact is assessed as Low. Medium sensitivity species + Low Impact = Low effect significance. No likely significant effects at a local level are predicted.

Vegetation removal could impact on nesting passerines such as blackbird and wren thus ideally this activity should be carried out only outside the bird-nesting season (March 1st – August 31st) in order to avoid impacts on nesting birds. In the event this work is required earlier an ECoW should be onsite to ensure no nesting birds are present. Should an occupied nest be found the clearance works will have to wait until after fledging.

7.5.2 Operational Phase

7.5.2.1 *Operational Phase Effects on Habitats*

Overall site development will result in a long-term neutral modification of habitats which are already modified by development of the site.

A landscape plan will be implemented as part of the development and planting will be undertaken in compliance with the Biodiversity Nett Gain requirements of the Limerick Development Plan.

7.5.2.2 *Operational Phase Effects on Fauna*

Surveys reveal the site is unsuitable for roosting bats but is used for feeding purposes. Detectors were placed in areas of highest bat potential; thus these results should be interpreted as a conservative result. Predominantly, Pipistrelle species and Leisler's were most frequently recorded thus mitigation and enhancement will reflect this. The presence of Lesser Horseshoe bats, albeit at very low numbers confirms the wider area is usable by this species and a corridor probably exists along the Groody River. While the site itself is of relatively low value for the species it is important the site does not impact the potential north-south corridor by creating excessive light spill outside the site.

Overall site development will result in a neutral modification of habitats of light industrial nature.

The potential effects on fauna in the absence of mitigation would be ***negative*** and ***long term*** for the operational phase.

7.6 Mitigation Measures

7.6.1 Construction Phase

7.6.1.1 Habitats

In line with standard engineering design to comply with the Surface Water Regulations, the construction of the proposed development will be subject to specific construction management measures as set out in the CEMP to avoid direct and indirect impacts on the water courses which drain the site.

These measures are also intended for the protection of European sites with hydrological connectivity either via ground or surface water.

Potential impacts on birds will be avoided by cutting of vegetation outside the bird nesting season March 1 to August 31.

7.6.1.2 Badgers

There are no mitigation measures proposed for badgers.

7.6.1.3 Otters

There are no specific mitigation measures proposed for otters. Mitigation in terms of control of construction activity and surface water quality are included in a CEMP which will have beneficial effects for upholding good water quality status and maintaining good habitats for fish and prey species for otters.

7.6.1.4 Bats

The Bat and Bird Survey report prepared by Eire Ecology (and included as Appendix 7.1 of the EIAR) sets out detailed mitigation and enhancement measures for bats. The measures are focused on the creation of roosting, feeding and commuting habitats and the creation of sensitive lighting regime which will create sufficient lighting for residents while allowing bat species most frequently found here to continue to utilise the site.

The measures are summarised as follows:

- Where lighting is required near site boundaries, the lighting poles will be installed on the boundary and will face inwards (i.e. towards the centre of the site). This will ensure that lighting is not directed outside the site boundaries.
- All lights around the site boundary will be fitted with directional hoods and/or luminaires to direct the light downwards onto targeted areas and to prevent unnecessary light-spill.
- The intensity of lighting will be kept to the minimum level required for safety and security.
- Low-UV LEDs or low / high pressure sodium lamps will be the preferred bulb type, as they have least adverse effect on bats. Mercury, metal halide or high-UV LED bulbs will not be used.

These measures will apply both to temporary lighting during the construction of the Proposed Development, and to permanent lighting during the operation of the development.

7.6.1.5 Birds

Potential impacts on birds will be avoided by cutting of vegetation outside the bird nesting season March 1 to August 31. In the event this work is required earlier an ecological clerk of works (ECoW) should be onsite to ensure no nesting birds are present. Should an occupied nest be found the clearance works will have to wait until after fledging.

Prior to enabling works an ECoW ornithologist will assess the site and identify any species of note using the site. The ECoW will have the authority to co-ordinate where works can take place and will create buffer zones to reduce disturbance. Measures such as the placement of hoarding can also be employed to prevent visual disturbance.

Disturbance on the existing pond outside of the application site but within overall, previously developed areas of the Parkway Valley site could impact Lapwing using the site. Hoarding is already present along the road to the north of the site and provides good mitigation against disturbance. Lapwing are sensitive to visual stimuli out to 300m, (Cutts 2013), thus additional hoarding is required to be erected south of the pond to ensure disturbance from construction works will not occur. Hoarding should consist of solid fence at least 2.5m tall.

7.6.2 Operational Phase

<u>Lesser Horseshoe bat corridor</u>

Figure 7-1 of the Bird and Bat Report shows the location of the site, situated close to the Groody River valley, a strip of grassland potentially used by Lesser Horseshoe bats flying N-S from the Clare to Limerick ranges. Static surveys confirmed the presence of the species albeit in very low numbers. A desktop study also revealed another proposed development on the east bank of the Groody river where student accommodation blocks are proposed. Existing streetlights along the R445 are already creating a potential

barrier along the potential corridor thus efforts are required to prevent additional light spill from the Parkway Valley proposal.

A lighting report has been completed by Moloney Fox Consulting Engineers for the Proposed Development. The lighting scheme has been produced with ecologist input and reference to; (BCT I. , 2023), (BCI, 2010) and (Voigt, 2018).

The Scheme comprises primarily of pole mounted Warm White (2700k) LED fittings with internal louvres. The Warm White LED light source has the least negative impact on insects and bat prey items as identified in previous studies and is also a compact light source which enables easier control of the light spread.

Internal louvres minimise light spill, particularly to the rear of the fitting, and also completely eliminate any upward light from the fittings.

Lowest possible design illuminance levels have been proposed, considering the nature of the site. A dimming proposal will ensure lights are reduced for periods of the night.

The aim of the lighting scheme is to have an overall low light level where invertebrates are not attracted away from dark areas as well as dedicating an eastern zone of land as a dark zone. This will have benefits for the local bat populations by maintaining a hunting zone over scrubby woodland and help maintain the potential Lesser Horseshoe corridor along the Groody River.

Landscape design incorporates a new eastern treeline composed of native, locally appropriate species will be established along the road boundary to function as a light-blocking landscape feature. This planting will intercept low-angle spill from vehicle and amenity lighting, reinforcing the effectiveness of the bat-sensitive lighting design and maintaining dark conditions within habitats further east.

Bat roosts

It is proposed to install a box house to the east within the dark zone. It will be situated at a height suitable for Pipistrelle species and Leisler's bats; the most frequently recorded species within the site.

Internal landscaping

Several design features have been proposed which will increase the attractiveness of the development for bats. These include an internal green corridor between blocks A, D and B, C as well as the creation of green roofs.

Wildlife Pond and Managed Grassland

A pond is proposed to the southeast of the site. While manicured ponds offer little for wildlife, this pond will be situated away from high levels of human activity and surrounded by habitat beneficial to bird life. The pond should be of high value for species such as lapwing, reed bunting, little grebe, mallard, heron and little egret. The pond will be within the dark zone, providing ideal hunting grounds for bat species. The lack of lighting proposed for this area will allow it to be accessible by bat species.

To the south-east of the pond, an area of grassland will be managed for lapwing. According to (Gillings 1999), Lapwings generally preferred short swards but avoided swards more than 10 cm tall. The optimum sward is around 7 cm tall and lapwings prefer to feed in fields that have been mown twice. Grassland to the SE of the pond will be short sward, less than 7 cm, with scattered bare ground up to 10% of the area. Scattered clumps up to 10-15cm must make up 20% of the habitat area.

Swift Boxes

Six treble integrated swift boxes will be installed into the wall of block C facing east. Occupancy success of integrated boxes are less influenced by direction than mounted boxes. In, addition, a calling system will be installed for the first two years of operational phase and or until such time as occupancy has been confirmed. The calling system will conform to Swift Conservation Irelands Guidance document (Appendix B). A licence will be sought from the NPWS prior to instillation of lure.

7.7 Monitoring or Reinstatement Measures

There are no requirements for monitoring of habitats.

Post-construction monitoring will be required for a minimum of three years to confirm that the bird and bat mitigation measures are effective. This will include Lux monitoring of the Dark Zone. Should monitoring identify any unforeseen impacts or deficiencies, the mitigation strategy will be reviewed and amended as necessary.

There are no other requirements for monitoring of fauna.

A Landscape Plan has been prepared to increase Biodiversity where possible. This involves saving native tree saplings for future planting, maintaining 'rough or scrub' areas for encouraging biodiversity and planting native and wildflower areas where feasible.

Management includes appropriate seasonal vegetation cutting, management of sward length for the grassland area adjacent to the pond, replanting saplings to replace hedges, rough and grassy verges allowing unmanaged verges to develop natural wildflower components.

The Landscape Plan has been prepared in consultation with this EIAR to incorporate elements of the existing environment, consider loss and apply appropriate mitigation with sustainable planting of replacement woodland, scrub and linear features in particular with native species of local type and provenance.

7.8 Residual Effects of the Proposed Development

7.8.1 Construction Phase

The proposed development will have negligible negative impacts on the local bird and bat populations as long as all mitigation measures are implemented.

7.8.2 Operational Phase

The proposed landscaping planting is expected to grow sufficiently in the short-term period to provide reconnection between sections of removed treelines and scrub. The loss of a small number of immature trees will have a temporary neutral effect on bat foraging habitat.

The landscape plan and lighting plan has sufficient measures to create a dark zone to ensure no residual negative effects on bats and to increase biodiversity gain and promote food sources and commuting areas for bats and birds.

With the employment of appropriate mitigation measures with regard to local biodiversity, the Proposed Development will have a ***positive*** and ***long-term*** effect on biodiversity.

7.9 Cumulative Impacts of the Proposed Development

Cumulative effects are described by the EPA as the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects. In combination effects are considered in the appropriate assessment process as an assessment of the potential adverse effects of a plan or project in combination with other plans or projects. The underlying intention of the in-combination provision is to take account of cumulative effects.

The proposed development and the permitted are primarily located on brownfield land. Construction will incur loss of biodiversity but landscaping at perimeters and replacement planting in compliance with the overall biodiversity management plans will result in protecting ecological corridors and providing new habitat.

A review of planning permissions within 1km of the Proposed Development is presented in Appendix 2.1. The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement for regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard. Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by Limerick City and County Council which will determine the requirement for Ecological Impact Assessment and/or AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

While the future build-out of the wider masterplan lands is not part of the current planning application and would be subject to separate assessment and consent, the cumulative effects of the Proposed Development with the potential Phase 2 development have been considered at a masterplan level and are not predicted to give rise to significant cumulative effects on biodiversity or Natura 2000 sites, subject to the implementation of appropriate environmental controls and mitigation measures.

There are no predicted in-combination effects given that the Proposed Development would not have any adverse effects on the distant coastal European sites considered in the assessment, nor will it have any significant effects on Biodiversity.

With the employment of appropriate mitigation measures with regard to local biodiversity, the cumulative effect is considered to be ***neutral, imperceptible*** and ***long-term*** during construction and operation.

7.10 References

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Chapter 8 – Air Quality

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8. AIR QUALITY

8.1 Introduction

This chapter assesses the likely air quality impacts associated with the Proposed Parkway Valley Large Residential Development (LRD) located at Dublin Road (R445), Limerick, Co. Limerick. The assessment of impacts has been undertaken in the context of current relevant standards and guidance and identifies any requirements or possibilities for mitigation. A full description of the development is available in Chapter 2.

8.2 Methodology

8.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

- Guidance on the Assessment of Dust from Demolition and Construction v2.2 (Institute of Air Quality Management [IAQM] (hereafter referred to as the IAQM Guidelines) (IAQM, 2024);
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020); and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland [TII], 2025a).

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018); and
- Environmental Impact Assessment (EIA) Directive Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

8.2.2 Ambient Air Quality Standards

National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants to reduce the risk to health from poor air quality. These limit values or *"Air Quality Standards"* are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

8.2.2.1 Air Quality Directive

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This directive supersedes EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* (CAFE Directive). It sets out air quality standards for pollutants to be reached by 2026 and by 2030.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must similarly transpose this directive into national law within the statutory two-year period, i.e. update the Air Quality Standards Regulations, before December 2026.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, these are more closely aligned with the Interim Target 4 in the 2021 WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

In relation to the Proposed Development, the applicable limit values are for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Table 8.1 outlines the limit values pre-2030 and post-2030 for the specified pollutants. For the purposes of this assessment the post-2030 limit values set out in Table 1 of Annex I of Directive (EU) 2024/2881 have been applied. This is in line with the TII PE-ENV-01106 guidance (2025a) and ensure a conservative approach to the assessment.

Table 8.1: Ambient Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m^3
	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value
Particulate Matter (as $PM_{2.5}$)	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

a. Note µg/m^3 = micrograms per cubic metre.

8.2.2.2 WHO Air Quality Guidelines & Clean Air Strategy

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026 (Table 8.2), the IT4 targets by 2030 and the final targets by 2040 (Table 13.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *"Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II."*

These assessment thresholds relate to monitoring of ambient air quality by Member States, where *"exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years."*

Table 8.2: WHO Air Quality Guidelines

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m^3
	Annual limit for protection of human health	20 µg/m^3	-	10 µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

The applicable air quality limit values for the purposes of this assessment are those set out in Table 8.1.

8.2.2.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). The EU ambient air quality standards outlined in Table 8.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no criteria have been stipulated for nuisance dust for this specific type of Proposed Development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the Proposed Development, in terms of both sensitive human and ecological receptors.

8.2.2.4 Air Quality Significance Criteria

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025a) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025a) and reproduced in Table 8.3 below. These criteria have been adopted for the Proposed Development to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the Proposed Development.

Table 8.3: Air Quality and Traffic Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard Value (AQLV)			
	1%	2-5%	6-10%	>10%
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source: TII (2025a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

As per Table 8.3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the Opening Year, without the Proposed Development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the Opening Year, without the Proposed Development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (TII, 2025a) states that "*the evaluation of significance of effects for the operational phase should be undertaken for the Opening Year only as the Design Year is likely to show lower total pollutant concentrations and changes in concentration*" (TII, 2025a).

Non-significant effects (i.e. of local importance only) are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (TII, 2025) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

The impact descriptors in Table 8.3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA, 2022). Whilst it may be determined that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, an overall judgement should be made of whether the Proposed Development is 'significant' or 'not significant' in terms of air quality. Factors to consider when determining the overall significance of a Proposed Development are provided in Table 4.10 of the TII guidance (TII, 2025a).

8.2.3 Construction Phase

8.2.3.1 Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025a).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 8.4, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 8.4: IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
► Total building volume <12,000 m^3 ► Construction material with low potential for dust release (e.g. metal cladding or timber) ► Demolition activities <6 m above ground ► Demolition during wetter months	► Total building volume 12,000 - 75,000 m^3 ► Potentially dusty construction material ► Demolition activities 6 – 12 m above ground level	► Total building volume >75,000 m^3 ► Potentially dusty construction material (e.g. concrete) ► On-site crushing and screening ► Demolition activities >12 m above ground level
Earthworks		
► Total site area <18,000 m^2 ► Soil type with large grain size (e.g. sand) ► <5 heavy earth moving vehicles active at any one time ► Formation of bunds <3 m in height ► Earthworks during wetter months	► Total site area 18,000 m^2 - 110,000 m^2 ► Moderately dusty soil type (e.g. silt) ► 5 – 10 heavy earth moving vehicles active at any one time ► Formation of bunds 3 – 6 m in height	► Total site area >110,000 m^2 ► Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) ► >10 heavy earth moving vehicles active at any one time ► Formation of bunds >6 m in height
Construction		
► Total building volume <12,000 m^3 ► Construction material with low potential for dust release (e.g. metal cladding or timber)	► Total building volume 12,000 - 75,000 m^3 ► Potentially dusty construction material (e.g. concrete) ► On-site concrete batching	► Total building volume >75,000 m^3 ► On-site concrete batching ► Sandblasting
Trackout (Truck Movements)		
► <20 HDV (>3.5 t) outward movements in any one day ► Surface material with low potential for dust release ► Unpaved road length <50 m	► 20 – 50 HDV (>3.5 t) outward movements in any one day ► Moderately dusty surface material (e.g. high clay content) ► Unpaved road length 50 – 100 m	► >50 HDV (>3.5 t) outward movements in any one day ► Potentially dusty surface material (e.g. high clay content) ► Unpaved road length >100 m

The sensitivity of the area must then be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their

time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Table 8.5 outlines the criteria for determining the sensitivity of the area to dust soiling, dust-related human health effects and ecological impacts as per the IAQM guidance (IAQM, 2024).

Table 8.5: Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance From Source (m)**			
		<20	**<50**	**<100**	**<250**
High	>100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**			
			<20	**<50**	**<100**	**<250**
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Once the dust emission magnitude and sensitivity of the area have been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 8.6.

Table 8.6: IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

8.2.3.2 Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025a), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a Proposed Development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

Punch Consulting Engineers have prepared a Traffic and Transport Impact Assessment for the Proposed Development enclosed separately and have prepared Chapter 13 Material Assets (Traffic and Transportation) of this EIAR. As per Chapter 13, it has been determined by Punch Consulting Engineers that the construction stage traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria, and a detailed air quality assessment of construction stage traffic emissions is not required as there is no potential for significant impacts to air quality with respect with human or ecological receptors. The impact of construction traffic has been qualitatively assessed.

8.2.4 Operational Phase

The traffic does not meet the scoping criteria (Section 8.2.3.2), and a detailed air quality assessment of operational stage traffic emissions is not required as there is no potential for significant impacts to air quality with respect to human or ecological receptors.

8.2.5 Forecasting Methods and Difficulties Encountered

There were no forecasting difficulties encountered.

8.3 Receiving Environment

8.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality are the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources

of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest weather station collating detailed weather records is Shannon Airport meteorological station, which is located approximately 22 km west of the site. Shannon Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (Figure 8.1). For data collated during five representative years (2021 - 2025) (Met Éireann, 2026), the predominant wind direction is westerly to south-westerly; the mean wind speed over the long term 30-year averaging period 1991 - 2020 is 4.6 m/s (Met Éireann, 2025).

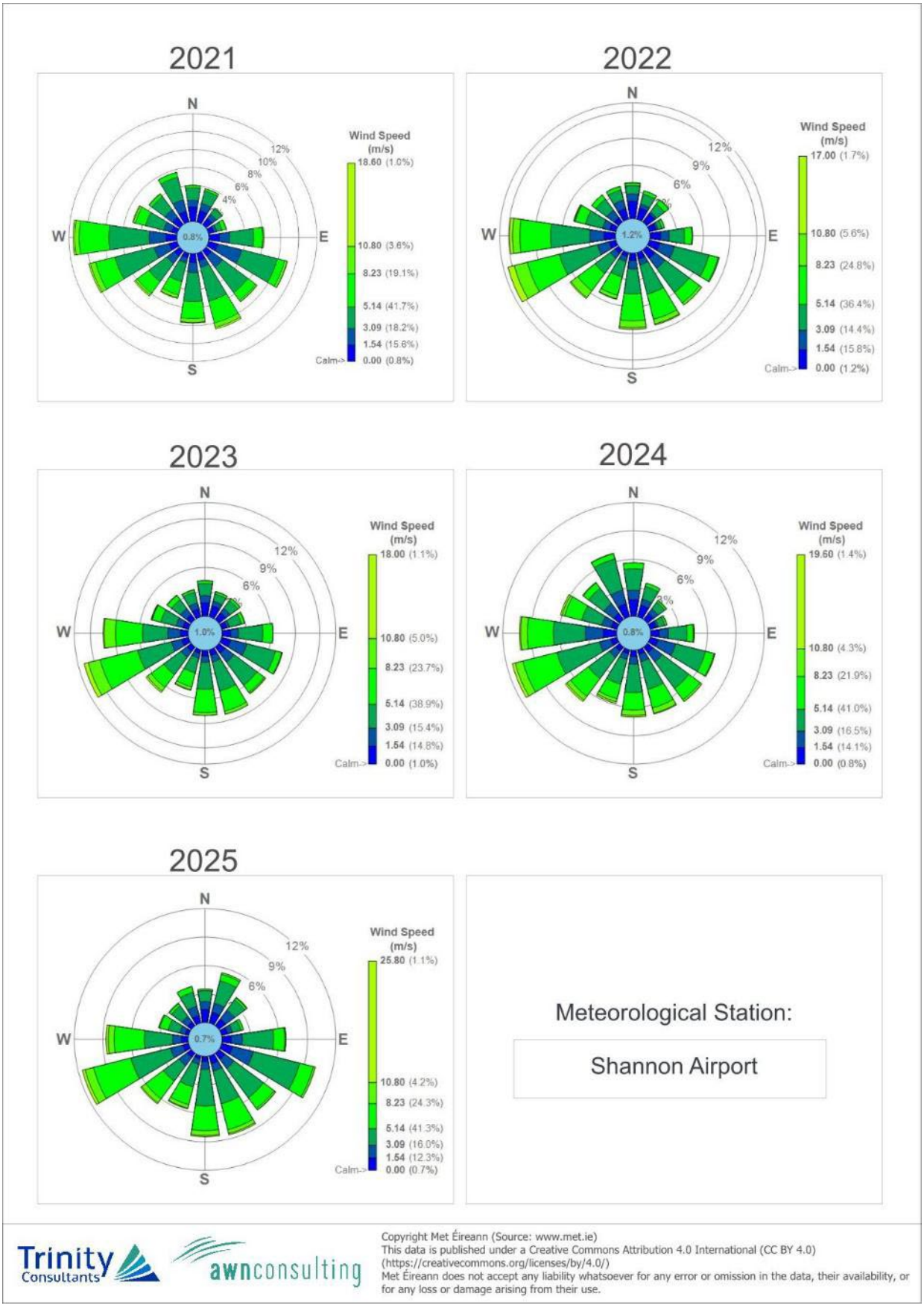

Figure 8.1: Wind Roses for Shannon Airport Meteorological Station

8.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is *"Air Quality In Ireland 2024"* (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2025).

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the Proposed Development site is within Zone C (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the Proposed Development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

8.3.2.1 NO_2

Long-term NO_2 monitoring was carried out at the Zone C suburban background locations of Dundalk, Kilkenny Seville Lodge and Portlaoise for the period 2020 – 2024 (EPA, 2025). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3 and the post-2030 limit value of 20 µg/m^3. Average results range from 4 – 11 µg/m^3 for the relevant background locations (Table 8.7). The 5-year average NO_2 concentration for all representative sites suggests an average concentration of 8 µg/m^3 as a background concentration. Additionally, there was at most 1 exceedance (Dundalk) of the hourly limit value of 200 µg/^{m3} (in 2020, 2022 and 2023). Based on the above information, a conservative estimate of the current background NO_2 concentration for the region of the Proposed Development is 8 µg/m^3.

Table 8.7 Background Air Quality - Nitrogen Dioxide (NO_2)

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Dundalk	Annual Mean NO_2 (µg/m^3)	10	11	10	9	10
	1-hr Mean NO_2 Values >200 µg/m^3	1	0	1	1	0
Kilkenny Seville Lodge	Annual Mean NO_2 (µg/m^3)	4	4	5	4	5
	1-hr Mean NO_2 Values >200 µg/m^3	0	0	0	0	0
Portlaoise	Annual Mean NO_2 (µg/m^3)	8	8	9	8	8
	1-hr Mean NO_2 Values >200 µg/m^3	0	0	0	0	0

8.3.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at the representative Zone C suburban locations from 2020 - 2024: Athlone, Carlow Town, Dundalk, Galway Rahoon, Kilkenny Seville Lodge, Portlaoise, Tralee and Wexford Town (Table 8.8).

Long-term PM_{10} concentrations are in compliance with the current annual average limit value of 40 µg/m^3 and the post-2030 limit value of 20 µg/m^3.

Levels range from 10 - 18 µg/m^3 over the five-year period with at most 14 exceedances (in Tralee, 2022) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year) (EPA, 2025). The 5-year average PM_{10} concentration at the sites suggests an average concentration of no more than 13 µg/m^3 (Table 8.8). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the Proposed Development is 13 µg/m^3.

Table 8.8 Background Air Quality - PM_{10}

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Athlone	Annual Mean PM_{10} (µg/m^3)	16	12	12	12	12
	24-hr Mean > 50 µg/m^3 (days)	3	2	3	1	-
Carlow Town	Annual Mean PM_{10} (µg/m^3)	11	10	11	10	11
	24-hr Mean > 50 µg/m^3 (days)	1	0	0	0	-
Dundalk	Annual Mean PM_{10} (µg/m^3)	13	12	12	13	12
	24-hr Mean > 50 µg/m^3 (days)	2	0	2	1	-
Galway Rahoon	Annual Mean PM_{10} (µg/m^3)	13	11	13	13	12
	24-hr Mean > 50 µg/m^3 (days)	1	1	0	0	-
Kilkenny Seville Lodge	Annual Mean PM_{10} (µg/m^3)	18	17	18	14	12
	24-hr Mean > 50 µg/m^3 (days)	1	2	2	0	-
Portlaoise	Annual Mean PM_{10} (µg/m^3)	12	11	12	11	12
	24-hr Mean > 50 µg/m^3 (days)	0	1	0	0	-
Tralee	Annual Mean PM_{10} (µg/m^3)	16	17	18	15	15
	24-hr Mean > 50 µg/m^3 (days)	7	11	14	2	-
Wexford Town	Annual Mean PM_{10} (µg/m^3)	12	14	15	13	13
	24-hr Mean > 50 µg/m^3 (days)	0	2	5	1	-

8.3.2.3 $PM_{2.5}$

Continuous $PM_{2.5}$ monitoring was carried out at the representative Zone C suburban background locations from 2020 - 2024: Athlone, Bray and Carlow Town (Table 8.9) Levels range from 5 - 13 µg/m^3 over the five-year period (EPA, 2025) which is in compliance with the current annual mean limit value of 25 µg/m^3 and the post-2030 limit value of 10 µg/m^3. Based on the EPA data, a conservative estimate of the current background $PM_{2.5}$ concentration in the region of the Proposed Development is 8 µg/m^3.

Table 8.9: Background Air Quality - $PM_{2.5}$

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Athlone	Annual Mean $PM_{2.5}$ (µg/m^3)	12	9	9	8	9
Bray	Annual Mean $PM_{2.5}$ (µg/m^3)	5	6	6	6	6
Carlow Town	Annual Mean $PM_{2.5}$ (µg/m^3)	7	7	7	6	7

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Portlaoise	Annual Mean $PM_{2.5}$ (µg/m^3)	8	8	8	7	8
Tralee	Annual Mean $PM_{2.5}$ (µg/m^3)	12	13	13	10	11

Based on the above information the air quality in the area is generally good, with concentrations of the key pollutants generally well below the relevant limit values.

8.3.2.4 Summary

Based on the above information the air quality in the Zone C area, including the Proposed Development is generally good, with concentrations of the key pollutants generally well below the relevant limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881. The current pollutant concentrations at the majority of monitoring sites are also in compliance with the 2030 limit values set out in Table 1 of Annex I in Directive (EU) 2024/2881 and the clean air strategy, however, concentrations are approaching the limit values at some sites. Further measures will be needed at a national scale to reduce air pollution in future years. The EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2025).

8.3.3 Sensitivity of the Receiving Environment to Dust

The impact to air quality from construction phase activities is assessed at sensitive receptors within 250 m of the development boundary.

In terms of receptor sensitivity to dust soiling, there are between 10 and 100 sensitive receptors within 20 m of the proposed works area and a further >100 sensitive receptors within 250 m of the Proposed Development (Figure 8.2).

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust from construction sites deposited on vegetation may create ecological stress within the local plant community. The guidance states that dust impacts to vegetation can occur up to 50 m from the site and 50 m from site access roads, up to 250 m for the site entrance. There are no internationally designated sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), (hereafter referred to as 'European sites') or nationally designated sites (Natural Heritage Areas (NHAs) located within this distance. Therefore, ecological impacts will not be considered further in the dust assessment.

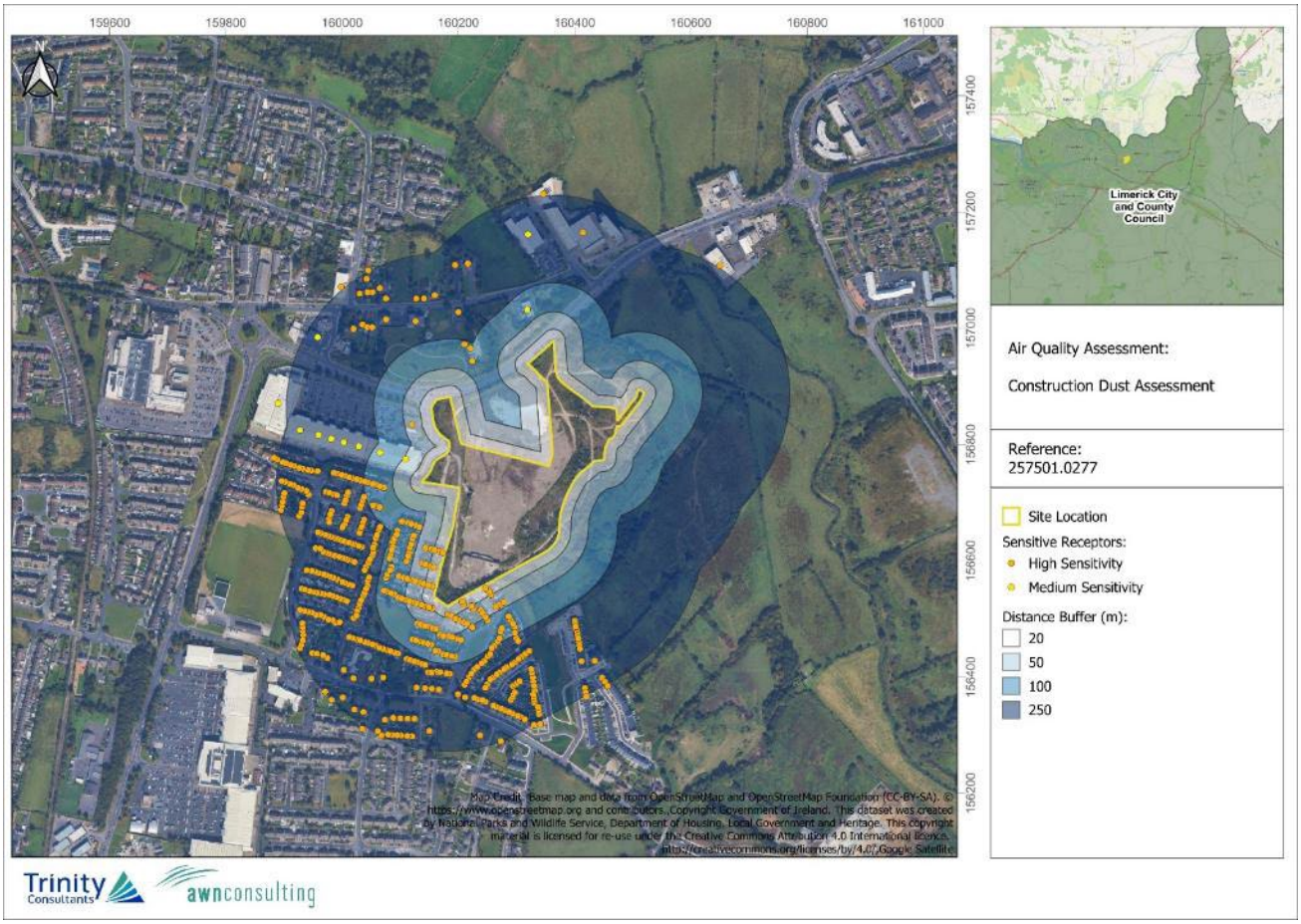

Figure 8.2: Construction Dust Sensitive Receptors within 250 m of Site

8.4 Characteristics of the Proposed Development

The development consists of a mix of residential, community, and healthcare uses supported by new site infrastructure. The scheme includes a medical centre of approximately 3082 m^2 located at the western extent of the site, along with a 306 m^2 crèche at lower ground floor level within Block B. The residential component will provide a total of 403 units across 5 no. blocks, comprising 246 one-bedroom units, 29 two-bedroom (3-person) units, and 128 two-bedroom (4-person) units. To support the development, a new entrance from the R445 is proposed, together with nature-based surface water drainage solutions within the neighbouring Groody Valley green wedge.

Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

8.4.1 Construction Phase

During the construction phase construction dust emission have the potential to impact air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

8.4.2 Operational Phase

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$). However, the Proposed Development will not increase traffic by 1,000 AADT or 200 HDV AADT. Operational phase impacts will be long-term in duration.

8.5 Potential Impacts of the Proposed Development

8.5.1 Construction Phase

8.5.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Shannon Airport meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 8.3.1). Dust impacts are likely to occur during drier periods, as rainfall acts as a natural dust suppressant (IAQM, 2024). Days with less than 0.2mm of rainfall can be classified as days with little or no rainfall. A review of historical 30-year average data for Shannon Airport indicates that on average 223 days per year have rainfall over 0.2 mm (Met Éireann, 2026a). Therefore, it can be determined that over 61% of the time dust generation will be reduced due to natural meteorological conditions.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the sensitivity of the area (Section 8.3.3). The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (construction vehicles on public roads).

8.5.1.2 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity (Table 8.10) has been determined below for the Proposed Development using the criteria in Table 8.4.

Table 8.10: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Total building volume to be demolished will be less than 12,000 m^3
Earthworks	Medium	Total site area is between 18,000 m^2 and 110,000 m^2
Construction	Large	Total building volume will be greater than 75,000 m^3
Trackout	Medium	Between 20 and 50 outward HDV movements per day

8.5.1.3 Determining the Sensitivity of the Area

As determined in Section 8.3.3, there are between 10 and 100 high sensitivity receptors within 20 m of the proposed works area and >100 high sensitivity receptors within 250 m. There are no European sites

or nationally designated sites within 50 m of the Site boundary. Based on the IAQM criteria outlined in Table 8.5, the sensitivity of the area to dust soiling is considered high.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the Proposed Development is 13 µg/m^3 and there are between 10 and 100 sensitive receptors within 20 m of the site boundary. Based on the IAQM criteria outlined in Table 8.5, the worst-case sensitivity of the area to human health is considered low.

The sensitivity of the area to dust soiling and human health impacts from dust are shown in Table 8.11.

Table 8.11: Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

8.5.1.4 Determining the Risk of Dust Impacts

As detailed in Table 8.6, The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation.

Table 8.12 below provides a summary of the risk of dust impacts for the Proposed Development.

There is at most a high risk of dust soiling impacts based on the high sensitivity of the surrounding area to dust soiling and, at most, large dust emissions magnitude. There is a low risk of dust-related human health impacts associated with the proposed works based on the low sensitivity of the area to human health impacts and the large dust emission magnitude. Without mitigation in place, construction dust will have a ***direct, negative, short-term*** and ***slight*** impact on air quality, which has the potential to be ***significant***. As a result, best practice dust mitigation measures associated with high-risk works will be implemented to ensure there are no significant impacts at nearby sensitive receptors (see Section 8.3.3).

Table 8.12: Risk of Dust Impacts used to Define Site-Specific Mitigation

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	High Risk	Medium Risk
Human Health	Negligible Risk	Low Risk	Low Risk	Low Risk

8.5.1.5 Construction Phase Traffic

There is also the potential for traffic emissions to impact air quality in the short term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed, and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the TII assessment criteria in Section 8.2.3.2.

Following the completion of the initial site clearance works, the generation of HGV movements during the build period will be evenly spread throughout the day and, as such, will not impact significantly during the peak traffic periods.

It can therefore be determined that the construction stage traffic will have a ***negative, short-term, localised*** and ***not significant*** impact on air quality.

8.5.2 Operational Phase

There is the potential for vehicles accessing the site to result in emissions of NO_2, PM_{10} and $PM_{2.5}$. However, the Proposed Development will not increase traffic by 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the Proposed Development satisfy the screening criteria (Section 13.4.3.2). A detailed air quality assessment was scoped out for the operational stage of the development as per the TII screening criteria. The potential operational stage effects on air quality will be ***neutral***, ***long-term*** and ***imperceptible***.

8.6 Mitigation Measures

8.6.1 Construction Phase

Based on the assessment results in Section 8.5.1, mitigation associated with a high-risk of construction dust impacts is required. Mitigation measures for high-risk sites as recommended by IAQM construction dust guidance are detailed in Table 8.13.

Table 8.13: Construction Phase Dust Mitigation Measures

Category	Mitigation Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information.
Site Management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. • Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Category	Mitigation Measure
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary – no idling vehicles. • Impose and signpost a maximum-speed-limit of 25 kmph on surfaced and 15 kmph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate) • Produce and implement a Construction Transport Management Plan (CTMP) to manage the sustainable delivery of goods and materials. • The CTMP should also support and encourage sustainable travel (public transport, cycling, walking, and car-sharing)
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	• Bonfires and burning of waste materials are legally prohibited.
Measures Specific to Demolition	• Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.

Category	Mitigation Measure
Measures Specific to Construction	• Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. • For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • Access gates to be located at least 10 m from receptors where possible.

8.6.2 Operational Phase

The impact of the operational traffic associated with Proposed Development on air quality is predicted to be *imperceptible* with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

8.7 Monitoring or Reinstatement Measures

8.7.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the Proposed Development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

8.7.2 Operational Phase

There is no monitoring recommended for the operational phase of the Proposed Development as impacts to air quality are predicted to be ***imperceptible***.

8.8 Residual Effects of the Proposed Development

8.8.1 Construction Phase

8.8.1.1 Air Quality

Once the dust mitigation measures outlined in Section 8.6.1 are implemented, the residual effect of the Proposed Development in terms of dust soiling will be ***short-term, negative, localised*** and ***not significant*** at nearby receptors.

8.8.1.2 Human Health

Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of construction of the Proposed Development will be ***short-term, negative, localised*** and ***not significant*** with respect to human health.

8.8.2 Operational Phase

As no mitigation is proposed, the operational phase residual effect on air quality and human health as a result of increased traffic is ***long-term, neutral*** and ***imperceptible***.

8.9 Cumulative Effects of the Proposed Development

8.9.1 Construction Phase

According to the IAQM guidance (2024) should the construction phase of the Proposed Development coincide with the construction phase of any other developments within 500 m then there is the potential for cumulative construction dust related effects at nearby sensitive receptors. Table 8.14 lists the developments identified as sufficient in scale to potentially generative cumulative effects with the Proposed Development.

Table 8.14: Summary of Committed Developments with Potential for Cumulative Construction Dust Effects

Planning Reference No.	Description
2560113 (Limerick County Council)	A Large-Scale Residential Development (LRD) - development of a Purpose-Built Student Accommodation (PBSA) scheme on land fronting the Groody Road and Dublin Road, Castletroy, in the townland of Newcastle, Limerick for a period of seven years.
221216 (Limerick County Council)	Large-Scale Residential Development (LRD) on lands (0.53 Ha) at Old Dublin Road, Rhebogue, Limerick City. The development comprises of the construction of a Purpose-Built Student Accommodation (PBSA) scheme consisting of 26 no. apartments with a total of 202 no. student bedspaces distributed across 3 No. multi storey blocks.

The dust mitigation measures outlined in Section 8.6.1 will be applied during the construction phase which will avoid significant cumulative effects on air quality. Similar dust mitigation measures are required for other permitted developments as per their respective impact assessments and planning conditions.

With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the Proposed Development and the aforementioned developments are deemed ***short-term, negative, localised*** and ***not significant***.

8.9.1.1 Operational Phase

The cumulative effect is included within the operational stage traffic assessment for the Proposed Development. The effect is predicted to be ***long-term, direct, neutral*** and ***imperceptible*** with regards to air quality.

8.10 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the Proposed Development with regards to air quality. These impacts have been considered for both the construction and operational phases of the Proposed Development. The cumulative impact of the Proposed Development and surrounding developments have also been considered.

Provided all mitigation measures are followed as set out in this chapter, the overall predicted air quality effect of the Proposed Development is ***not significant***.

8.11 References

- Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Protection Agency (2025) Air Quality in Ireland 2024 (& previous annual reports 2020-2023)
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Government of Ireland (2023) Clean Air Strategy for Ireland
- Institute of Air Quality Management (IAQM) (2020) A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1)
- Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)
- Met Éireann (2025) Ireland's 30-year Climate Averages
- Met Éireann (2026) Met Éireann website: https://www.met.ie/
- Transport Infrastructure Ireland (2025a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
- Transport Infrastructure Ireland (2025b) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107
- World Health Organisation (2021) Air Quality Guidelines (and previous Air Quality Guideline Reports 1999 & 2000 & 2006)

Chapter 9 – Climate

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9. CLIMATE

9.1 Introduction

This chapter assesses the likely climate impacts associated with the Proposed Development. A full description of the development is available in Chapter 2 (Description of the Proposed Development).

The climate assessment is divided into two distinct sections:

- The Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the greenhouse gas (GHG) emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- The Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a project's vulnerability to climate change and identifies adaptation measures to increase project resilience.

9.2 Assessment Methodology

9.2.1 Legislation, Policy and Guidance

In common with all environmental legislation, in Ireland climate legislation is driven primarily by international agreements or European Directives that are then transcribed into domestic law by the Government of Ireland. This is then interpreted through European and domestic policy instruments that clarify aspects, objectives, targets and requirements described in the legislation.

9.2.1.1 Legislation

The **United Nations Paris Agreement** (United Nations, 2015) treaty binds signatory nations to a commitment to hold global average temperature increase well below 2°C above pre-industrial levels with efforts to limit the increase to 1.5°C below pre-industrial levels. Signatories commit to Nationally Determined Contributions (NDCS) which are self- defined climate pledges made by countries in response to climate change, which also includes the direction of finance. Adaptation to the adverse impacts of climate change and lowering greenhouse gas emissions should be undertaken in an equitable manner so as not to disadvantage populations on lower incomes or those most at risk from climate change.

Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (European Parliament and Council, 2021) follows from the Paris Agreement and writes into EU law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas (GHG) emissions by at least 55% by 2030, compared to 1990 levels. These targets are also applied to member states.

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (European Parliament and Council, 2014) acknowledges that climate change will play a crucial role in the sustainable development of society. Directive 2014/52/EU requires assessment of the impact of specific types of new development on the climate. There is a requirement for the quantification of greenhouse gases from a development, and an assessment of the risk posed to specific types of new development by the adverse effects of climate change.
The **Climate Action and Low Carbon Development Act 2015** (Government of Ireland, 2015) enables Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally*

sustainable economy by the end of the year 2050. This is referred to in the 2015 Act (as amended) as the '*national transition objective*'. The 2015 Act (as amended) made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

Section 15 of the 2015 Act, sets out the duties imposed by certain bodies, including local authorities and *An Coimisiún Pleanála*. This section was amended by the 2021 Act and states:
"(1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with—
(a) the most recent approved climate action plan,
(b) the most recent approved national long term climate action strategy,
(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and
(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

The **Climate Action and Low Carbon Development (Amendment) Act 2021** (Government of Ireland, 2021) provides the framework for Ireland to achieve a climate resilient and climate neutral economy by the end of the year 2050. The Act allows for the setting of carbon budgets and sectoral emissions ceilings to apply to sectors of the economy whilst promoting climate justice and just transition to the climate resilient and climate neutral economy. Carbon budgets are determined based on the requirements for reductions in GHG described in *EU Regulation 2018/842* and *EU Regulation 2018/842*. The Climate Action and Low Carbon Development (Amendment) Act 2021 should be read together with the Climate Action and Low Carbon Development Act 2015, and together are referred to in this report as the "Climate Act".

9.2.1.2 Policy

The **European Green Deal** published by the European Commission in December 2019, provides an action plan which aims for the EU to achieve climate neutrality by 2050. The EU Green Deal highlights a reduction in emissions of 55% in comparison to 1990 levels by 2030 and 90% by 2040. The deal outlines plans for a just and fair transition to a climate neutral society through funding and social investment, carbon pricing, the Emissions Trading Scheme, green industry, the circular economy and stakeholder engagement in the processes at every level.

The **2021 EU Strategy on Adaptation to Climate Change** (European Commission, 2021a) sets out the pathway to prepare for the unavoidable impacts of climate change. The aim is that "by 2050, when we aim to have reached climate neutrality, we will have reinforced adaptive capacity and minimised vulnerability to climate impacts…"

The latest iteration of the Government of Ireland's *Climate Action Plan* (CAP25) (Government of Ireland, 2025a) was published in 2025 updating many of the suggested measures and actions required to achieve carbon budgets and sectoral emissions ceilings from CAP24, (Government of Ireland, 2024a). Both CAP24 and CAP25 should be read together. The plans taken together provide the roadmap for halving Ireland's emissions by 2030 and achieving carbon neutrality by 2050. The CAP25 advances sector-specific measures including decarbonising the residential building sector. This includes the complete phase-out of fossil fuel heating for both new builds and retrofits. CAP25 details the 5-year carbon budget periods, shown in Table 10.1, and the Sectoral Emissions Ceilings, shown in Table 10.2, as required by the Climate Act.

Table 9-1: Carbon Budgets for the CAP25 5-Year Periods

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 9-2 CAP25 Sectoral Emission Ceilings for 2030

Sector	Baseline (Mt CO_2e)	Carbon Budgets (Mt CO_2e)		2030 Emissions (Mt CO_2e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, a new approach aligned with the EU LULUCF Regulation has been adopted.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

The **Long-Term Strategy on Greenhouse Gas Emissions Reductions** (Government of Ireland, 2023) provides the indicative pathways beyond 2030 on how Ireland will transition towards carbon neutrality by 2050. The strategy is intended to bridge the gap between the short-term objectives of the Climate Action Plans and the longer-term objectives of EU Climate Law and Ireland's National Climate Objective.

The **National Planning Framework (First Revision)** (Government of Ireland, 2025b) specifies policies relevant for the Proposed Development:

- National Policy Objective 66: The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the

medium and longer-term requirements of all relevant environmental and climate legislation and the sustainable management of our natural capital.
- National Policy Objective 69: Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions as expressed in the most recently adopted carbon budgets
- National Policy Objective 82: Integrated planning for Green and Blue Infrastructure will be incorporated into the preparation of statutory land use plans while maintaining ecosystem services and ecosystem functions and conserving and/or restoring biodiversity.
- National Policy Objective 93: Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, heating systems with zero local emissions, green and blue infrastructure planning and innovative design solutions

9.2.1.3 Climate Change Vulnerability Policy

The **Second National Adaptation Framework** (NAF) (Government of Ireland, 2024b) outlines a comprehensive, whole-of-government and whole-of-society approach to climate adaptation. Its core objective is to enhance Ireland's resilience to a wide range of climate risks, including extreme weather events, flooding, drought, biodiversity loss, sea level rise, and rising temperatures. The NAF sets out the roles of the Taoiseach, Government and non-governmental organisations, incorporates an evidence base for climate change and incorporates sectoral and local requirements and indicators for adaptation planning. In relation to the built environment, the NAF states in Chapter 3, "deepening of adaptation considerations in the planning and building standards processes is considered the most appropriate way of increasing the resilience of the built environment". Within the NAF it mentions that there is a risk of damage to buildings and structures from severe weather events such as high winds and intense rainfall. New development should accommodate predicted future climate change impacts without requiring major redesign or redevelopment in the future, which may be costly and inefficient. This will require facilitating innovative building design, new materials and standards (to accommodate hotter summers while withstanding changes in precipitation patterns and more intense storms for example).

The **National Climate Change Risk Assessment** (NCCRA) (Environmental Protection Agency, 2025) was required as part of the 2021 CAP. The NCCRA approached the risk assessment though:

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected
- **Sensitivity** - refers to the degree to which a system or asset is affected by climate hazards. It reflects how vulnerable something is to changes such as temperature extremes, flooding, or drought, based on its physical, functional, or ecological characteristics
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems

Compilation of the NCCRA was undertaken using scenarios from the fifth Intergovernmental Panel on Climate Change Assessment Report (AR5). The NCCRA used a high concentration scenario resulting a predicted average global temperature increase of 4.3°C by 2100 (RCP8.5) generally accepted as an extreme worst-case scenario, and a moderate scenario (RCP4.5) where emissions are predicted to peak

by 2040 and then decline resulting in an average global temperature increase of between 2.5°C and 3°C. Both scenarios are considered conservative for Ireland as they assume that emissions targets are not met.

9.2.2 Local policy

The Limerick City and County Council Climate Action Plan 2024–2029 (LCCC, 2024) outlines the council's strategic approach to climate mitigation and adaptation, aiming to reduce greenhouse gas (GHG) emissions by 51% by 2030 (from a 2018 baseline) and to achieve climate neutrality by 2050. The plan is structured around a place-based approach, aligning with national and EU climate objectives, and is designed to support a just transition for communities across Limerick.

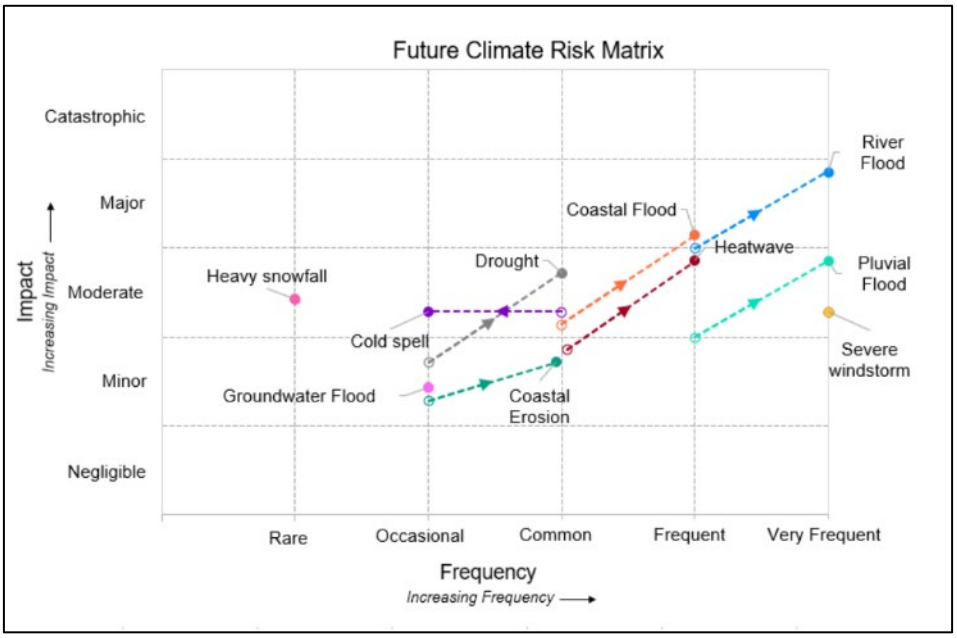
The plan is built on five key thematic areas:

- Buildings and Energy
- Transport
- Environment and Nature-Based Solutions
- Flood Resilience
- Circular Economy and Resource Management

Strategic vison of LCC– "A Green City Region on the Waterfront By 2030, Limerick will become a green City region on the Shannon Estuary connected through people and places. This will be achieved through engagement, innovation, resilient urban development and self-sustaining rural communities".

The plan also includes a Climate Change Risk Assessment, which identifies key hazards for Limerick, including increased frequency of heavy rainfall, flooding, heatwaves, and droughts. The risk matrix below shows the future change in risk with the hollow marker showing the current risk and the solid marker the future risk. The dotted line shows the change between the current and future risk.

Figure 9-1 Future Climate Risk Matrix reproduced from LCC Climate Action Plan 2024-2029



The risk of existing hazards such as river, pluvial, and coastal flooding and coastal erosion is projected to increase in the future because of projected increases in the frequency of heavy precipitation events and rising sea levels. Heatwaves and droughts, although already experienced in Limerick City and County, are expected to occur more frequently due to climate change. These hazards can therefore be considered as resulting in emerging risks for the region. Although the frequency and impact of severe windstorms is

thought to be unchanged in the future, these events will remain a risk for Limerick City and County. The level of impact associated with cold spells for Limerick City and County remains constant, however, due to the potential decrease in hazard frequency, the overall risk of these hazards is likely to reduce in the future, resulting in a lesser risk.

9.2.2.1 Guidance

The following guidance is considered relevant to this assessment:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (Environmental Protection Agency, 2022)
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (hereafter referred to as the EU Guidance) (European Commission, 2017)
- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (Transport Infrastructure Ireland, 2022);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (Transport Infrastructure Ireland, 2025)
- Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as Institute of Environmental Management & Assessment (IEMA)) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the ISEP 2026 GHG Guidance) (Institute of Sustainability & Environmental Professionals, 2026);
- ISEP Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the ISEP 2020 EIA Guide) (Institute of Sustainability & Environmental Practitioners, 2020a)
- ISEP GHG Management Hierarchy (hereafter referred to as the ISEP 2020 GHG Management Hierarchy) (Institute of Sustainability & Environmental Practitioners, 2020b)
- Carbon Management in Infrastructure and Built Environment - PAS 2080 (The British Standards Institution, 2023)
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021b)

9.2.3 Greenhouse Gas Assessment

9.2.3.1 Construction Phase

The assessment of GHG emissions resulting from the construction phase is quantified using the categories described in BS EN 15978. These are:

- **Product Stages (Category A1 to A3)**
  The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and associated carbon impacts that arise) from transforming the raw materials into construction products.

- **Construction (Category A4 to A5)**
  These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building. Construction activities such as excavation works and construction transport are also included.

- **Use Stage (Category B1 to B7)**
  This covers a wide range of sources from the GHG emissions associated with the operation of the building (B1), maintenance (B2), repair (B3), refurbishment (B4) and replacement (B5) of materials, and operational energy use (B6) and water use (B7).

End of Life Stages (Category C1 to C4)

- The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No "credit" is taken for any future carbon benefit associated with the reuse or recycling of a material into new products.

PE-ENV-01104 (Transport Infrastructure Ireland, 2022) recommends the calculation of the construction stage embodied carbon using the TII Online Carbon Tool or an appropriate alternative tool. Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The purpose of the embodied carbon assessment is to engage the design team in the consideration of embodied carbon at an early stage in the development and mitigate embodied carbon. This engagement aims to ensure carbon savings are made and to assist in aligning the project to Ireland's CAP25 goal of achieving carbon neutrality by 2050.

The TII Online Carbon Tool has been commissioned by TII to assess GHG emissions associated with road or rail projects in Ireland. The TII Carbon Tool uses emission factors from recognised sources including, but not limited to:

- Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database
- Circular Ecology ICE v4.0 ICE DB Advanced V4.0

The tool can be applied to a variety of developments, not just road or rail and aligns with PAS 2080. The TII Carbon Tool was utilised to estimate the GHG emissions associated with the non-building elements of the Proposed Development including construction activities, land clearance activities and construction wastes.

For the building elements of the Proposed Development, the OneClick LCA 3D Designer tool was utilised. OneClick LCA is certified to EN 15978, ISO 21931 – 1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It allows users to assess the carbon impact of buildings at various stages of design. The tool includes a detailed product and material list based on Irish materials as well as materials from the UK and Europe. The OneClick LCA 3D Designer option allows for a high-level assessment of the embodied carbon impact of a development at early design stages when specific detailed design information is not known and is suitable for EIAR stage assessments.

Inputs into the tool include gross floor areas for the building types (houses/duplexes/apartments), building frame type, number of above ground floors and building size and shape. The tool then makes necessary default assumptions based on these parameters and a typical build-up with the option to refine the default assumptions where project specific information is available. The tool allows for optioneering and optimization of the carbon impact, it highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials.

Reasonable conservative estimates have been used in this assessment where necessary to provide an estimate of the GHGs associated with the Proposed Development.

The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget. The emissions are broken down into different assessment categories, and these must be compared separately to the relevant sectoral emissions budgets, which are detailed in Table 9-2. The relevant sectoral emissions for the Proposed Development comparison include the Industry sector, Transport sector, Electricity sector and Waste sector. The predicted emissions for the Proposed Development are annualised over the assumed 60-year lifespan and then compared to the relevant sector 2030 carbon budgets. Annualising the full carbon emissions over the lifetime of the development allows for appropriate comparison with annual GHG targets.

9.2.3.2 Operational Phase

9.2.3.2.1 Operational Phase Energy Use

The EU *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) also states that indirect GHG emissions as a result of a development must be considered, which include emissions associated with energy usage. A Climate Action Statement was prepared by Moloney Fox Consulting Engineers in relation to the Proposed Development and is submitted separately as part of the planning application. The report outlines measures which have been incorporated into the overall design of the development directly in relation to operational phase energy use. These measures will have the benefit of reducing GHG emissions associated with operational energy use during operation and are listed in the mitigation section of this Chapter (Section 9.6).

9.2.3.2.2 Traffic Emissions

Operational phase traffic also has the potential to impact climate. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025a), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a Proposed Development and should be included in the local air quality assessment. The same criteria is applied for climate assessments in lieu of alternative guidance. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

Punch Consulting Engineers have prepared a Traffic and Transport Impact Assessment for the Proposed Development enclosed separately and have prepared Chapter 13 Material Assets (Traffic and Transportation) of this EIAR. As per Chapter 13, it has been determined by Punch Consulting Engineers that the operational stage traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria, and a detailed assessment of operational stage traffic GHG emissions is not required as there is no potential for significant impacts to climate. GHG emissions arising from operational traffic are therefore scoped out of this assessment.

9.2.3.3 Significance Criteria

The significance of the impacts of GHG emissions on the climate is an area of scientific consensus that is described clearly in the IPCC AR6 reports (IPCC, 2023), and as such all GHG emissions are considered to contribute adversely towards climate change.

In accordance with ISEP and TII guidance, the significance of the impacts of GHG emission resulting from a given project is based on how it contributes to the overall GHG emissions within the sectoral and national carbon budgets and whether that project contributes or not to the CAP25 objective for Ireland to achieve carbon neutrality by 2050, that is, that a project contributes to reducing GHG emissions. This process requires an assessment of the quantified GHG emissions against the sensitivity of receptors (Ireland's national GHG targets or National Climate Objective), qualification of the potential measures that will mitigate against GHG emissions, and a degree of professional judgement that takes account of the balance of all of these factors. Both the ISEP and TII guidance documents are explicit in this concept.

ISEP guidance (2026) highlights the importance of mitigation in determination of significance committing the project to go further than minimum regulatory compliance. It determines embodied carbon must be addressed and generalised measures found in a CEMP cannot be relied upon to materially reduce significance. Where no sufficient and meaningful mitigation is proposed which supports an applicable 1.5°C or net zero compatible trajectory, beyond minimum compliance with current regulations (such as [sic] Department of Housing, Local Government and Heritage Technical Guidance Document L), this would typically indicate a significant adverse effect.

In order to streamline the process and provide accountability, the criteria outlined in PE-ENV-01104 (Transport Infrastructure Ireland, 2022) (which are based on the 2022 ISEP guidance and are consistent with the terminology contained within Figure 3.4 of the EPA's (2022) '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*'), are used together with the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050
  The level of mitigation taking place.

Table 9-3: TII Significance Criteria for Greenhouse Gas Assessment

Effects	Significance Level	Description
Significant adverse	Major adverse	► The project's GHG impacts are not mitigated; ► The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and ► No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	► The project's GHG impacts are partially mitigated; ► The project has partially complied with do-minimum standards set through regulation, and has not fully complied with local or national policies; and ► Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	► The project's GHG impacts are mitigated through "good practice" measures. ► The project has complied with existing and emerging policy requirements; and ► Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	► The project's GHG impacts are mitigated beyond design standards. ► The project has gone well beyond existing and emerging policy requirements; and ► Well "ahead of the curve" for Ireland's trajectory towards net zero.
Beneficial	Beneficial	► The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. ► The project has gone well beyond existing and emerging policy requirements; and

		► Well "ahead of the curve" for Ireland's trajectory towards net zero, provides a positive climate impact.

9.2.4 Climate Change Risk Assessment

The Climate Change Risk Assessment (CCRA) involves determining the vulnerability of the Proposed Development to climate change. This requires an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

- **Step 1:** First an initial, high level climate screening of physical hazards is carried out based on location and type of development. This is a qualitative screening intending to only proceed with relevant hazards.
- **Step 2:** The Proposed Development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022) provides the list of asset categories and climate hazards to be considered, as per the below. The asset categories will vary for development type and need to be determined on a development-by-development basis.

  - **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs; light posts; buildings; and fences.
  - **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

  Following this, all asset categories are assessed on their sensitivity to climate change. The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

  - **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
  - **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
  - **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

- **Step 3:** Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type. For example, flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

  - **High Exposure** It is almost certain or likely this climate hazard will occur at the project location, i.e. might arise once to several times per year. This is an exposure score of 3.
  - **Medium Exposure** It is possible this climate hazard will occur at the project location, i.e. might arise a number of times in a decade. This is an exposure score of 2.
  - **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location, i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

- **Step 4:** Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability:

Vulnerability = Sensitivity x Exposure

9.2.4.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the Proposed Development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the Proposed Development to various climate hazards.

The vulnerability assessment at this stage excludes mitigation. Table 9-4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

The PE-ENV-01104 guidance note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the Proposed Development can be considered to be not significant.

However, following the embedding of mitigation measures, where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. According to PE-ENV-01104, an assessment of construction phase CCRA impacts is only required if a detailed CCRA is required. Where a CCRA for the construction phase is not required, best practice mitigation against climate hazards should still be recommended.

Table 9-4: Vulnerability Matrix

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**High (3)**	9 - High	6 - High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 - Low	1 - Low

9.3 Receiving Environment

9.3.1 Current GHG Baseline

Data published in March 2026 (EPA, 2026), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 3.93 $MtCO_2e$. However, the reported emissions for 2024 represent the second consecutive year in which Ireland's emission were below 1990 levels by 4.2%. Emissions Trading Scheme emissions have decreased by 49.7% or 11.1 $MtCO_2e$ compared to 2005 and Effort Sharing Regulation emissions decreased by 10.2% or 5 $MtCO_2e$. Ireland is now a net 2,020 $ktCO_2e$ distant from its target under the Effort Sharing Regulation.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 1.9% on 2023 levels to 53.93 $MtCO_2e$, with an 8.8% reduction in electricity industries alone. This was driven by an increase in generation from renewables in 2024 by 1.6% and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.4% to 6.2 $MtCO_2e$ in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 36.2% of the total, followed by transport at 20.9%. For 2024, total national emissions (including LULUCF) were 58.74 $MtCO_2e$ (Table 12.6).

The current estimates of National greenhouse gas emissions (including LULUCF) in 2024 are 12.6% below 2018, well off the target for the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021 to 2024 Ireland has used 85.2% of the 295 $MtCO_2e$ Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 14.8% annual emissions reduction across all sectors for 2025 to stay within the budget.

Figures for 2025 emissions are due to be provisionally published by the EPA in July 2026. The final 2025 emissions outturn will determine whether the first carbon budget (2021 to 2025) has been exceeded and, consequently, may necessitate adjustments to the subsequent carbon budget period for 2026 to 2030 in accordance with national carbon budgeting arrangements under the Climate Action and Low Carbon Development (Amendment) Act 2021.

Table 9-5: Trends in Total National GHG Emissions 2021 – 2024

Sector *Note 1*	Annual Total Emissions for Carbon Budget 1 (Mt CO_2e)				Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual % Change 2023-2024
	2021	2022	2023	2024			
Electricity	9.88	9.68	7.56	6.95	40	85.19%	-8.11%
Transport	11.19	11.88	11.93	11.78	54	86.66%	-1.26%
Buildings (Residential)	6.71	5.62	5.23	5.48	29	79.47%	4.84%
Buildings (Commercial and Public)	1.42	1.38	1.34	1.44	7	79.69%	8.05%
Industry	7.25	6.81	6.46	6.18	30	89.00%	-4.37%
Agriculture	21.97	21.78	20.72	20.45	106	80.11%	-1.33%
Other Note 2	1.82	1.85	1.75	1.65	9	78.45%	-5.82%
LULUCF	2.87	2.47	2.96	2.51	-		
Total including LULUCF	**63.11**	**61.48**	**57.96**	**56.45**	**295**	**81.01%**	**-2.61%**
Total excluding LULUCF	60.24	59.01	54.99	53.93	-	-	-1.93%

Note 1 Reproduced from latest emissions data from the EPA (EPA, 2026).
Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

9.3.2 Future GHG Baseline

The future GHG baseline is considered in relation of the ability of the Proposed Development to contribute positively or negatively to the ability of Ireland to meet the binding commitment as part of the Climate Act for carbon neutrality by 2050.

The targets for 2030 and 2050 are described in CAP24 and CAP25 as required by the Climate Act that codified the GHG reductions required by EU Regulation 2018/842 amended by EU Regulation 2023/857 put in place to enable European Member States to meet their obligations under the Paris Agreement. The future baseline is determined by Ireland being able to meet its requirements under these regulations.

Ireland's Greenhouse Gas Emissions Projections 2024-2055 (EPA, 2025) summarises total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 9.5% on 2005 levels by 2030, significantly short of the 42.0% reduction target. If measures in the higher ambition (With Additional Measures) scenario are

implemented, EPA projections show that Ireland can achieve a reduction of 21.7% by 2030, still short of the 42.0% reduction target.

9.3.3 Current CCRA Baseline

9.3.3.1.1 Climate Hazard Screening

Table 9-6 sets out a qualitative assessment of climate hazards relevant to the Proposed Development. This high-level screening ensures focus is given to relevant climate hazards throughout the remainder of the assessment. The initial climate hazard list is taken from TII PE-ENV-01104.

Table 9-6: Physical Climate Hazard Screening

Climate-related Hazard	Hazard Screening Rationale	Screening
Extreme heat (including extreme heat events and increasing temperatures overtime)	Screen in	High temperatures are a key consideration for both construction and long-term operation of the proposed project. Heat can affect the performance of materials, roofing, road surfaces, electrical systems while also affecting the lifecycle of assets. Extreme heat should therefore be further considered and screened in.
Extreme cold (including frost and snow)	Screen in	Snow and ice events pose significant risks to health, safety, and site operations. Road access may be disrupted, and low temperatures can affect water mains. Freeze-thaw cycles may cause cracking in concrete and road surfaces, with snow clearance and requiring management. Cold temperatures are therefore screened in.
Flooding (pluvial)	Screen in	Surface water is a key vulnerability for any Proposed Development during both construction, operational and decommissioning phases due to the sensitivity of construction materials, site access, and site assets to water exposure therefore it is screened in.
Flooding (fluvial)	Screen in	Fluvial flooding can cause damage to buildings and infrastructure. Foundations can be damaged and in rare cases, homes may become unhabitable. The FRA by PUNCH Consulting Engineers states the Proposed Development is mainly in Flood Zone C with a small section in Flood Zone A, therefore fluvial flooding is screened in.
Flooding (coastal)	Screen out	Proposed Development approximately 60km from the coast.
Drought	Screen out	Drought is more likely to occur in the future but it is not considered a fundamental issue for the operation of a residential development.
Wildfire	Screen out	The area surrounding the Proposed Development is largely developed and in close proximity to urban centres.
Extreme wind	Screen in	High winds may cause localised disturbance such as road blockages and flying small debris. Damage would be expected to be minor and easily repairable but should be further assessed so is screened in.
Fog	Screen out	Fog is not considered a significant hazard for the Proposed Development, as it does not involve transport, aviation, or activities requiring high visibility.

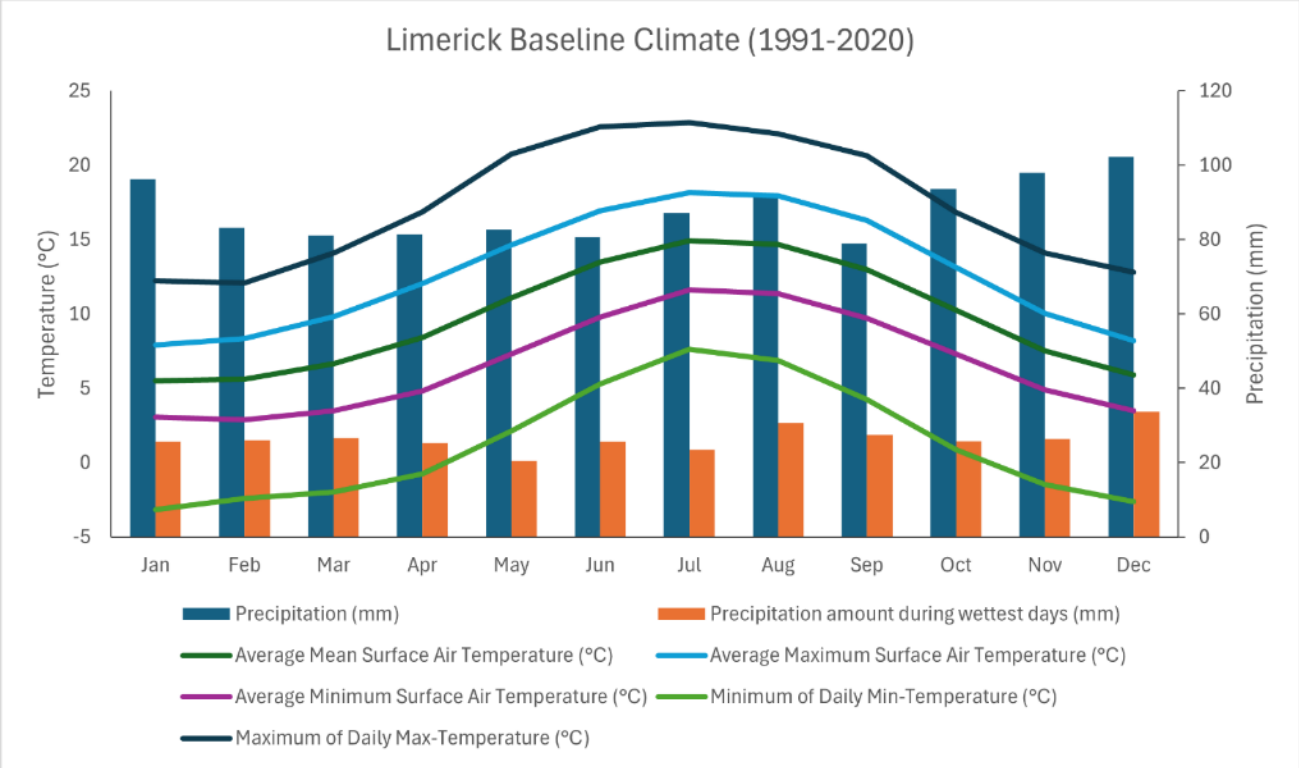
Lightning and hail	Screen out	Proposed Development not at an elevated location and is surrounded by other tall buildings.
Landslides	Screen out	Geological Society of Ireland (GSI) landslide susceptibility mapping database categorized location as low for landslide susceptibility.

9.3.3.2 Extreme temperatures and precipitation

The region of the Proposed Development has a temperate, oceanic climate, resulting in mild winters and cool summers. This baseline data is derived from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 data reanalysis and presented on the World Bank Group Climate Change Knowledge Portal (World Bank Group, 2026b) which includes observed data from local meteorological weather stations across Ireland from 1950-2023. This data is re-analysed to model a complete picture of Irelands historical climate. This method has been chosen to ensure data can be analysed at the daily level and harmoniously compared with future scenarios. The baseline time-period referred to in this assessment was from 1991-2020 and is specific to the county of Limerick.

Climate averages for the 30-year period from 1991-2020 are shown in Figure 9.2. The data show that there are two distinct peaks in precipitation, one occurring in the period July to September peaking in August at 91.6 mm, and another wetter period from October to January with December being the wettest month on average with rainfall of 102.2 mm. The period from February to July experiences rainfall below the average for the year (88.1 mm). December is when the wettest days occur with daily average maximum rainfall of 33.7 mm. The driest month is September with 79.0 mm of rainfall which is below the annual average.

Figure 9.2: Climate Averages for Limerick, Ireland, for the period 1991-2020



July is the warmest month on average with a mean surface air temperature of 14.9°C. July also experiences the average maximum surface air temperature (18.2°C) and the daily maximum temperature (22.8°C). January is the coldest month on average with a mean average surface temperature of 5.5°C and recording the daily minimum temperature (-3.2°C), however the average minimum surface air temperature of 2.8°C occurs in February.

Wind and storms

At Shannon Airport during the period 1991-2020, the average wind speed was 9.1 knots (16.9 kmh), the average windiest month being February at 10.1 knots (18.7 kmh). Historically, the highest absolute gust of 86.0 knots (159.3 kmh) was recorded in February 2014 during Storm Darwin. With reference to recent extreme weather events in Ireland, storm Éowyn hit the island in January 2025 and recorded a 10-minute mean wind speed of 142 kmh in Galway, with the highest gust being 184 kmh. Four weather stations broke their highest gust records during this storm and two stations reached hurricane force 12 on the Beaufort scale.

Later in the year storm Amy also resulted in strong winds such that five recording stations broke their records for 10-minute mean wind speeds. Overall, there were five named storms to hit Ireland in 2025.

Wildfire

The Limerick area is classified at being of a medium risk of wildfire by the World Bank Global Facility for Disaster Reduction and Recovery (GFDRR) Think Hazard (World Bank Group, 2026a) dataset. The Limerick City Council Climate Action Plan 2024-2029 makes no mention of wildfires regarding it as a low risk.

Flood

A Site-Specific Flood Risk Assessment undertaken by PUNCH Consulting Engineers showed the site is at low risk from pluvial, groundwater or coastal flooding. The majority of the site falls within fluvial flood zone C meaning the risk of flooding is very low. However, the surface water discharge pipe downstream of the attenuation pond is located within Flood Zone A as it is discharging to the river.

Landslides
The site location has no record of previous historical landslides and is not susceptible to the risk of future landslides (GSI, 2026).

9.3.4 Future CCRA Baseline

9.3.4.1 Climate Change Impacts and Projections for Ireland

Ireland is already experiencing increased annual rainfall in the north and west, with more variable patterns in the south and east (EPA, 2021b). Key risks identified by the EPA relevant to Ireland:

- Increased likelihood of more frequent and intense North Atlantic low-pressure systems bringing high rainfall and high winds.
- More intense rainfall periods which may lead to pluvial flooding and elevated fluvial levels.
- Longer dry spells and increased temperatures will elevate the risk of wildfire.

9.3.4.2 Climate Modelling and Planning

International best practice and national policy such as the NCCRA (2024), IPCC (2023), and Transport Infrastructure Ireland (TII, 2022) recommends using two emission scenarios to project future climate change. This includes a moderate and high emission scenarios (RCP4.5 and RCP8.5) for future planning. These Representative Concentration Pathways (RCPs) reflect varying levels of global climate mitigation explained below.

- RCP 4.5 (a 'moderate' scenario) represents an approximate 2.4°C increase in global average temperatures (1.7-3.2°C). It assumes moderate mitigation efforts leading to stabilisation of emissions by mid-century and is generally aligned with current policies for emission reduction.
- RCP 8.5 (a 'worst case' / high emissions scenario) represents an approximate 4.3°C increase in global average temperatures (3.2-5.4°C) and assumes continued high emissions with minimal mitigation. This high-end scenario is useful for understanding potential impacts of current emission trends continue. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

This climate change assessment uses the latest climate change projections standardised and bias corrected for Ireland available through the EPA and the TRANSLATE project (EPA, 2025e).

9.3.4.3 Key Findings from Climate Projections

Table 9-7 provides a detailed comparison of baseline and future climatology across a medium (RCP4.5) and high emissions scenario (RCP8.5) up to 2100.

Key Projected changes include:
- Average maximum temperatures rising by 2.7°C (late century, RCP8.5) and overall mean temperatures increasing 1.1°C and 1.5°C by mid-century under RCP4.5 and RCP8.5 respectively.
- Annual precipitation rising by 29mm (mid-century, RCP4.5) with maximum 1-day rainfall increasing by 9mm (2071-2100, RCP8.5).
- Fewer frost days (-23 days >0°C, 2071-2100, RCP8.5).
- Increased number of heatwaves (5 consecutive days >25°C).

Longer dry periods and heavy rainfall events are predicted. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

Impacts resulting from climate change hazards will evolve and have the potential to include increases in global temperatures and increases in the intensity and frequency of rainfall days per year combined with increases in the intensity and frequency of low-pressure systems in the north Atlantic during the winter storm period. Therefore, it is expected that the climate over the proposed site in will evolve over time and consideration is needed with respect to this within the design of the Proposed Development.

Overall 10m mean windspeed is projected to decrease marginally (~<1%) across all seasons of the year with a high degree of certainty (EPA, 2025c).

Table 9-7: Predicted future climate hazards across RCP4.5 and RCP8.5 up to 2100

Climate Hazard	Indicator	Baseline	RCP4.5		RCP8.5	
		(1976-2005)	(2041-2070)	(2071-2100)	(2041-2070)	(2071-2100)
Temperature	Mean temp (°C)	10.27	11.4 (+1.1)	11.8 (+1.5)	11.8 (+1.5)	13.0 (+2.7)
	Mean Max temp (°C)	14.01	15.0 (+1.0)	15.4 (+1.4)	15.5 (+1.4)	16.6 (+2.6)
	Mean Min temp (°C)	6.53	7.7 (+1.1)	8.1 (+1.6)	8.1 (+1.6)	9.4 (+2.9)
	Average of Daily Max temp (°C)	25.99	28.6 (+2.6)	29.6 (+3.6)	29.2 (+3.2)	30.1 (+4.1)
	Frost Days (Nr.)	29.07	16.8 (-12.2)	13.1 (-16.0)	13.1 (-15.9)	5.9 (-23.1)
Precipitation and Flooding	Annual precipitation (mm)	980	1009 (+29)	1032 (+52)	1027 (+47)	1068 (+88)

	Max 1-day (mm)	28	33 (+5)	35 (+6)	33 (+5)	37 (+9)
Storms and high winds	Storm Frequency and Average speed	On Average 8 named storms annually with speeds exceeding 100km/hrN.1	Winter storm frequency is projected to increase, with a possible extension of the storm season. While the intensity of individual storms cannot be accurately projected, storm wind speeds are likely to remain above 100 km/hr.			
	Max Gust speed	86.0 knots (159.3 kmh) N.2				
Note-1: Data from combined Met Éireann						
Note-2: Data from Shannon Airport (~22km from site), 1991-2020						

9.4 Characteristics of the Proposed Development

9.4.1 Proposed Development Overview

The Proposed Development comprises five residential apartment blocks with a total of 403 no. residential units, ranging from five to eight storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development. The current proposals also extend to the R445 to accommodate a proposed entrance from the R445. They will also include a proposed nature-based surface water drainage solution within the neighbouring Groody Valley green wedge.

9.4.2 Construction Stage

During the construction phase embodied carbon of materials used in the construction of the development along with site activities will impact climate. Engine emissions from site vehicles and machinery have the potential to impact climate through the release of CO_2 and to a lesser extent, other greenhouse gases. Impacts to climate are assessed against Ireland's obligations under the EU 2030 GHG targets and sectoral emissions ceilings.

9.4.3 Operational Stage

Engine emissions from vehicles accessing the site have the potential to impact climate during the operational phase of the development through the release of CO_2. Emissions from the operational phase of the residential buildings are qualified through the Climate Action Statement produced by Moloney Fox Consulting Engineers. In addition, the vulnerability of the Proposed Development in relation to future climate change must be considered during the operational phase.

9.5 Potential Impact of the Proposed Development

9.5.1 Greenhouse Gas Assessment

9.5.1.1 Construction Stage

The results of the GHGA are shown in Table 9-8. This includes both the outputs from the OneClick LCA tool and the TII Carbon Tool. Construction materials (Construction materials for buildings and Construction materials external to buildings) make up the majority of GHG emissions for the Proposed Development, accounting for approximately 87% of the total construction phase GHG emissions. Other contributions are

from Construction Energy (6%) and Material Transport (5%). It should be noted that Construction Energy is likely over estimated due to the application of default factors in OneClick which do not take the energy source into consideration. As set out in Section 9.6, Hydrogenated Vegetable Oil (HVO) will be used on this project during the construction phase to power plant and vehicles.

Avoided carbon is associated with the re-use of excavated materials on site. Excavated materials are inert and therefore do not attract an emissions factor however re-using them on site reduces GHG emissions associated with transport of the materials.

It has been calculated that the total construction phase embodied carbon for the Proposed Development will be 31,503 tCO_2e.

Table 9-8: GHG Construction Phase Assessment Results

PAS2080 LC Stage	TII Category	tCO_2e	Predicted GHG Emissions as % of Construction Phase	Sector
A0	Clearance and demolition	3	<1%	Industry
A1-A5	Construction materials for buildings	14,838	47%	Industry
A1-A3	Construction materials external to buildings	12,584	40%	Industry
A4	Material Transport	1,577	5%	Transport
A4	Construction Worker Travel to Site	540	2%	Transport
A5	Excavation	43	<1%	Industry
A5	Construction energy	1,912	6%	Electricity
A5	Construction Waste Disposal	6	<1%	Waste
A5	Construction Waste Transport	<1	<1%	Transport
Total		**31,503 tCO_2e**		
Avoided emissions		22 tCO_2e		

9.5.1.2 Operational Stage

The results of the GHGA are shown in Table 9-9. This includes both the outputs from the OneClick LCA tool and the TII Carbon Tool. GHG Emissions from maintenance includes embodied carbon of new materials required to repair or replace building elements through the lifetime of the Proposed Development. It is quantified using default product specifications in OneClick. Operational waste disposal data has been taken from the Waste Chapter (Chapter 13) and the transport of the waste is calculated using default in the TII tool, both values have been multiplied by the lifespan of the building.

It has been calculated that the total operational phase GHG emissions for the Proposed Development will be 7,104 tCO_2e.

Table 9-9: GHGA Operational Phase Assessment Results across the lifespan of the Proposed Development

PAS2080 LC Stage	TII Category	tCO_2e	Predicted GHG Emissions as % of Operational Phase	Sector
B1-B5	Operational Waste Disposal	683	10%	Waste
B1-B5	Operational Waste Transport	259	4%	Transport
B1-B5	Maintenance	6,161	87%	Industry
Total		7,104 tCO_2e		

As set out in Section 9.2.3, operational traffic has been scoped out of this assessment.

The Proposed Development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 9.6.2 and are based on information provided within the Climate Action Statement was prepared by Moloney Fox Consulting Engineers.

9.5.1.3 Contextualisation of GHGA

In Table 9-10, GHG emissions have been compared against the carbon budget for the industry, transport, electricity and waste sectors in 2030, against Ireland's total GHG emissions in 2024, and against Ireland's EU 2030 target of a 42% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842).

The estimated total GHG emissions annualised over the 60-year Proposed Development lifespan are shown in Table 9-10 and are a small fraction of the sectoral budgets.

Table 9-10: Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

Target/Sectoral Budget (tCO_2e)		Annualised Development GHG Emissions (tCO_2e)		% of Relevant Target/Budget
Ireland's 2024 Total GHG Emissions (existing baseline)	5,764,000	38,607	Total GHG Emissions	0.07%
Non-ETS 2030 Target	27,722,000			0.14%
2030 Sectoral Budget (Industry Sector)	4,000,000	560	Total Industry Emissions	0.01%
2030 Sectoral Budget (Transport Sector)	6,000,000	40	Total Transport Emissions	0.001%
2030 Sectoral Budget (Waste Sector)	1,000,000	11	Total Waste Emissions	0.001%
2030 Sectoral Budget (Electricity Sector)	3,000,000	32	Total Electricity Emissions	0.001%

9.5.1.4 GHGA Significance of Effects

As set out in Table 9-10, the Proposed Development will negatively contribute to Irelands trajectory to achieving net zero by 2050 as GHG emissions contribute a small fraction towards the national and sectoral budgets.

In accordance with the EPA Guidelines (EPA, 2022), the above criteria equates to an impact of GHG emissions during the construction phase of a ***direct*** impact due to its presence, that is ***long-term*** due to the nature of GHG emissions and their atmospheric lifetime and ***negative*** due to the emission of GHGs. As the Proposed Development marginally impedes the trajectory to carbon neutrality, the impact on the climate is ***moderate***, which overall, is considered to be ***significant*** in EIA terms.

In accordance with the EPA Guidelines (EPA, 2022), the above criteria equates to an impact of GHG emissions during the operational phase of a ***direct*** impact due to its presence, that is ***long-term*** as a result of the estimated lifetime of the buildings and atmospheric lifetime of GHG emissions and ***negative*** due to the emission of GHGs. As the Proposed Development impedes the trajectory to carbon neutrality, the impact on the climate is ***moderate***, which overall is considered to be ***significant***.

9.5.2 Climate Change Risk Assessment

9.5.2.1 Construction Stage

Whilst the development is likely to be exposed to potential weather extremes due to climate change during the construction phase, the potential length of the construction phase and its transient nature means that a detailed CCRA of this phase is scoped out.

The following non-exhaustive list of risks has been identified:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding affecting unfinished structures or access roads/pavement
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather potentially affecting setting concrete or cement, dust suppression and construction worker health and safety
- Reduced temperatures resulting in ice or snow potentially affecting setting concrete or cement, landscaping and construction worker health and safety
- Major storm damage including wind damage potentially affecting landscaping, stored materials, vertical infrastructure and construction worker health and safety

9.5.2.2 Operational Stage

9.5.2.2.1 Sensitivity Analysis

The aim of the sensitivity analysis is to identify which climate hazards are relevant to the specific type of project, irrespective of its location. Individual components within the Proposed Development are assessed against each climate hazard.

Table 9-11: Receptors and their sensitivity to climate hazards

Sensitive Receptors	Sensitivity to Climate Hazards (No consideration of site location)				
	Extreme Heat	Extreme Cold	Flood (Pluvial)	Flood (Fluvial)	Extreme Wind
Building & structures	1	1	2	2	1

Drainage	1	1	2	2	1
Health and wellbeing	2	1	2	2	2
Roads	2	1	2	2	1
Communal gardens	2	2	1	1	2
Critical systems	2	1	2	2	2
1= Low, 2= Medium, 3= High					

Table 9-11 shows low sensitivity and medium sensitivity for relevant climate hazards when assessed against sensitivity receptors. High sensitivity was not proposed for any of the sensitivity receptors. The majority of the medium risks are to the health and wellbeing of the residents and to critical systems. By the EU Technical guidance definition, a high risk is "the climate hazard will or is likely to have a major impact on the asset category". Due to the nature of the Proposed Development and strict building regulations ensuring buildings in Ireland are constructed to a high quality and with some resilience to climate hazards, the risks to the receptors are not considered high.

9.5.2.2.2 Exposure Analysis

The exposure of the Proposed Development to climate risks is highly dependent on the project location. The aim of the exposure analysis is to identify which climate hazards are relevant to the planned project location. This assessment is based on current climate described in Section 9.3.3.

Table 9-12: Exposure of Proposed Development to the climate hazards

Climate Exposure	Exposure Risk to Climate Hazards (Consider the site location)				
	Extreme Heat	Extreme Cold	Flood (Pluvial)	Flood (Fluvial)	Extreme Wind
Exposure at project location	2	1	1	1	2
1= Low, 2= Medium, 3= High					

Table 9-12 shows the locality of the Proposed Development is at low or medium exposure to the climate hazards. Medium exposure is defined as "this climate hazard occurs at the project location a number of times in a decade". The assessment has been based on information in Section 9.3.3 for example extreme wind is evidenced by the number of named storms discussed in Table 9-7. Occurrences of extreme heat also sit within the medium exposure category based on the current climate. Exposure of the Proposed Development to pluvial and fluvial flooding was determined by the FRA prepared by PUNCH Consulting Engineers. The FRA determines that the redevelopment of the site will not adversely affect pluvial flood levels or extents in the area when a suitable surface water drainage system is installed. Fluvial flooding

from the River Groody or River Shannon will not impact the site due to the height of the existing site rising away from the river.

9.5.2.2.3 Vulnerability Analysis

This assessment combines the outcomes of the sensitivity and exposure analysis to determine which climate hazards pose a risk to the Proposed Development. The vulnerability of the Proposed Development to climate risks is determined based on the sensitivity and the exposure as follows:

Vulnerability = Sensitivity x Exposure

The vulnerability of the Proposed Development to the risks of Climate Change impacts is shown in Table 9-13 below:

Table 9-13: Vulnerability of the Proposed Development to the risks of climate change impacts

Receptors	Vulnerability Analysis				
	Extreme Heat	Extreme Cold	Flood (Pluvial)	Flood (Fluvial)	Extreme Wind
Buildings & Structures	2	1	2	2	2
Drainage	2	1	2	2	2
Health, safety & wellbeing	4	1	2	2	4
Roads	4	1	2	2	2
Communal gardens	4	2	1	1	4

Critical systems	4	1	2	2	4
1, 2 = Low; 3, 4 = Medium; 6,9 = High					

Table 9-13 shows a collective rating of each receptor's vulnerability to the hazards that were screened in. Health and wellbeing of the users of the Proposed Development, the communal gardens and critical systems are the most vulnerable to the physical hazards. Extreme heat poses a threat to the receptors as it can cause overheating of critical systems, heat stress on residents, damage plants and landscaping and cause road surfaces to buckle.

Extreme winds have the potential to cause damage to the receptors through flying debris, uprooting of trees and plants and damage exposed electrical systems which can in turn have a cascading effect on the health and wellbeing of the users of the Proposed Development e.g. if the power supply is damaged, residents may experience power outages.

9.5.2.3 CCRA Significance of Effects

In the absence of design mitigation, there is a medium risk to the Proposed Development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the Proposed Development as a result of climate change are ***direct*** as climate extremes have a direct physical effect on buildings and infrastructure, ***long-term*** due to the response times of the climate in relation to changes in anthropogenic emissions, ***negative*** as climate extremes have been shown to damage or adversely affect infrastructure, and ***moderate*** due to the medium vulnerability of the Proposed Development to the effects of climate change, which is overall ***significant*** in EIA terms.

9.5.3 Do-Nothing Impact

In the Do-Nothing scenario, 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).

As the site is zoned for development, 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 Proposed Development.

9.6 GHG Mitigation Measures

9.6.1 Construction Stage

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase.

The Design Team intend to mitigate GHG emissions during the construction phase by re-using materials which are already in situ on the brownfield site. A shopping centre was partially constructed in 2007 and was demolished in 2020, with reinforced concrete retaining walls left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground. This reduces the volume of new material which will be required for backfilling at the site. Further, the retaining walls will be incorporated as part of

the Proposed Development negating the requirement for additional reinforced concrete to be procured for this element of the works.

The floor levels of some blocks have been designed to a height which reduces excavation requirements on site. In addition, 10% of excavated material will be used on site for landscaping and backfill which will avoid 22tCO_2e from its transport to processing sites. More information on this mitigation measure can be found in the Waste Chapter (Chapter 14).

HVO fuelled vehicles and plant will be used during construction which will reduce GHG emissions compared to petrol or diesel. The HVO will be sourced from sustainable sources and a Chain of Custody Certificate to evidence the source will be obtained from the supplier.

As set out in the Waste Chapter (Chapter 14):

- Building materials will be chosen to 'design out waste', in line with circular economy principles and green procurement strategies outlined in the RWMP. Product selection will, where practicable, favour materials with recycled content and take-back schemes.
- On-site segregation of waste materials will be carried out where possible to increase opportunities for off-site reuse, recycling and recovery.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible.
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;

In addition to the above, during the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant, machinery and vehicles are well maintained and inspected regularly.
- Using grid connections for electric power when practicable instead of HVO fuel powered generators
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability.
- Material choices and quantities will be reviewed during detailed design, to identify and implement any lower embodied carbon options, where feasible. For example, a 30% minimum clinker replacement in cement may be utilised in line with the requirements for public bodies.

9.6.2 Operational Stage

With reference to the Climate Action Statement (Moloney Fox Consulting Engineers, 2025), sustainable building practices and technologies have been incorporated into the Proposed Development design to reduce the impact on climate wherever possible.

The Climate Action Statement states that the development will be a Nearly Zero Energy Building (NZEB) in accordance with the 2022 Part L requirements. NZEB buildings are required to generate 20% of their energy requirements from renewable sources. The Proposed Development buildings will be constructed to achieve an A2 BER rating, in line with NZEB standards. Electrically driven exhaust air heat pumps have been incorporated into the Proposed Development design to meet the heating requirements for the residential dwellings and achieve the requirement to generate 20% of energy from renewable sources. Exhaust air heat pumps are designed to provide ventilation, heating, and hot water to units with very low energy demand.

Additional sustainable technologies incorporated into the development design include solar PV installations across the roofs of the apartment blocks, the use of Demand-Control-Ventilation (DCV), which optimizes the amount of fresh air to improve indoor air quality while increasing energy efficiency. LED lighting and smart lighting controls will be implemented to increase energy efficiency and promote energy conservation.

A number of sustainable design features have been considered within the design to achieve the sustainability targets of the Proposed Development. These include:

- The proximity of the development to public transportation networks
- The proximity of the Proposed Development to active travel networks and car sharing locations including the BusConnects route planned for 2027
- Electric vehicle (EV) parking spaces provided for residential (21 no. spaces / 20%) and commercial use (6 no.).
- Installation of infrastructure for additional EV charging to allow for future installation of EV charging points
- The Residents/ Staff / Facilities Management will ensure on-Site segregation of all waste materials into appropriate categories

The above measures will assist in optimising the energy consumed by the Proposed Development which will reduce the impact to climate during the operational phase of the Proposed Development.

9.7 CCRA Mitigation Measures

9.7.1 Construction Stage

In terms of impact on the Proposed Development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding, extreme temperatures and wind and storms through site risk assessments, method statements and good site management practice. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.

9.7.2 Operational Stage

9.7.2.1 Extreme heat and cold

Extreme temperatures, both hot and cold, can affect building materials and infrastructure; however, the project will use materials that comply with current standards and are designed to withstand projected climate extremes. Cold events are expected to decline, reducing the risk of cracking from freeze thawing of road surfaces and deterioration of auxiliary systems and infrastructure. However, cold events are still anticipated and systems have been designed with this in mind, for example, solar panel systems are designed to accommodate snow load. While potential heat-related impacts such as road surface softening are possible during heatwaves, projected extremes are not expected to reach critical thresholds for infrastructure failures seen in other European countries.

Further, tree planting and green infrastructure will provide shading and sequester carbon dioxide, reducing global warming. Native and drought tolerant planting are included in the landscaping design proposed and will include plants such as lavender, sedum, salvia, yarrow, and native plants that thrive with limited water.

9.7.2.2 Fluvial Flooding

The Proposed Development is at low risk from fluvial flooding from the Groody River and the River Shannon. The outfall pipe from the development is in Flood Zone A but the rest of the development is in Flood Zone C. Flood mitigation set out in the FRA by Punch Consulting Engineers include:

- The proposed lowest Finished Floor Level for the Proposed Development is 10.20mAOD. This level is in accordance with best practice and 4.17m above the CFRAMS 1% AEP (Catchment Flood Risk Assessment and Management) MRFS (Mid-range Future Scenario) fluvial water level. This indicates that under a mid-range future climate change scenario, the Proposed Development could withstand and be protected against a 1 in 100 year flood event.
- As part of the site maintenance plan, all future proprietors inspect all road gullies in the vicinity and report any blockages to the Local Authority, development management company and/or Irish Water. The proprietor should also inspect all surface water drainage within the site, in particular following heavy rain which may cause debris to obstruct the ACO drain and road gullies;

9.7.2.3 Pluvial Flooding

Pluvial Flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high-intensity rainfall. The provision of a suitable surface water drainage system for any Proposed Development on the site will mitigate against this risk. The proposed stormwater drainage arrangements have been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document - "*Recommendations for Site Development Works for Housing Areas*", with guidance taken from the "*Greater Dublin Strategic Drainage Study"* (GDSDS),CIRIA Publications C644 – *"Building Greener"* and the Limerick Development Plan 2022-2028.

The proposed drainage has also been designed to meet the requirements of the Greater Dublin Strategic Drainage Study and Limerick Development Plan 2022-2028 to limit site discharge 2 l / s / ha or Qbar, and to provide interception storage in line with Limerick Council drainage requirements.

The following Sustainable Urban Drainage System (SuDS) features have been incorporated into the Proposed Development design:

- Hydrobrake;
- Green Roofs;
- Permeable Pavements;
- Rain Gardens;
- Infiltration Trenches;
- Engineered Swales;
- Tree Root Systems; and
- Attenuation Ponds

9.7.3 Extreme Wind

To mitigate against the effects of extreme winds utilities are expected to be buried and not exposed. In terms of the buildings and structures, foundations are designed to transfer load from high winds experienced by buildings directly to ground in accordance with the relevant Eurocodes. The landscaped areas pose a risk from flying debris. To reduce this risk, the Landscape architect has confirmed maintenance, and management plans will include:

- **Pruning for Airflow:** Regularly prune trees and large shrubs to thin dense crowns
- **Deadwood Removal:** Remove dead, diseased, or weak branches, which are the first to fall during high winds.

- **Staking and Support:** Stake young, top-heavy, or newly planted trees securely to help them establish roots without falling.
- **Root Protection:** Ensure trees have healthy soil to encourage deep, anchoring roots.

Solar PV panels sit on metal frames which are held in place by concrete blocks or ballast trays. The weighting of the panels will be calculated to resist wind uplift and are generally tilted at 5-15° to reduce wind load.

9.8 Monitoring

Monitoring and reporting of the embodied carbon in the construction phase will be conducted. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, for the successful tenderer to ensure that the Proposed Development stays in line with updated aims. Commitments to monitor GHG emissions during the construction phase will also be secured through the final Construction Environmental Management Plan (CEMP). Monitoring will include embodied carbon of construction materials, water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the Proposed Development is not meeting its targets, further mitigation will be put in place.

Monitoring should also include reviewing potential for extreme weather events which may cause damage during construction. Contractors' Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding.

9.9 Residual Effects of the Proposed Development

9.9.1 GHG Residual Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

TII reference the ISEP guidance (2022) which states that the crux of assessing significance is:

"not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".

As set out in Table 9-10, the Proposed Development will marginally impede Ireland's trajectory to achieving net zero by 2050 as GHG emissions contribute a small fraction towards the national and sectoral budgets. Further, although the Proposed Development will result in GHG emissions during the construction and operational phases; the Proposed Development will minimise its impacts through design and management measures (see Section 9.6.1). The level of mitigation described in Section 9.6 has therefore been taken into account when determining the residual significance of the proposed project's GHG emissions.

Based on the above reasoning, according to the TII significance criteria, the residual significance of the GHG emissions during the construction and operational phase is **minor adverse**. The ISEP GHG guidance (ISEP, 2022) (which has been embraced by the updated TII Guidance (TII, 2022) in Section 6.7.2) describes minor adverse as follows:

"A minor adverse not significant impact is described with: A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050."

In addition, the TII guidance (2022) describes minor adverse as:

- The project's GHG impacts are mitigated through 'good practice' measures.
- The project has complied with existing and emerging policy requirements; and
- Fully in line to achieve Ireland's trajectory towards net zero.

In accordance with the EPA Guidelines (EPA, 2022), the above criteria equates to an impact of GHG emissions during the construction phase of a ***direct*** impact due to its presence, that is ***long-term*** as a result of the atmospheric lifetime of GHG emissions, ***negative*** due to the emission of GHGs and ***slight*** based on the reduced contribution of GHG emissions to Irelands national trajectory to net zero, due to the outlined mitigation measures. Overall, the impact on the climate is considered to be ***not significant*** in EIA terms.

In accordance with the EPA Guidelines (EPA, 2022), the above criteria equates to an impact of GHG emissions during the operational phase of a ***direct*** impact due to its presence, that is ***long-term*** as a result of the estimated lifetime of the buildings and atmospheric lifetime of GHG emissions and ***negative*** due to the emission of GHGs and ***slight*** based on the reduced contribution of GHG emissions to Irelands national trajectory to net zero, due to the outlined mitigation measures. Overall, the impact on the climate is considered to be ***not significant*** in EIA terms.

9.9.2 CCRA Residual Effects

With design mitigation in place, there are no residual risks to the Proposed Development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the Proposed Development as a result of climate change are ***direct*** as climate extremes have a direct physical effect on buildings and infrastructure, ***long-term*** due to the response times of the climate in relation to changes in anthropogenic emissions, ***negative*** as climate extremes have been shown to damage or adversely affect infrastructure, and ***not significant*** due to the low vulnerability of the Proposed Development to the effects of climate change once mitigation measures have been embedded, which is overall ***not significant*** in EIA terms.

9.10 Cumulative Impacts of the Proposed Development

In accordance with guidance from the ISEP (2022) and TII (2022) the climate is not constrained by project, regional or national boundaries and therefore the GHG assessment has been presented in the context of the national and sectoral carbon budgets for the whole of Ireland and the ability of the Proposed Development to assist or impede the national relevant targets. Given the contribution of such targets to the global efforts to reduce the impact of society upon the climate the assessment is considered to be inherently cumulative.

In light of this, the residual cumulative impact of the Proposed Development in relation to GHG emissions is considered ***direct***, ***long-term***, ***negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

9.11 Section 15 Compliance

Section 15 of the 2015 Act, sets out the duties imposed by certain bodies, including local authorities and An Coimisiún Pleanála. This section was amended by the 2021 Act and states:

"(1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with—
(a) the most recent approved climate action plan,
(b) the most recent approved national long term climate action strategy,
(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and
(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.".
This chapter demonstrates how the Proposed Scheme is consistent with the objectives of Section 15 of the 2015 Act (as amended). The EIAR has carried out a greenhouse gas emissions assessment and assessed the Proposed Scheme's resilience/adaptation to climate change.

- Greenhouse Gas Emissions Assessment – This assessment considers the Proposed Scheme's GHG emissions over its lifetime. The assessment analyses these emissions in the context of the relevant carbon budgets, targets and policies to ensure consistency with the most recent approved climate action plan and the most recent approved national long term climate action strategy, and with measures in furtherance of the national climate objective. This complies with subsections 15 (1) (a), (b), and (d) of the Act.
- Climate Change Vulnerability Assessment – This assessment identifies the impact of a changing climate on the Proposed Scheme and receiving environment in the context of the most recent approved national adaptation framework and approved sectoral adaptation plans. The assessment considers the Proposed Scheme's vulnerability and adaption to climate change and identifies adaptation measures to increase resilience, as discussed in Section 8.4.3.2.1. This covers sections 15(1)(c) and (e) of the Act.

The above measures pursue the furtherance of the national climate objective and the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State as far as practicable as required by section 15(1)(d) and(e) of the Acts.

9.12 References

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Chapter 10 – Noise and Vibration

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10. NOISE AND VIBRATION

10.1 Introduction

This chapter presents an evaluation of potential significant noise and vibration impacts associated with the proposed Large Residential Development (LRD) located at Singland, Dublin Road, Limerick, Co. Limerick.

This chapter includes a comprehensive description of the existing ambient noise climate in the vicinity of the subject site. It provides an assessment of the potential noise and vibration impacts arising from the Proposed Development during both the short-term construction phase and the long-term operational phase. The assessment considers the potential effects on the surrounding environment as well as on the development itself.

Both direct and indirect noise and vibration impacts have been evaluated, along with any potential cumulative effects in the context of the surrounding area.

Where applicable, mitigation measures are proposed to ensure that the development is constructed and operated in an environmentally sustainable manner, with the objective of minimising adverse noise and vibration impacts on the receiving environment.

The assessment has been carried out with reference to the most appropriate and up-to-date guidance documents relevant to environmental noise and vibration. These documents are cited throughout the chapter and listed in the references section. In addition to specific noise-related guidance, other relevant planning and environmental guidelines were also reviewed and considered in the preparation of this chapter.

This assessment meets the requirements for an EIAR, as outlined in the relevant National and EU legislation, and has been prepared in accordance with the following guidance documents;

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 – Noise;
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration;
- BS 7385-2:1993 Guide for measurement of vibrations and evaluation of their effects on buildings;
- BS 8233:2024 Guidance on Sound Insulation and Noise Reduction for Buildings;ISO 1996-1:2016 and ISO 1996-2:2017: Acoustics - Description, Measurement and Assessment of Environmental Noise;
- Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) (2017). ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise: New Residential Development. May 2017;
- EPA "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR)" (2022); and
- TII (formerly NRA) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014).

10.2 Methodology

The assessment has been conducted in accordance with the following methodology:

- Comprehensive baseline noise monitoring was carried out at multiple locations across the development site to establish the existing range of noise levels throughout a full diurnal cycle;

- A thorough review of the most relevant and applicable published standards and guidance documents was undertaken, to establish appropriate noise and vibration criteria for both the construction and operational phases of the Proposed Development;
- Predictive noise calculations have been carried out for the construction phase to estimate potential noise and vibration impacts at the nearest noise-sensitive receptors adjacent to the site;
- Further predictive acoustic modelling was conducted to assess potential noise impacts during the operational phase at the most sensitive locations surrounding the development;
- An inward noise assessment was performed, developing an acoustic design statement, to evaluate the potential effects of existing environmental noise on the residential amenity within the Proposed Development; and
- An evaluation of the need for mitigation measures has been undertaken to address and, where necessary, reduce both inward and outward noise and vibration impacts associated with the construction and operation of the Proposed Development.

10.3 Receiving Environment

The Proposed Development site is situated adjacent to the existing Parkway Retail Park on Dublin Road, Limerick. To the East, the site is bordered by open green fields, while mature residential housing estates lie to the South and represent the nearest noise-sensitive receptors to the proposed works. Parkway Retail Park is located directly to the West of the site, and the busy R445 roadway forms the Northern boundary, separating the site from additional commercial developments to the North on the opposite side of the road.

10.3.1 Existing/Ambient Noise Survey

An environmental noise survey was undertaken at the Proposed Development site to quantify the existing acoustic environment. The survey was carried out in general accordance with ISO 1996:2017 – Acoustics: "Description, Measurement and Assessment of Environmental Noise". Detailed methodology and measurement results are provided in the following sections.

10.3.1.1 Selection of Measurement Positions

Five measurement locations were selected as shown in Figure 10-1 for the site assessment.

Figure 10-1: Noise Monitoring Locations at / Around the Proposed Development Site.

10.3.1.2 Survey Periods

A fully attended noise survey was conducted between the following periods: It consisted of a 15-minute period taken at each NSL location and the proceeding directly on to the next NSL location between the hours listed as outlined in Table 10-1 below.

Table 10-1 Fully Attended Survey Periods

Location	Ref.	Survey Period
Chesterfield Grove	**NSL1**	Commenced at 12:47 hours on 30/04/25
		Ceased at 09:38 hours on 01/05/25
Oakwood	**NSL2**	Commenced at 13:06 hours on 30/04/25
		Ceased at 10:04 hours on 01/05/25
Carn Na Rae	**NSL3**	Commenced at 13:25 hours on 30/04/25
		Ceased at 10:25 hours on 01/05/25

A partially attended noise survey was conducted during the periods outlined in Table 10-2 below. These were continuous uninterrupted periods for both NML1 and NML2.

Table 10-2 Partially Attended Survey Periods

Location	Ref	Survey Period
Dwelling Location	**NML1**	Commenced at 12:13 hours on 30/04/25
		Ceased at 13:23 hours on 01/05/25
Dwelling Location	**NML2**	Commenced at 10:40hours on 01/05/25
		Ceased at 13:07 hours on 01/05/25

The measurement period was selected to provide a representative snapshot of the existing noise climate (a full diurnal cycle), with the primary objective of ensuring that the proposed noise criteria for the development are appropriately aligned with prevailing environmental conditions.

10.3.1.3 Weather Conditions – During Assessment Period

Weather conditions during the survey period were fully suitable for conducting environmental noise measurements. Windspeeds remained below 5M/S, with dry ground conditions, no precipitation, and no evidence of temperature inversion. Ambient temperatures ranged between 9°C and 22°C. Wind direction was predominantly from the southeast, with speeds ranging from 2 to 3 Km/Hr throughout the measurement period.

10.3.1.4 Personnel and Instrumentation

Ted Dalton (Dalton Acoustics Ltd) performed the measurements during the survey periods. Measurements undertaken at positions NSL1, NSL2 and NSL3 were fully manned and witnessed. Measurements at NML1 and NML2 were partially manned.

Attended measurements were made using an NTI XL2 Sound Level Meter. Partially attended measurements (which were witnessed measurements for a proportion of the period), were also made using an NTI XL2 sound Level Meter. Sample periods were 15 minutes for all noise measurements. However, the SLMs were set to 1 second logging with full audio recording for the purposes of post processing on PC Data software.

Before and after the survey the measurement instruments were check calibrated using a Rion NC74 Sound Level Calibrator. All measurement equipment used for this assessment is fully within their respective required calibration dates and certificates are available on request.

10.3.1.4.1 Ted Dalton - Statement of Authority:

In accordance with Article 5(3)(a) of the EU Directive, by appointing Dalton Acoustics Ltd, the applicant has ensured that this chapter has been prepared by Competent experts. Qualifications for Ted Dalton are set out as follows:

- BSc Surv. (Hons) 1995 – Trinity College
- Diploma (Hons) in Acoustics & Noise Control 1999 (Institute of Acoustics).
- MSc (Hons) in Applied Acoustics 2016 (University of Derby).
- Member of Institute of Acoustics (MIOA) & Member of Irish branch committee (IOA).
- Secretary and Member of the Association of Acoustic Consultants of Ireland (MAACI).
- Diploma in Environmental Noise Measurement & Assessment (IOA).
- 2014 to present: Principal at Dalton Acoustics Ltd.

10.3.1.5 Relevant Acoustic/Measurement Param

The unattended noise survey results are presented in terms of the following param:

- **LA_{eq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- **LA_{10}** is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- **LA_{90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.
- **LAF_{max}** is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.
- **L_{day}** is the average LAeq noise level measured over the course of the daytime period, defined as 07:00hrs to 19:00hrs.
- **$L_{evening}$** is the average LAeq noise level measured over the course of the daytime period, defined as 19:00hrs to 23:00hrs.
- **L_{night}** is the average LAeq noise level measured over the course of the daytime period, defined as 23:00hrs to 07:00hrs.

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.

10.3.1.6 Survey Results and Evaluation

The results of the surveys at the monitoring locations are summarised in Table 10-3, 10-2 & 10-3 below.

Table 10-3 Attended Survey Results at Noise Sensitive Locations (NSLs) in dB.

Location	Date & Start Time	LA_{eq}(15min)	LAf_{max}	LAf_{min}	LA_{90}	LA_{10}
NSL1 at Chesterfield Grove	30/04/25 12:47 hrs	46	59	40	42	49
	30/04/25 13:44 hrs	46	63	39	42	49
	30/04/25 14:43 hrs	45	70	38	40	46
	30/04/25 15:43 hrs	45	60	37	41	48
	30/04/25 16:41 hrs	48	63	38	41	51
	01/05/25 08:21hrs	47	64	39	43	49
	01/05/25 09:23hrs	47	69	37	41	49
Location	**Date & Start Time**	**LA_{eq}(15min)**	**LAf_{max}**	**LAf_{min}**	**LA_{90}**	**LA_{10}**
NSL2 at Oakwood	30/04/25 13:06 hrs	49	65	37	42	52
	30/04/25 14:04 hrs	43	62	37	39	45
	30/04/25 15:05 hrs	48	73	34	37	46
	30/04/25 16:03 hrs	43	70	36	38	45
	01/05/25 08:41hrs	51	71	38	41	52
	01/05/25 09:49hrs	46	68	36	40	47
Location	**Date & Start Time**	**LA_{eq}(15min)**	**LAf_{max}**	**LAf_{min}**	**LA_{90}**	**LA_{10}**
NSL3 at Carn Na Rae	30/04/25 13:25 hrs	45	61	41	43	47
	30/04/25 14:23 hrs	43	67	39	41	44
	30/04/25 15:24 hrs	44	59	39	41	45
	30/04/25 16:22 hrs	45	69	38	41	46
	01/05/25 09:00hrs	45	54	38	42	46
	01/05/25 10:10hrs	44	53	38	42	46

The partially attended / manned monitoring location (NML1) is subject to traffic noise from the R445 roadway and access traffic to and from the Parkway Retail Park. In order to cross check these levels a concurrent measurement position was setup at NML2 to verify traffic noise levels over the site. There is no direct correlation between noise levels achieved at these 2 positions, however it does confirm that traffic noise levels alone from the R445 onto the site are lower when removing the Parkway Retail Park access traffic contributions.

Table 10-4 below indicates the results of the partially manned long-term assessment at NML1.

Table 10-4 Partially manned results for nearest proposed dwellings (NML1) in dBs of the partially manned long-term assessment at NML1.

Location	Position	Date	Lday	Levening	Lnight
NML1	Nearest proposed dwelling	30/04/2025	55	51	48

Table 10-5 below indicates the 15 minute LAeq concurrently measured samples for **NML1 & NML2** with the level differences between both locations. These show no correlation, but noise levels are lower at **NML2** further away from the Parkway Retail Park entrance. Still **NML2** is dominated by the presence of R445 traffic noise.

Table 10-5 Comparative Concurrent Levels Across the Site at NML1 and NML2 in dB.

Date & Start Time	Period	LAeq NML1	LAeq NML2	Difference
2025-05-01 10:45:00	0:15:00	50.1	47.7	2.4
2025-05-01 11:00:00	0:15:00	49.8	46.7	3.2
2025-05-01 11:15:00	0:15:00	49.0	46.6	1.9
2025-05-01 11:30:00	0:15:00	49.0	47.1	0.3
2025-05-01 11:45:00	0:15:00	49.4	48.7	1.3
2025-05-01 12:00:00	0:15:00	48.9	48.1	0.5
2025-05-01 12:15:00	0:15:00	49.3	48.4	-4.4
2025-05-01 12:30:00	0:15:00	55.4	53.7	2.7
2025-05-01 12:45:00	0:15:00	54.0	52.7	1.3

10.4 Associated Noise Characteristics of the Proposed Development

For a development of this nature, potential noise and vibration impacts on the surrounding environment must be assessed separately for two key stages: the short-term construction phase and the long-term operational phase.

The construction phase will involve activities such as site clearance, demolition of existing derelict structures, building construction, road works, and landscaping. This phase represents the highest potential for noise and vibration impacts on the surrounding area, although these impacts will be limited to a short duration.

During the operational phase, no significant sources of noise or vibration emanating from the development itself are anticipated.

10.5 Relevant Criteria

10.5.1 Construction Phase

At present, there is no official Irish legislation setting out maximum allowable noise and vibration levels during a project's construction phase. As a result, it is common practice to refer to BS 5228:2009+A1:2014 — "Code of Practice for Noise and Vibration Control on Construction and Open Sites", to guide the management of construction-related noise and vibration. For this assessment, suitable construction noise limits have been established based on Part 1 of this standard, which focuses on noise control.

The methodology used involves categorizing noise-sensitive locations into three groups (A, B, or C) based on the ambient noise levels in the area before construction activities begin. This classification sets noise threshold limits, and if these limits are surpassed at any location, it indicates a significant noise impact from construction.

The nearest noise-sensitive receptors to the Proposed Development are residential buildings located about 30 m to the west of the closest development structures.

BS 5228-1:2009+A1:2014 provides various examples of acceptable construction and demolition noise limits, with the most straightforward approach being the comparison of noise levels against fixed limits outlined in Table 10.5. For example, Paragraph E.2 states:

> *'Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with windows shut.'*

Paragraph E.2 goes on to state:

> *'Noise levels, between 07:00 and 19:00 hours; outside the nearest window of the occupied room closest to the site boundary should not exceed:*
>
> *70 decibels (dBA) in rural, suburban areas away from the main road traffic and industrial noise;*
>
> *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.'*

Note that a typical planning condition in relation to construction noise issued by Local Authorities refer also to the compliance with BS 5228 part 1 as a means of controlling impacts to the surrounding environment. BS 5228 has therefore been used to inform the assessment approach for construction noise in line with Local Authorities requirements.

Example thresholds of significant effects at dwellings are set out in Table 10-6 below.

Table 10-6 Example Threshold of Significant Effect at Dwellings

Assessment category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category [A]	Category [B]	Category [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and Weekends Daytime	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

a. Category A: Threshold values applied when ambient noise levels, rounded to the nearest 5 dB, are below the specified limits.
b. Category B: Threshold values applied when ambient noise levels, rounded to the nearest 5 dB, correspond exactly to the Category A limits.

c. Category C: Threshold values applied when ambient noise levels, rounded to the nearest 5 dB, exceed the Category A limits.

For the relevant assessment period, which in this case is daytime, the ambient noise level is established and rounded to the nearest 5 dB. Baseline monitoring undertaken as part of this assessment indicates that Category A thresholds are appropriate for the nearest noise-sensitive receptors considered here. If construction noise levels exceed the threshold values corresponding to the assigned category, a significant noise effect is considered to occur. Based on the measured ambient noise, the recommended daytime construction noise limit is set at 65 dB $LA_{eq(T)}$.

10.5.2 Operational Phase

10.5.2.1 Additional Road Traffic on Public Roads

To assess the potential noise impact from additional traffic generated by the Proposed Development on the existing road network, it is appropriate to evaluate traffic noise using the LA10 parameter, which represents the ten-percentile noise level commonly used for vehicle movement assessments on public roads.

For interpretation purposes, Table 10-7 provides guidance on the expected significance of changes in traffic noise levels, based on the National Roads Authority, Design Manual for Roads and Bridges (DMRB, 2011).

Table 10-7: Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB LA10)	Subjective Reaction	DMRB magnitude of Impact	EPA Classification Magnitude of Impact
0	Inaudible	No Change	Neutral
0.1 – 2.9	Barely Perceptible	Negligible	Imperceptible
3 – 4.9	Perceptible	Minor	Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
10+	Doubling of loudness and above	Major	Significant

10.5.2.2 Inward Noise Impact

The Limerick Agglomeration Noise Action Plan (2024 – 2028) refers to the use of the Professional Guidance on Planning and Noise (ProPG) document, released in May 2017, was created by a working group made up of members from the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA), and the Chartered Institute of Environmental Health (CIEH). Although it is not an official government publication, ProPG is widely seen as a best practice guideline and has been widely adopted in Ireland due to the lack of specific national standards.

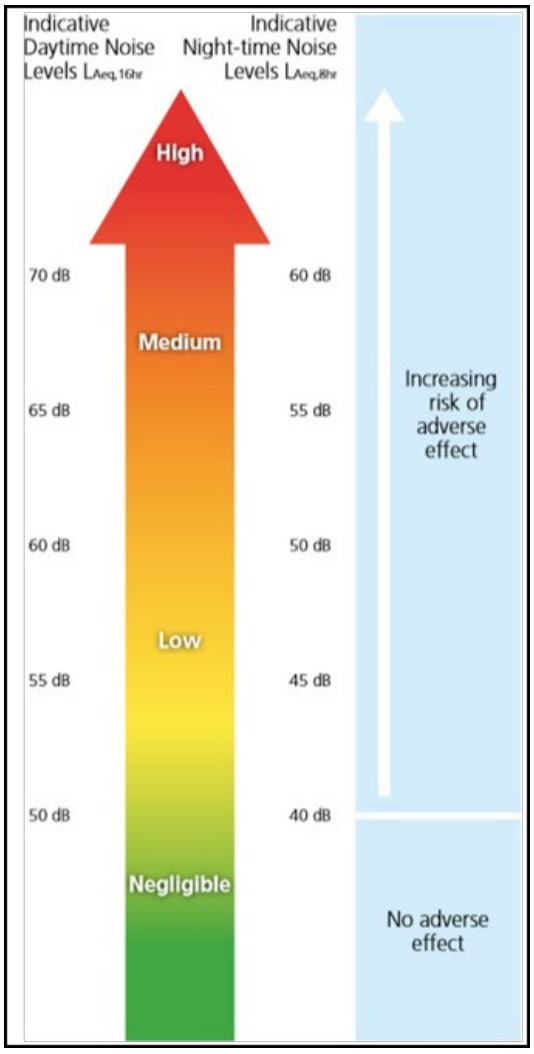
ProPG sets out a systematic, risk-based two-stage approach for assessing noise exposure at prospective residential development sites. The two principal stages can be summarised as follows:

- Stage 1: A high-level preliminary noise risk assessment of the proposed site, based on either measured or predicted noise levels; and
- Stage 2: A comprehensive, detailed appraisal of the Proposed Development addressing four "key elements," including:
  - Element 1 - Good Acoustic Design Process;
  - Element 2 - Noise Level Guidelines;

- Element 3 - External Amenity Area Noise Assessment
- Element 4 - Other Relevant Issues

The initial noise risk assessment is designed to offer an early indication of potential acoustic challenges associated with the site. It requires categorising the site's noise exposure as negligible, low, medium, or high risk, based on the existing noise environment. Figure 10-2 illustrates the framework for this assessment, presenting suitable risk categories corresponding to a range of continuous noise levels, whether measured or predicted on site.

Figure 10-2: ProPG Stage 1 - Initial Noise Risk Assessment



It should be noted that a site cannot be classified as negligible risk if more than 10 LAFmax noise events exceed 60 dB during the night period. Conversely, the site should be considered high risk if LAFmax events exceed 80 dB more than twenty times in a single 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 10-8Table 10-8 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Table 10-8: ProPG Internal Noise Levels

Activity	Location	(07:00 to 23:00 hours)	(23:00 to 07:00 hours)
Resting	Living room	35 dB LAeq,16hr	-
Dining	Dining room/area	40 dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr 45 dB LAmax,T*

*Note: ProPG states that the internal LAFmax,T noise level may be exceeded not more than ten times per night without a significant impact occurring.

In addition to specifying absolute internal noise level targets, ProPG offers guidance on the flexibility of these limits. For example, where a development is deemed necessary or desirable but external noise levels exceed recommended guidelines, a relaxation of up to 5 dB in the internal LAeq values may still be acceptable to achieve reasonable internal acoustic conditions. This allowance is based on BS 8233:2014, Subsection 7.7.2, as detailed below:

> *NOTE 7:Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.'*

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 LAeq,16hr.'

10.5.2.3 *Outward Noise Impact*

For the purposes of this assessment, external noise limits are derived based on the internal criteria outlined in Table 10-8 above. This derivation accounts for the typical noise attenuation provided by a partially open window, which is approximately 15 dB as referenced in the British Standard BS8233: 2014. Applying this correction factor, the corresponding external noise levels required to achieve the internal noise targets listed in Table 10-8 are as follows:

- Daytime / Evening (07:00 to 23:00 hours) 50 - 55dB LAeq,1hr
- Night-time (23:00 to 07:00 hours) 45dB LAeq,15min

These noise limits will be applied to all noise sources associated with the Proposed Development, excluding road traffic, such as mechanical plant and equipment serving the development.

10.5.3 Vibration Criteria

10.5.3.1 Construction Phase

Guidance relevant to acceptable vibration in order to avoid damage to buildings is contained within BS 7385- 2 (1993). The guidance values contained within BS 7385 are reproduced also in British Standard BS 5228-2 (2009+A1:2014).

These standards distinguish between transient and continuous vibration. Surface construction activities are classified as transient because they occur for a limited time at a specific location. The standards indicate that the risk of cosmetic damage to residential buildings begins at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz. It is also noted that below a PPV of 12.5mm/s, the risk of damage is negligible. Both standards highlight that important buildings that are difficult to repair may need special consideration on a case-by-case basis. However, historical buildings should not automatically be considered more sensitive

unless they are structurally unsound. A building in an unstable condition may be more susceptible to damage from vibration or other ground disturbances. Table 10.7 below outlines the proposed vibration thresholds below which no damage to buildings is expected. These limits apply to vibration frequencies under 15Hz, where stricter limits are necessary. In cases where protected buildings are near construction works, there may be an increased risk of vulnerability compared to modern structures. Therefore, as a precaution, the vibration limits for structurally sound buildings are reduced by 50%, as recommended by the referenced guidance documents.

Table 10-9: Transient Vibration Impact Criteria for Buildings (Conservative Criteria Below Which There is No Risk of Cometic Damage)[1]

Category of Building	Threshold of potential significant effect (Peak Particle Velocity - PPV - at building foundation) for Transient Vibration
Structurally sound and nonprotected buildings	12 mm/s
Protected and / or potentially vulnerable buildings	6 mm/s

10.5.3.1.1 Human Perception

It is acknowledged that humans are sensitive to vibration stimuli and that perception of vibration at high magnitudes may lead to concern. Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s (BS 6472-1:2008) and may become disturbing or annoying at higher magnitudes. Higher levels of vibration are acceptable for brief or one-off events, especially during construction projects, provided the source of the vibration is known. For continuous vibration sources like traffic, vibrations become noticeable at around 0.5mm/s (TII - Noise and Vibration Assessment of Proposed National Roads) and can become disturbing or annoying at higher levels. However, short-term or isolated events are typically more tolerable. For example, intermittent activities like blasting and piling, which are common during construction, are usually tolerated at vibration levels of up to 12mm/s and 2.5mm/s, respectively. This guidance applies only during the daytime, as it is unreasonable to expect people to tolerate such activities at night.

10.5.3.2 Operational Phase

No sources of vibration are anticipated during the operational phase; therefore, specific vibration criteria have not been established for this stage.

10.6 Impact Assessments

10.6.1 Construction Phase

The construction programme is expected to generate typical site-related noise associated with various activities. Throughout the construction phase, a range of plant machinery will be employed, including excavators, lifting equipment, dumper trucks, compressors, and generators.

The proposed construction hours are from 07:00 to 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays.

Given the nature of daytime construction activities, significant noise levels may be generated. Vibration impacts at nearby sensitive receptors are limited to excavation operations and lorry movements over

[1] Source: "Guidelines for the Treatment of Noise & Vibration in National Road Schemes", NRA, 2004

uneven surfaces. Considering the type of works proposed, the likelihood of structural or cosmetic damage to adjacent dwellings from vibration is minimal.

As the construction schedule is currently outlined only in broad terms, precise calculations of noise emissions to the local environment are challenging. Nevertheless, typical noise levels can be predicted using the guidance provided in BS 5228-1:2009+A1:2014. Table 10-10 presents anticipated noise levels for various plant items during different construction phases, referenced at a standard distance of 10 m.

Table 10-10: Typical Noise Levels Associated with Individual Construction Plant Items

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB LAeq(1hour))
Site Preparation	Wheeled Loader Lorry (D3 1)	75
	Track Excavator (C2 22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Demolition	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Breaker Mounted on Backhoe (C1.2)	92
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7 6)	77
	Poker Vibrator (C4 33)	78
General Construction	Hand tools (D7.76)	81
	Tower Crane (C4.48)	76
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68

For the purposes of this assessment, it is assumed that standard best practice measures for controlling construction site noise will be implemented. These measures are discussed in greater detail within the mitigation section of this chapter.

Table 10-11 presents the predicted daytime noise levels at the nearest off-site receptor during an indicative construction period. The construction noise sources are assumed to operate for 50% of the time. Predictions are based on a 30-metre distance from the construction activities, representing a worst-case scenario when work is occurring adjacent to the site boundaries closest to existing residential properties.

Table 10-11: Typical Noise Levels Associated with Construction Plant Processes

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	BS5228 Reference Levels at 10M (dB)	Predicted at Receiver (30M Distance) dB

Site Preparation	Wheeled Loader Lorry (D3 1)	75	62
	Track Excavator (C2 22)	72	59
	Dozer (C2.13)	78	65
	Dump Truck (C4.2)	78	65
	TOTAL SITE PREPARATION		69
Demolition	Pulveriser on Tracked Excavator (C1.5)	72	59
	Tracked Crusher (C1.14)	82	69
	Breaker Mounted on Backhoe (C1.2)	92	79
	Dump Truck (C4.2)	78	65
	TOTAL DEMOLITION		80
Foundations	Tracked Excavator (C3.24)	74	62
	Concrete Pump (C3.25)	78	65
	Compressor (D7 6)	77	64
	Poker Vibrator (C4 33)	78	65
	TOTAL FOUNDATIONS		70
General Consttruction	Hand tools (D7.76)	81	68
	Tower Crane (C4.48)	76	63
	Pneumatic Circular Saw (D7.79)	75	62
	Internal fit – out	70	57
	TOTAL GENERAL CONSTRUCTION		70
Landscaping	Dozer (C2.13)	78	65
	Dump Truck (C4.2)	78	65
	Surfacing (D8.25)	68	55
	TOTAL LANDSCAPING		68

Construction noise levels are anticipated at times to reach a threshold that may result in a significant impact at the nearest noise-sensitive receptors. It will be necessary at such times to introduce mitigation measures such as a combination of source replacement (seeking out quieter methods of carrying out work), path blocking (introducing high-performance acoustic hoarding or barriers), and operational controls (scheduled periods for carrying out high noise activities), this may result in bringing exceedance down to a negligible or fully compliant level. It should be noted that the predicted noise levels presented in this section are indicative. Additionally, these noise levels are expected to occur only intermittently and affect only a limited number of properties. For the majority of the time and across most properties surrounding the Proposed Development, construction noise levels will be lower than those predicted.

In the direction of the nearest noise sensitive dwellings, vibration impacts during the construction phase are required to comply with the limits set out in Table 10-9.

10.6.2 Operational Phase

10.6.2.1 Associated Additional Road Traffic Noise on Public Roads

A Traffic Impact Assessment for the Proposed Development has been carried out by Punch Consulting Engineers and included in this EIAR. Data from this assessment has been used to estimate the anticipated changes in noise levels from the R445 adjacent the development site for both the opening year and the design year.

To evaluate the potential noise impact, it is important to examine the relative increase in noise caused by traffic on existing roads and junctions, comparing scenarios with and without the Proposed Development. Traffic flow, represented by AADT (Annual Average Daily Traffic) figures, has been analysed, and the resulting changes in noise levels for the opening year and design year are presented in Table 10-13 and Table 10-14.

Table 10-12: Change in Traffic Noise Levels with Proposed Development - Opening Year

Road	Opening Year AADT		Change in Noise Level dB (A)
	Without Development	With Development	
R445 – 602 m from Parkway Roundabout adjacent proposed site	28,300	29,000	<1dB

Table 10-13: Change in Traffic Noise Levels with Proposed Development - Design Year

Road	Design Year AADT		Change in Noise Level dB (A)
	Without Development	With Development	
R445 – 602 m from Parkway Roundabout adjacent proposed site	32,100	32,900	<1dB

The resultant calculated changes in noise levels due to increased traffic flow are considered imperceptible based on dwellings (high sensitivity) and negligible magnitude of change in noise levels as a result of such increases. Thus the <1dB change is considered as neutral (imperceptible) as per Table 3.8.1 (DMRB L.A.104:2020)

10.6.2.2 Mechanical and Electrical Sources Considered

The detailed design information as to the plant suggested for use within the overall development is yet fully known. However, upon full operation of the development, various electrical and mechanical plant systems will be present to service the site and associated commercial buildings. Such plant equipment typically generates noise to varying extents. Certain plant may operate continuously, including overnight periods when ambient noise levels are lower, making their noise emissions more noticeable. Plant with a direct line of sight to noise-sensitive receptors are likely to have the greatest potential impacts. The cumulative effects of noise emanating from all mechanical and electrical plant noise sources shall be required not to exceed the criterion set out within Section 10.5.2.3 for daytime and night-time at the nearest noise sensitive dwellings within the development.

- Daytime / Evening (07:00 to 23:00 hours) 50 - 55dB LAeq,1hr
- Night-time (23:00 to 07:00 hours) 45dB LAeq,15min

10.6.2.3 Inward Noise Impact

The dominant external noise influence on the Proposed Development is road traffic on the adjacent R445 corridor to the north. Secondary noise contributions arise from vehicle movements associated with the nearby Parkway Retail Park. These sources define the prevailing acoustic conditions across the site and form the basis of the inward noise assessment.

10.6.2.3.1 Existing Ambient Noise Climate

An environmental noise survey was undertaken at representative monitoring locations, NML1 and NML2. The results indicate daytime noise levels reaching approximately 55 dB LAeq, with evening and night-time levels reducing to around 51 dB LAeq and 48 dB LAeq respectively at the closest proposed residential façades. These findings confirm that road traffic is the primary noise source affecting the site. The results of measurement are summarized in Section 10.3 of this chapter.

To assess the inward noise impact on the proposed noise-sensitive residential units, it is necessary to estimate the internal noise levels within these buildings. These internal levels can then be evaluated against the relevant criteria outlined in BS 8233:2014, as summarized in Section 10.5 (10.6).

Internal noise levels within the proposed residential properties can be calculated by considering the current and anticipated noise environment, the design and construction of the buildings, and the sound insulation properties of building elements such as walls, roofs, and glazing.

10.6.2.3.2 Noise Model of Site

To estimate noise levels across the site, an acoustic model was developed and initially calibrated using on-site noise survey data. Proprietary noise calculation software, INoiseV2024.3, was employed to establish the prevailing noise environment at the Proposed Development. This software computes noise levels based on the specified noise sources in accordance with established methodologies.

The following information was included in the model:

- Site layout drawings of Proposed Development overlaid onto the existing sites curtilage;
- Calibrated Google mapping of the site's location.

10.6.2.3.3 Calibration of the INoise Model

Noise levels recorded during the partially attended survey at locations NML1 and NML2 were used to calibrate the acoustic model. Corresponding noise levels were then calculated at these locations using the developed model. The results, presented in Table 10-14 and Table 10-15, cover daytime (07:00 to 19:00), evening (19:00 to 23:00), and night-time (23:00 to 07:00) periods and are compared against the measured onsite data.

Table 10-14: Predicted & Measured Noise Levels at Development Site – NML1

Location	Time Period	Measured Noise Level, dB	Predicted Noise Level, dB
NML1	Daytime	55	54
	Evening	51	51
	Night-time	48	48

Table 10-15: Predicted & Measured Noise Levels at Development Site – NML2

Location	Time Period	Measured Noise Level, dB	Predicted Noise Level, dB
NML2	Daytime	53	53
	Evening	49	48
	Night-time	46	45

10.6.2.3.4 Noise Risk Classification for the Site

In accordance with the methodology set out in ProPG, as detailed in Section 10.5, the acoustic model was utilised to predict noise levels across the site. The results of this assessment are illustrated in Figure 10-3 and Figure 10-4, representing daytime and night-time periods, respectively.

Figure 10-3: Predicted Existing Noise Contour Across the Site - Daytime

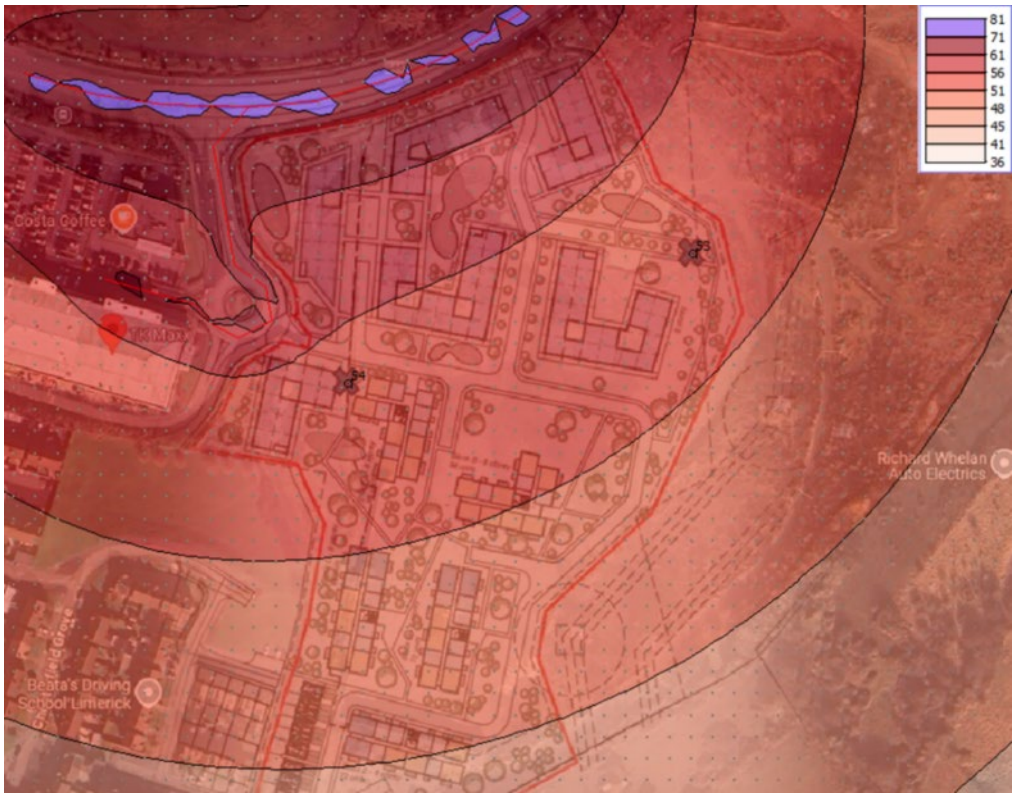
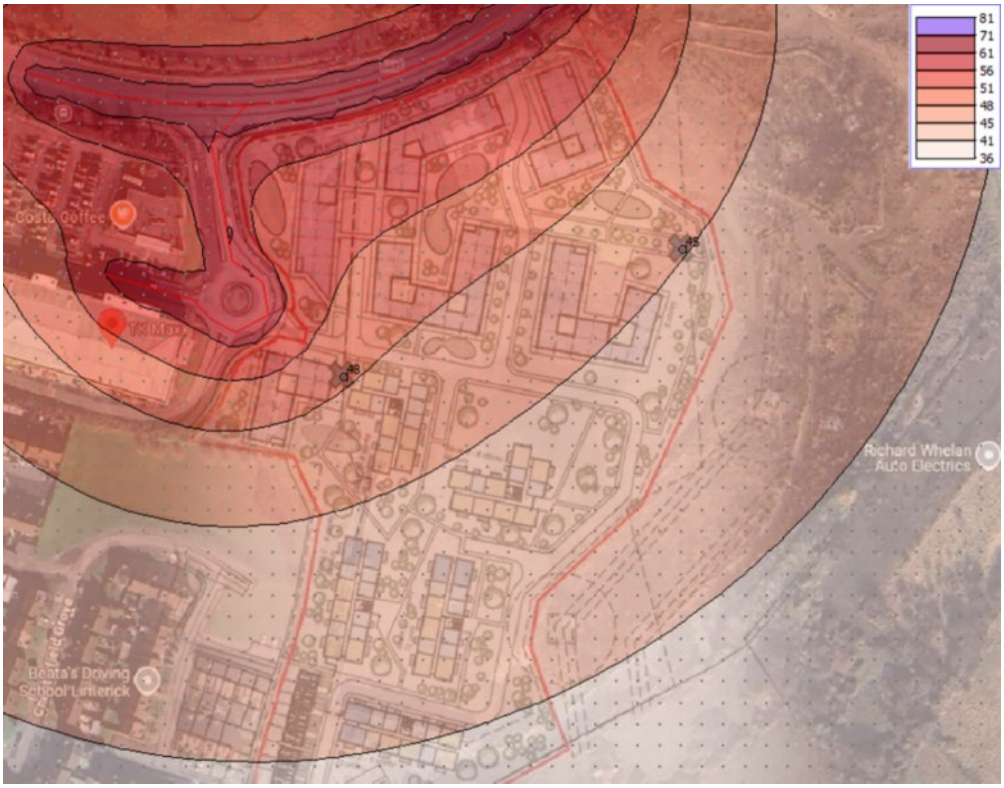


Figure 10-4: Predicted Existing Noise Contour Across Site - Night-time



Please note that Figure 10-3 and Figure 10-4 display the proposed site layout overlaid on the current vacant site. No calculations within these noise models account for the presence of the Proposed Development; these noise contours represent existing conditions on the undeveloped site and serve calibration purposes only.

Calculated road traffic noise levels across the majority of the site—where residential dwellings are proposed—range between 45 and 55 dB LAeq,16hr during daytime periods. Night-time noise levels across the proposed residential areas range from approximately 35 to 48 dB LAeq,8hr. The portion of the site nearest to the R445 roadway experiences higher noise levels, up to 70 dB LAeq; however, this area is designated for commercial development rather than residential use.

Using the ProPG Stage 1 assessment framework, the site is classified as exhibiting a Low to Medium Noise Risk. This classification is based on measured ambient noise levels and the presence of occasional LAFmax events above 60 dB during night-time periods.

Furthermore, the Stage 1 Noise Risk Assessment requires analysis of LAFmax noise events. The Dalton Acoustics Ltd survey recorded no exceedances of 80 dB during night-time hours. However, as per ProPG guidance, a site should not be classified as negligible risk if more than 10 LAFmax events exceed 60 dB during the night. Given that this threshold was exceeded more than 10 times, the site is appropriately classified as low to medium risk according to ProPG criteria.

ProPG states the following with respect to low and medium noise risks:

- Low Risk: At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
- Medium Risk: As noise levels rise, the suitability of a site from a noise perspective diminishes. Planning permission may be denied unless a thorough acoustic design process is carried out and

presented through an Acoustic Design Statement (ADS). This statement must clearly outline how noise impacts will be addressed and minimized, ensuring that any significant adverse noise effects are avoided in the final development.

Based on these criteria, the development site is categorized as **Low to Medium Risk**. As a result, an Acoustic Design Strategy is required to ensure that suitable measures are implemented to mitigate and minimize noise impacts, preventing any adverse noise effects in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

> *'2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design.'*

Therefore, following the ProPG guidance does not rule out residential development on sites with medium noise risk. Instead, it highlights the importance of a well-planned design approach to effectively address noise impacts on higher-risk sites. The primary goal of the ProPG framework is to ensure that the best possible acoustic conditions are achieved for each individual development site.

10.6.2.3.5 Façade Noise Levels

Noise levels across the development site have been predicted for both daytime and night-time periods using the established noise model. All proposed residential façades experience noise levels below 55dB LAeq,16hr during the day and 50dB LAeq,8hr at night.

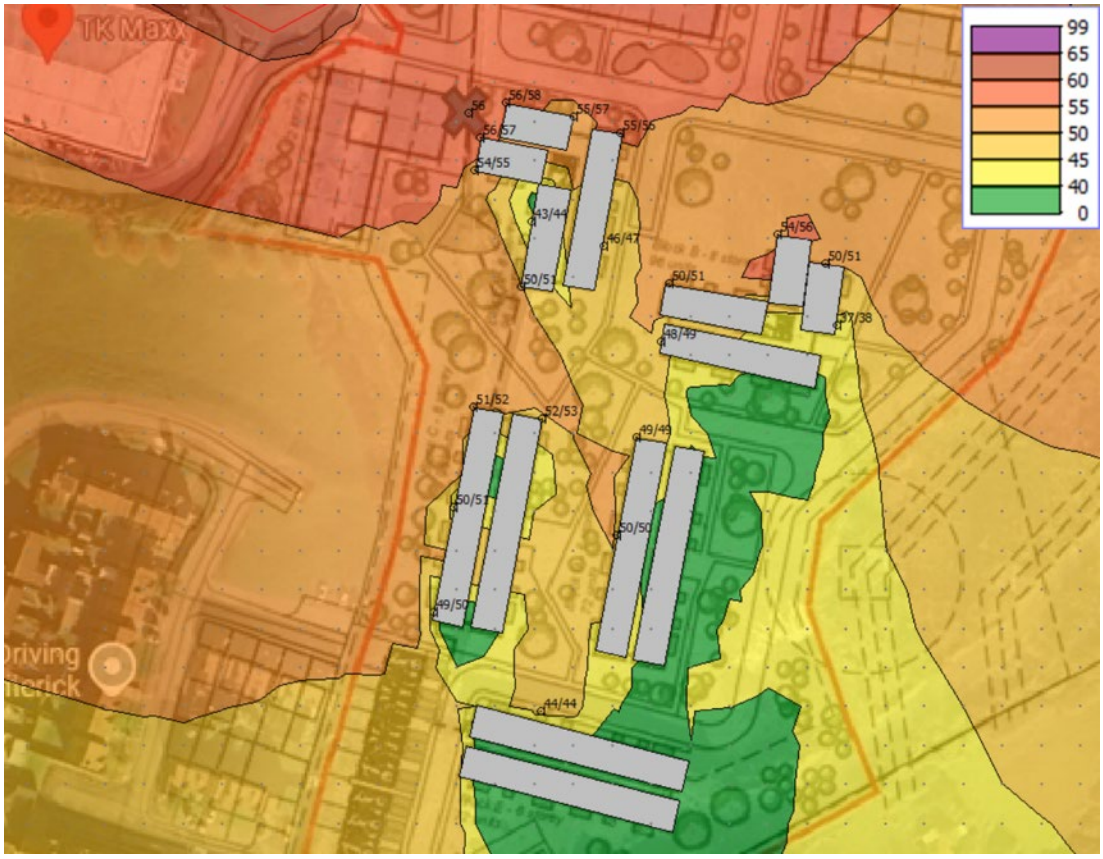
BS8233: 2014 7.7.2 "Internal ambient noise levels for dwellings', NOTE 7 states;

> *'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.'*

This indicates that reasonable internal noise conditions can be maintained while allowing for natural ventilation through open windows. For dwellings with façade noise below these thresholds, no additional mitigation measures are necessary.

Figure 10-5 illustrates the proposed dwelling locations on a daytime noise contour map of the site. These dwellings will benefit from additional acoustic shielding provided by the planned commercial buildings closer to the R445 road. However, as the exact design of these commercial buildings is not yet finalized, they have not been included in the INoise model calculations. Consequently, the actual traffic noise levels are expected to be lower than those shown in Figure 10-5. Figure 10-5 does however indicate the attenuation provided across the site by the presence of the proposed domestic dwellings.

Figure 10-5: Daytime levels across the dwellings on the proposed site 58 – 44dB(A)



Noise levels across the site are expected to decrease during the night-time periods, consistent with the values shown in Table 10-14 and Table 10-15**.**

The Lnight has been measured at 48dB for NML1, representing the nearest proposed dwellings facades to the R445. Lnight is a 7dB reduction on the measured daytime levels from 07:00 hours to 19:00 hours and a 3 dB reduction on the evening time hours of 19:00 to 23:00 hours.

The inward noise assessment demonstrates that, with the application of standard acoustic design measures such as appropriate façade specification, glazing performance, and ventilation strategies, reasonable internal noise conditions may be achieved throughout the proposed residential development. Predicted internal noise levels within the proposed dwellings have been derived from external façade conditions, including scenarios where windows are partially open. These internal levels have been assessed against the criteria set out in BS 8233:2014 and ProPG, which recommend internal noise limits of 35 dB LAeq,16hr for daytime living spaces, 30 dB LAeq,8hr for night-time bedrooms, and 45 dB LAmax, with limited exceedances considered acceptable. Where applicable BS8233:2014 'Internal Ambient Noise Levels for Dwellings' Note 7 states:

> *'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.'*

Therefore, inward noise impacts are considered ***not significant*** in the context of the EIAR.

10.6.2.3.6 External Noise Levels

External amenity spaces within the development are generally expected to fall within the ProPG desirable guideline range of 50–55 dB LAeq,16hr. Elevated noise levels are primarily confined to areas in closer proximity to the R445, which are not intended to serve as principal amenity areas.

10.7 Remedial and Mitigation Measures

10.7.1 Construction Phase

The construction phase assessment indicates that significant noise and vibration impacts are unlikely. However, the contractor will implement best practice noise and vibration control measures throughout construction to prevent any significant disturbance to the nearest sensitive receptors. These measures will follow the guidelines outlined in BS 5228 (2009 + A1:2014) Parts 1 and 2, covering key mitigation strategies such as:

- Use and selection of quiet equipment options;
- All equipment to be properly maintained;
- Silencers to be used on all plant and machinery where possible;
- Controlling noise at its source;
- Limiting the hours of high noise or vibration processes;
- Continuous noise and vibration monitoring to be employed on site;
- Installation of screening barriers; and
- Regular communication with the local community.

During the project's construction phase, some nearby residential properties may occasionally experience temporary noise disturbances caused by on-site operations and vehicle movements to and from the site.

Through enforcement of strict noise limits, monitoring on site, the restriction of working hours, and application of the above listed mitigation strategies, these impacts will be managed with the intention of remaining within acceptable limits.

10.7.2 Operational Phase

10.7.2.1 Additional Traffic on Adjacent Roads

The addition of the Proposed Development on the site is considered to add a negligible amount of vehicular movements when compared to the existing passing traffic numbers on the R445. The predicted additional vehicular traffic as a result of the development proceeding is less than 1% of the vehicular traffic against the development not being present. The resultant is negligible when considering the associated noise implications. Therefore, during the operational phase, no specific noise mitigation measures are required in relation to traffic noise generated by the development. Access to the site will be directly from the R445 roadway, with no vehicular connections to the adjacent residential estates, thereby minimizing traffic noise impacts on those areas.

10.7.2.2 Building Services Plant

Given that the nearest sensitive receptors are within the development itself and closer than any off-site receptors, compliance with the noise criterion outlined in 10.5.2.3 may apply:

- Daytime / Evening (07:00 to 23:00 hours) 50 - 55dB LAeq,1hr
- Night-time (23:00 to 07:00 hours) 45dB LAeq,15min

This will ensure that no adverse noise impacts occur at any off-site locations. Consequently, no additional mitigation measures are deemed necessary for building services plant noise.

10.8 Predicted Noise Impact of the Proposed Development

10.8.1 Construction Phase

During the construction phase, temporary / short-term noise, and vibration impacts on nearby noise-sensitive properties, may arise from site activities. The application of enforceable noise limits and restricted hours of operation, combined with the implementation of appropriate noise and vibration control measures previously outlined, will ensure that any noise and vibration impacts are minimized as far as reasonably practicable.

Overall, construction noise and vibration impacts are anticipated to be short-term and / or temporary, ranging from slight to moderate in severity as per Table 10-10.

10.8.2 Operational Phase

The predicted increase in noise levels due to additional traffic is expected to be imperceptible along the existing road network. Within the context of the current noise environment, the overall contribution from induced traffic is considered neutral, imperceptible, and of long-term duration at nearby residential locations.

The impact from any proposed mechanical and electrical plant associated with the new buildings will be required to comply with the daytime and night-time noise criteria set out in Section 10.5.2.3. These metrics prescribed for daytime and night-time include the cumulative noise effects of all proposed mechanical and electrical plant items. As a result, noise generated by building services plant should remain well within the adopted daytime and night-time noise limits at all nearest sensitive receptors. Provided that operational noise levels do not exceed the stated design criteria, the residual noise impact from building services plant will be neutral, imperceptible, and long-term.

10.9 Monitoring or Reinstatement Measures

10.9.1 Construction Phase

The contractor will be required to ensure that construction activities comply with the noise limits established in this assessment. Regular noise monitoring must be conducted at locations representative of the nearest sensitive receptors to verify that the relevant criteria are not exceeded.

Noise monitoring shall be carried out in accordance with the International Standard ISO 1996:2017 – Acoustics "Description, measurement, and assessment of environmental noise."

10.9.2 Operational Phase

Noise or vibration monitoring is not required once the development is operational.

10.10 Cumulative Impacts

This section considers whether the Parkway Valley development, when taken together with other existing and planned developments in the area, could lead to increased noise or vibration effects. The assessment looks at both the construction and operational phases, alongside established noise sources such as traffic on the R445 and activity within the Parkway Retail Park.

10.10.1 Construction Phase

During construction, there may be potential for cumulative impacts if works on nearby sites take place at the same time. In these situations, noise levels could temporarily increase due to multiple sources operating concurrently, including construction plant and associated traffic. However, these effects would be short-term in nature and heavily rely on attenuation over distance.

A review of foreseeable local development which may overlap in time suggests that such developments are between 500 to 750 m distance from the Parkway Valley development site and nearby identified NSLs, these are considered for study purposes and outside the sphere of influence. Due to attenuation over distance and considering the existing soundscape of this urban location cumulative noise emissions from these localized sites may blend into the background.

With standard mitigation measures in place—such as controlling working hours, using well-maintained equipment, and managing construction traffic—any cumulative impacts during this phase are expected to remain limited and not significant.

Similarly for vibration, developments between 500 m and 750 m are considered negligible as typical vibration levels attenuate much more quickly than airborne noise, unless there are exceptional activities (e.g., blasting, piling in sensitive ground conditions).

10.10.2 Operational Phase

For the operational phase, the main consideration is the combined effect of traffic generated by this and other developments on the surrounding road network, particularly the R445. While each development may only contribute to a slight increase in traffic, the combined effect could lead to a slight rise in overall noise levels. That said, the area is already influenced by existing road traffic, and the additional contribution from the Proposed Development is not expected to materially change the existing noise environment or result in significant adverse effects.

Operational vibration impacts are not anticipated to be significant, either individually or cumulatively, as the proposed domestic development does not include sources typically associated with notable vibration generation, and traffic-related vibration effects are expected to remain negligible at nearby receptors.

Overall, considering the current noise environment, the nature of the Proposed Development, and the use of standard mitigation measures, cumulative noise and vibration effects are not considered to be significant.

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Chapter 11 – Townscape and Visual Impact

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11. TOWNSCAPE AND VISUAL IMPACT

11.1 Introduction

This Townscape and Visual Assessment (TVIA) has been prepared to accompany a planning application for an LRD development that comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development. The current LRD development proposals also extend to the R445 to accommodate a proposed entrance from the R445. They will also include a proposed nature based surface water drainage solution within the neighbouring Groody Valley green wedge.

This TVIA describes the townscape context of the Proposed Development and assesses the likely townscape and visual impacts of the scheme on the receiving environment. Although closely linked, townscape and visual impacts are assessed separately.

- Townscape Impact Assessment (TIA) relates to assessing effects of a development on the Townscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the townscape, the aesthetic and perceptual aspects of the townscape and its distinctive character.
- Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the townscape and/or introduction of new elements. Visual impacts may occur from; Visual Obstruction (blocking of a view, be it full, partial or intermittent) or; Visual Intrusion (interruption of a view without blocking).

11.1.1 Approach and Statement of Authority

This TVIA adopts an approach that is founded in the following best practice guidance documents:

- Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) publication entitled Guidelines for Landscape and Visual Impact Assessment, 2013 (GLVIA3);
- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022)'; and
- 'Photography and Photomontage in Landscape and Visual Impact Assessment', Landscape Institute Technical Guidance Note 06/2019.

11.2 Methodology

This document uses methodology as prescribed in the previously mentioned GLVIA3. Given the site's context, this is principally a 'townscape' assessment, albeit the assessment utilises the same outline methodology as would be employed for the more familiar Landscape and Visual Impact Assessment (LVIA) of developments in rural settings.

GLVIA3 follows the European Landscape Convention (ELC) definition of landscape:

> *'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000). Thus, GLVIA-2013 covers all landscapes from "high mountains and wild countryside to urban and fringe farmland (rural landscapes), marine and coastal landscapes (seascapes) and the landscapes of villages towns and cities (townscapes)" - whether protected or degraded.*

Townscape is defined in GLVIA3 in the following manner (section 2.7):

> *'Townscape' refers to areas where the built environment is dominant. Villages, towns and cities often make important contributions as elements in wider-open landscapes but townscape means the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban spaces, including green spaces, and the relationship between buildings and open spaces. There are important relationships with historic dimensions of landscape and townscape, since evidence of the way the villages, towns and cities change and develop over time contributes to their current form and character.*

In the context of 'townscape' it is recognised that there is a strong interrelationship between the 'townscape' and 'cultural heritage' assessments. As stated in section 5.11 of GLVIA;

> *"the sharing of relevant baseline information should not be confused with the need for separate cultural heritage appraisals such as historic landscape characterisation and assessment of historic townscape appraisal, or there will be a danger of both double handling and inappropriate judgements by non-experts. It is particularly important that responsibilities are clear in considering any effects on the settings and views for historic buildings, conservation areas and other heritage assets."*

The identification of heritage assets in this assessment is made to indicate the value and quality of the wider townscape character as well as provide an indication of areas from which views are potentially more sensitive to change.

11.2.1 Scope of the Assessment

GLVIA3 establishes guidelines and not a specific methodology. The preface recognises that:

> **'***This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand.'*

The methodology for this assessment has therefore been developed specifically for this assessment to ensure that it is appropriate and fit for purpose. The TVIA Methodology can be summarised as undertaking the following key tasks:

- Desk study and site visits in September 2025;
- Defining the Baseline Landscape setting and conditions;
- Identification and Evaluation of key components of the Proposed Development;
- Consideration of Mitigation Measures;
- Assessment of Landscape Effects;
- Assessment of Visual Effects; and
- Summary Statement of Significance.

11.2.2 Forecasting Methods and Difficulties Encountered

There is a roadside hoarding currently in place along the Dublin Road to the northeast of the site which limits the understanding of foreground context in photomontage views from that section of road. Otherwise, there were no particular difficulties encountered in the assessment of Townscape and Visual effects.

11.2.3 Study Area

The Proposed Development is contained within the urban / peri-urban context of Limerick City where the key consideration is its influence on townscape and visual amenity within the immediate vicinity. With this

in mind, and considering the general diminishment of effects over distance, a proportionate focus is placed on the townscape within approximately 1km of the development and this will be the extent if the study area in this instance. (refer to Figure 11.1).

Figure 11.1 1km Extent of the Study Area

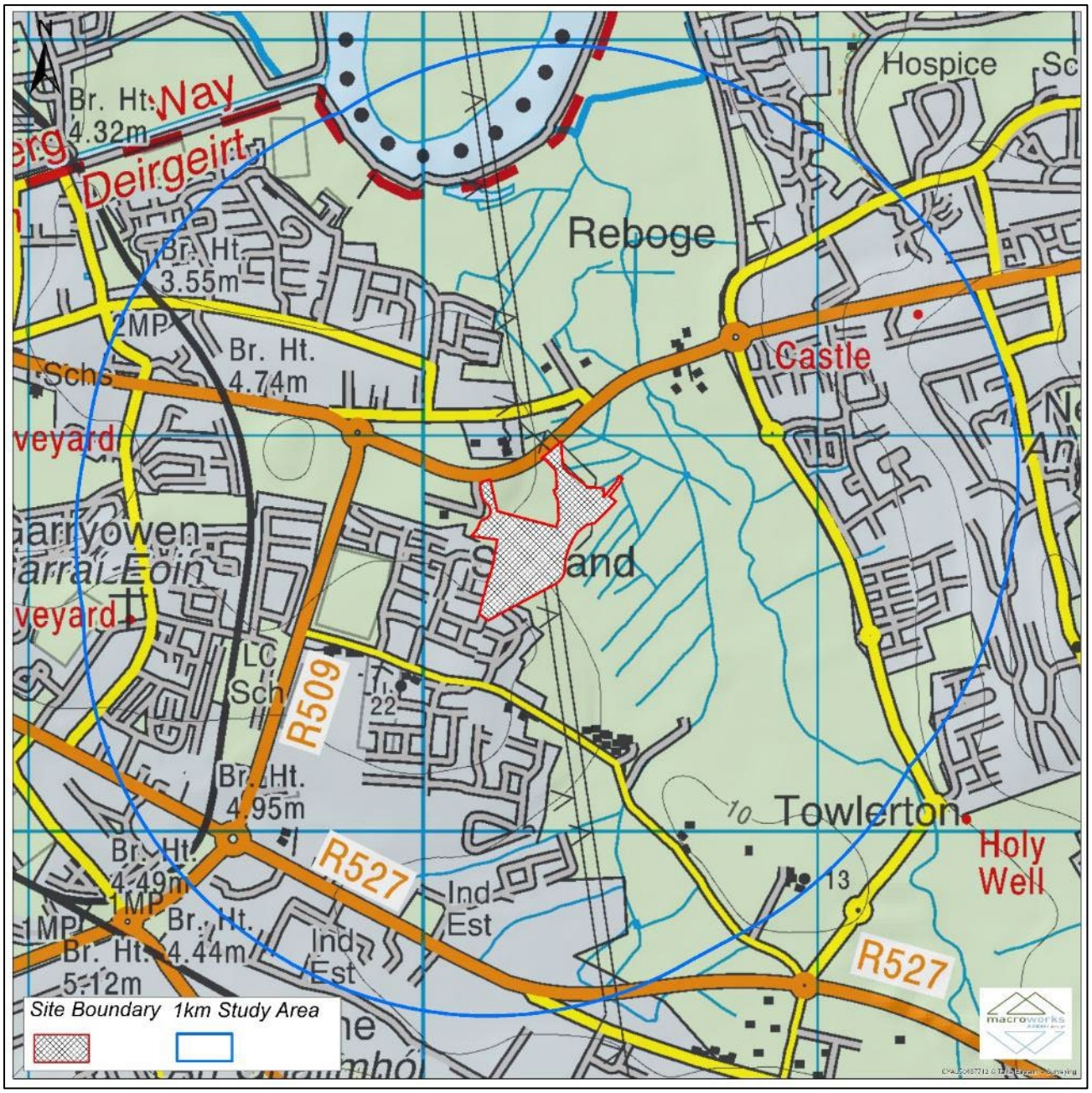


Figure 11.2 1km Extent of the Study Area (Aerial Photography)

11.2.4 Townscape Impact Assessment Criteria

This part of the TVIA provides an assessment of how the introduction of the Proposed Development will affect the physical features and fabric of the townscape, and then how the proposals influence townscape character with reference to published descriptions of character and an understanding of the contemporary character of the townscape as informed through desktop and site studies.

When assessing the potential townscape effects of the development, the value and sensitivity of the townscape receptor is weighed against the magnitude of impact to determine the significance of the townscape effect. Criteria outlined below are used to guide these judgements.

11.2.4.1 Townscape Sensitivity

The sensitivity of the townscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. In accordance with GLVIA3, the sensitivity of a townscape receptor (Townscape Character Area or feature) is derived from combining judgements in relation to its susceptibility to change and its value. The judgement reflects such factors as its quality, value, contribution to townscape character and the degree to which the particular element or characteristic can be replaced or substituted. Townscape Sensitivity is classified using the following criteria set out in Table 11.1.

Table 11.1 Townscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the townscape character exhibits a very low capacity for change in the form of development. Examples of which are high value townscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the townscape character exhibits a low capacity for change in the form of development. Examples of which are high value townscapes, protected at a national or regional level where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the townscape character exhibits some capacity and scope for development. Examples of which are townscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the townscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated townscapes that may also have some elements or features of recognisable quality, where townscape management objectives include, enhancement, repair and restoration.
Negligible	Areas of townscape character that include derelict sites and degradation where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of townscape improvements and/or restoration.

11.2.5 Visual Impact Assessment Criteria

This part of the TVIA provides an assessment of how the introduction of the Proposed Development will affect views within the townscape. It therefore needs to consider:

- Direct impacts of the Proposed Development upon views through intrusion or obstruction;
- The reaction of viewers who may be affected, e.g. residents, walkers, road users; and
- The overall impact on visual amenity.

It has been deemed appropriate to structure the assessment around a series of representative viewpoint locations. All viewpoints are located within the public domain and are representative of views available from main thoroughfares and pedestrian areas within the vicinity of the Proposed Development. The selected viewpoints are considered to be comprehensive in communicating the variable nature of the visual effects.

When assessing the potential visual effects of the development, the sensitivity of the visual receptor is weighed against the magnitude of the visual impact to determine the significance of the visual effect. Criteria outlined below are used to guide these judgements.

11.2.5.1 Sensitivity of Visual Receptors

As with townscape sensitivity, the sensitivity of a visual receptor is categorised as Very High, High, Medium, Low, and Negligible. Unlike townscape sensitivity however, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the townscape context of the viewer, the likely activity the viewer is engaged in and whether this heightens their awareness of the surrounding environment.

A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each viewpoint location.

11.2.5.2 Susceptibility of Visual Receptors to Change

In accordance with GLVIA3, visual receptors most susceptible to changes in views and visual amenity are:

- "Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the townscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the townscape setting enjoyed by residents in the area;
- Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".
- Visual receptors that are less susceptible to changes in views and visual amenity include;
- "People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the townscape;
- People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".

11.2.5.3 Value attached to Views

The value attached to a view is determined by considering the following:

- Recognised scenic value of the view (Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;
- Views from within highly sensitive townscape areas. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the townscape around them;
- Primary views from residential receptors. Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity;
- Intensity of use, popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;
- Provision of vast, elevated panoramic views. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding townscape at locations that afford broad vistas;
- Sense of remoteness and/or tranquillity. Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;

- Degree of perceived naturalness. Where a view is valued for the sense of naturalness of the surrounding townscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;
- Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable townscape / townscape feature such as a cathedral or castle;
- Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
- Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain townscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;
- Integrity of the townscape character. This looks at the condition and intactness of the townscape in view and whether the townscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
- Sense of place. This considers whether there is special sense of wholeness and harmony at the viewing location;
- Sense of awe. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity, and no relative importance is inferred by the order of listing.

It is recognised that a viewer's interpretation and experience of the townscape can have preferential and subjective components. Where relevant, judgements are made on those elements of the townscape that are considered to contribute more prominently and positively to the visual townscape resource as well as those elements that contribute negatively. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

11.2.5.4 Magnitude of Change - Visual

The magnitude of change is again a product of the scale, extent, or degree of change that is likely to be experienced as a result of the Proposed Development. This is directly influenced by its 'visual presence / prominence', as experienced by visual receptors in the townscape. These terms are somewhat quantitative in nature, and essentially relate to how noticeable or 'dominant' the proposal is within a particular view. Aside from the obvious influence of scale and distance, a development's visual presence is influenced by the extent and complexity of the view, contextual movement in the townscape, the nature of its backdrop, and its relationship with other focal points or prominent features within the view. It is often, though not always, expressed using one of the following terms: Minimal; Sub-dominant; Co-dominant; Dominant; Highly dominant. Criteria used to inform judgements are provided in Table 11.3.

Table 11.2 Magnitude of Change - Visual

Criteria	Description
Very High	Complete or very substantial change in view, dominant, involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g., through removal of key elements.
High	A major change in the view that is highly prominent and has a strong influence on the overall view. This may involve the substantial obstruction of existing views or a complete change in character and composition of baseline, e.g. through removal of key elements or the introduction of new features that would heavily influence key elements.

Criteria	Description
Medium	Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e., pre-development view through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.
Low	Minor change in baseline, i.e. pre-development view - change would be distinguishable from the surroundings whilst composition and character would be similar to the pre change circumstances.
Negligible	Very slight change in baseline, i.e. pre-development view - change would be barely discernible. Composition and character of view substantially unaltered.

11.2.6 Significance of Effect

The significance of a townscape or visual effect is based on a balance between the sensitivity of the receptor and the magnitude of change, and is categorised as Profound, Substantial, Moderate, Slight, or Imperceptible. Intermediate judgements are also provided to enable an effect to be more accurately described where relevant. 'No Effect' may also be recorded as appropriate where the effect is so negligible it is not noteworthy.

The significance category judgement is arrived at using the Significance Matrix at Table 11.4 as a guide. This applies the principle of significance being a function of magnitude weighed against sensitivity but employs slightly different terminology that avoids the potentially confusing use of the term 'significant' (as recommended by GLVIA3 Statement of Clarification 1/13 (Landscape Institute, 10th June 2013)).

Indicative criteria descriptions used in relation to the significance of effect category are presented at Table 11.5.

Table 11.3 Significance Matrix

	Sensitivity of Receptor				
Magnitude	**Very High**	**High**	**Medium**	**Low**	**Negligible**
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

11.3 Receiving Environment

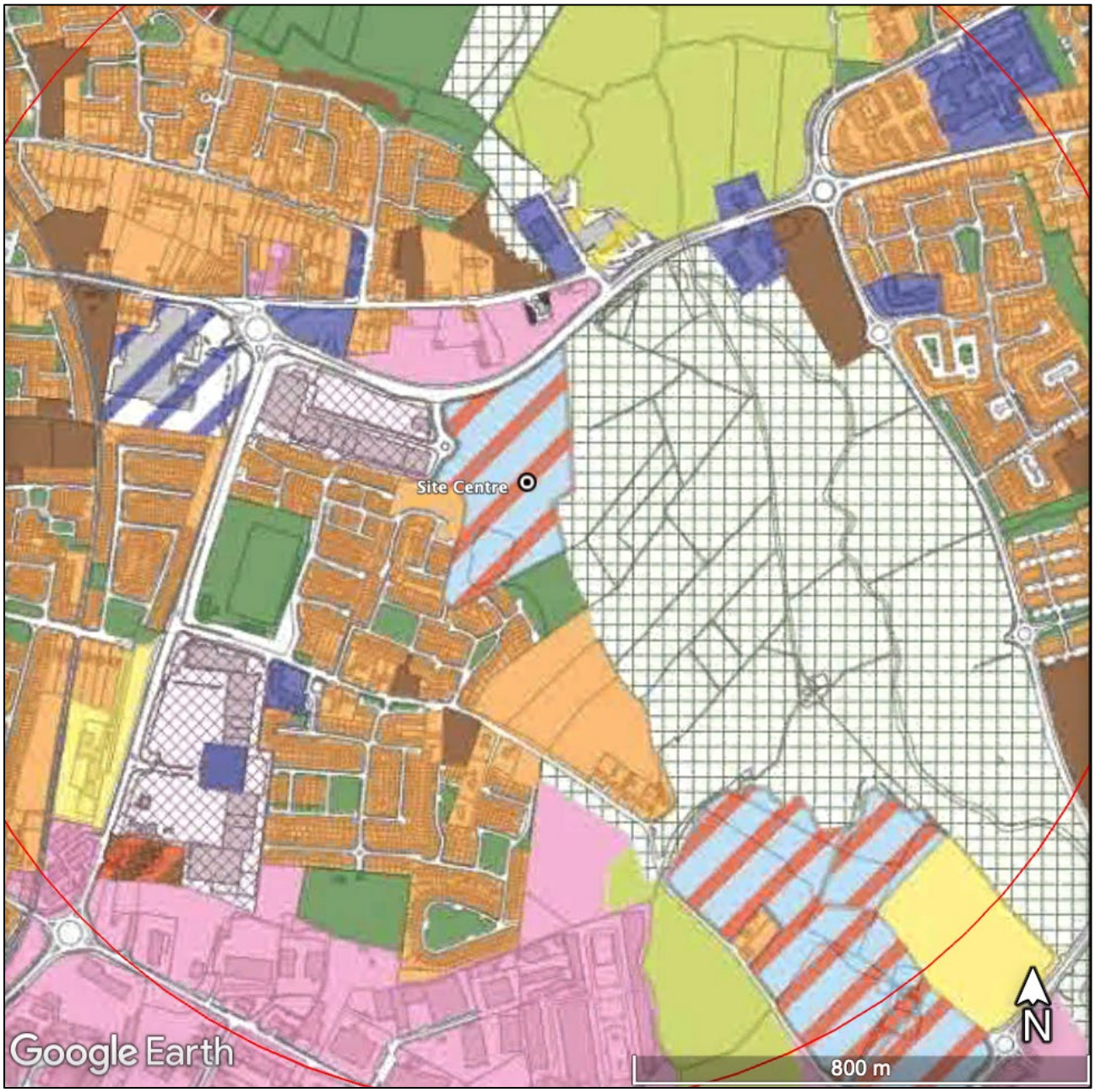
11.3.1 Townscape and Visual Policy Context and Designations

11.3.1.1 Limerick County Development Plan 2022-2028

The site is subject to the land use policies and objectives of the Limerick County Development Plan (LDP) 2022-2028. The LDP provides a framework to guide future development within the county and accordingly contains many policy objectives that deal with strategic planning issues.

The site is zoned for Mixed Use as shown in Figure 11.3 below.

Figure 11.3 1km Extract from Limerick City and Suburbs Zoning Map



Under Chapter 3 of the LDP, Objective PV 01 Parkway Valley states:

The former Horizon Mall brownfield site of 16.04ha. comprising a mixed-use zone is located adjacent to the Parkway Retail Park in the townland of Singland. The vision for development of these lands will be focused on the creation of a high-quality environment in terms of design and layout, a mixture of functions, tenure types, unit sizes and the provision of a broad range of on-site facilities for employees. The principal uses shall be for employment creation. A range of other uses are considered open for consideration but are seen as ancillary to the primary use as an employment zone. An element of residential use may be considered, where the Proposed Development makes a positive contribution to the area in terms of adding to the richness and diversity of uses. The retail needs of the area are being sufficiently met by the adjoining retail parks and shopping centres and the provision of retail development will not be permitted.

It is an objective of the Council to:

Require preparation of a masterplan by a suitable qualified person, with accompanying design statements showing how the design concepts are consistent with the following principles:

i) Demonstrating the internal organisation of land uses, amenities and the layout of each block, the detailed design of individual buildings and spaces, including private and collective amenity areas, hard and soft landscaping, materials, finishes, street furniture, signage and lighting. Finishes, materials and heights shall be consistent with the overall development of the site.

ii) Given the strategic location of the site on the R445 Dublin Road, there is potential for landmark buildings.

iii) The purpose of the link street is to improve connectivity within the area and the layout, location and design of new streets/roads will be determined at planning application stage.

Support development of the area as a major employment centre with supporting facilities such as crèches and amenity areas for employees and visitors. A high standard of urban design will be required throughout the site in order to create a high- quality environment with a defined sense of place, functionally and physically connected to the existing and permitted development on surrounding lands.

Support development of a civic square and streets with active frontage. The public realm will be characterised by a high standard of finishes and treatments. A network of high-quality spaces formed by the highest quality of buildings, paving and landscaping is required. Architecturally designed buildings and open plazas, using high quality finishes will define civic spaces.

Development shall be double fronted and shall address the Groody Park, the Dublin Road and streets and civic spaces within the development.

Ensure a sufficient mix of uses, including a maximum of 48% of development for residential use, which shall be appropriately integrated with other development on site to create a successful mixed-use development.

Encourage the use of underground parking, which shall be sensitively located and adequately screened.

Ensure provision of a network of pedestrian and cycle routes through the lands linked to the Groody Valley Green Wedge. Details of these linkages will be required in the masterplan.

Enable access via one entry point only along the R445 Dublin Road, with potential for a new access point to link with the Tipperary Road.

Ensure adequate provision of social and community facilities within the site, to serve existing and future residents. Provision shall be made for childcare facilities, playground and facilities suitable for a range of age groups including walking paths and community meeting space.

It should be noted that there is currently a proposed variation to the Limerick County Development Plan (Draft Variation 3) out for submissions, which has specific relevance to the Parkway Valley masterplan area. This variation includes a revised Objective PV 01, which allows for a greater proportion of the Parkway masterplan area to be utilised for residential development. The main change is to Design Principle (i), which now states;

(i) Residential development shall constitute the primary use on site and the masterplan shall identify the layout of each block, the detailed design of individual buildings and spaces, including private and collective amenity areas, hard and soft landscaping, materials, finishes, street furniture, signage and lighting. Finishes and materials shall be consistent across the whole site.

Further, design principle (i) (d) removes reference to a maximum of 48% residential development and now states;

Ensure a sufficient mix of uses, which shall be appropriately integrated with the residential development on site to create a successful mixed-use development.

11.3.1.2 LDP Urban Character Areas

The LDP defines the site as a gateway location between the Castletroy / University Gateway Urban Character Area (UCA) to the east and the Surrounding Suburban UCA to the west as shown in Figure 11.4 below.

Figure 11.4 Extract from LDP Map 3.6 Tall Buildings at City Level

The relevant character points and objectives for the UCAs within the 1km study area are:

- Infill and brownfield development patterns to be favoured
- River Groody Green Wedge to be retained
- Building Height Strategy to inform design of higher buildings

Whilst it is acknowledged that the LDP contains policy objectives that deal with many design and environmental considerations, those that are considered to be of particular relevance to townscape and visual issues are as follows:

Policy EH P8- Landscape/Townscape Character Areas

> *"It is a policy of the Council to promote the distinctiveness and where necessary safeguard the sensitivity of Limerick's landscape types, through the landscape characterisation process in*

accordance with the Draft Guidelines for Landscape and Landscape Assessment (2000) as issued by the Department of Environment and Local Government, in accordance with the European Landscape Convention (Florence Convention) and with A National Landscape Strategy for Ireland – 2015- 2025. The Council shall implement any relevant recommendations contained in the Department of Arts, Heritage and the Gaeltacht's National Landscape Strategy for Ireland, 2015 – 2025."

Objective EH O31- Views and Prospects

"It is an objective of the Council to:

a) Preserve, protect and encourage the enjoyment of views and prospects of special amenity value or special interests and to prevent development, which would block or otherwise interfere with views and/or prospects.

b) In areas where scenic views and prospects are listed in the Plan, there will be a presumption against development, except that required to facilitate farming and appropriate tourism and related activities. The development must be appropriately designed so that it can be integrated into the landscape."

11.3.1.3 County Scale Landscape Character Assessment

The National Landscape Strategy for Ireland 2015-2025 emphasizes the importance of understanding, protecting, managing, and planning landscapes by integrating landscape character assessments into decision-making processes. It advocates for the development of National and Regional Landscape Character Maps and Strategies. Below that is the Landscape Character assessment contained within the Limerick County Development Plan 2022-2028. Landscape character types are distinct types of landscape that are relatively homogenous in character. They are generic in nature in that they may occur in different localities throughout the City and County. At the county scale the site is located within the landscape character area defined as 'City' with the land immediately east of the site located within the character area defined as 'Castletroy'. The relevant objectives for the county scale character areas are:

- Infill and brownfield development patterns to be favoured
- River Groody Green Wedge to be retained

11.3.1.4 Limerick's Building Height Strategy Document (LBHSD)

The LBHSD is found in Volume 6 of the LDP. The site is defined in the LBHSD as the Parkway Valley Site opportunity area :

The former Horizon Mall brownfield site of 16.04ha is located adjacent to the Parkway Retail Park in the townland of Singland. The vision for development of these lands will be focused on the creation of a high quality environment in terms of design and layout, a mixture of functions, tenure types, unit sizes and the provision of a broad range of on-site facilities for employees.

Employment creation is a principal use for this site, with a range of other uses open for consideration, ancillary to the primary use as an employment zone. Due to the sites strategic location along the R445 Dublin Road, it is recognised that there is potential for increased building heights and that a masterplan which indicates building heights to include landmark buildings should be provided in any planning application made on this site.

The strategy states (p120):

> *Tall Buildings – Impact on Strategic Views*
>
> *Due to their massing, scale and height, tall buildings can impact on and detract from strategic views and prospects. As Limerick City has a relatively flat topography, elevated views are limited. The River Shannon, as the entrance to the City from the west and as a space that allows for wider views of the City Centre, is especially sensitive because of the panoramic views it offers.*
>
> *The impact of tall buildings on a particular view can be established through a visual impact assessment and by the use of verified views. While a tall building may impact a view, the nature of this impact can range from positive, to neutral or to harmful and therefore, needs to be examined.*
>
> *It is recognised that there are important viewpoints around the City such as the River Shannon and other panoramic views from vantage points both inside and outside the City, with three different view types identified i.e. linear views of landmark buildings, the City Walks and City skyline; river prospects; and approach road views. The impact of a tall building proposal on such views will need to be considered to avoid any negative visual impact or the situation where a tall building competes with an existing local landmarks, for example King John's Castle.*

The key vantage points into Limerick City are described as being of "strategic significance and special amenity value viewed by large numbers of people". They can also be views appreciated within a local context that are important to the character and legibility of areas within the city. The Proposed Development is within the viewshed of two of the four views listed:

- Westerly view from Annacotty Áth na Choite, Co. Limerick (Key Vantage Point 3), approximately 4.3km from the site.
- North-westerly view Ballyneety, Baile an Fhaoitigh, Co. Limerick (Key Vantage Point 4), approximately 4.1km from the site.

Neither vantage point is located within the 1km study area. Given the urban context, zoning, distance of view, and the relatively modest height, scale and massing of the proposals, the resultant visual effects arising from the proposals on these views are considered negligible and these are therefore scoped out of this TVIA.

In relation to local landmarks, key linear views, localised views and views towards the River Shannon, the site does not figure in those contained within the LBHSD.

11.3.2 Townscape Baseline

The townscape baseline represents the existing townscape context and is the scenario against which any changes to the townscape brought about by the Proposed Development will be assessed. A description of the townscape context of the proposed application site and wider study area is provided below under the headings of landform and drainage, vegetation and land use, centres of population and houses, transport routes and public amenities and facilities. Although this description forms part of the townscape baseline, many of the townscape elements identified also relate to visual receptors i.e. places and transport routes from which viewers can potentially see the Proposed Development. The visual resource will be described in greater detail in 11.3.3.

11.3.2.1 Landform and Drainage

The study area and wider townscape is composed of relatively flat terrain for the most part albeit the Groody River and minor valley landform including floodplain lie to the immediate east of the site. Topography on the eastern valley flanks of the Groody rises to approximately 30m AOD at the highest

point within the 1km study area. To the west of the Groody the highest point is approximately 20m AOD. The valley floor is approximately 8m AOD in the south of the study area. In the most northerly part of the study area the Groody meets the River Shannon and there is a broader floodplain at approximately 5m AOD.

The site has been previously developed with concrete retaining walls and development platforms cut into the east facing valley flanks. The majority of the site is generally flat, ranging from 8.4 to 9.64m AOD with a small parcel of land at 17m AOD in the south of the study area. There are steep banks around the edges of the site where the landform has been graded back. The northeastern parts of the site extend onto the valley floor at 5m AOD.

Figure 11.5 Aerial view of the site in relation to the adjacent townscape

11.3.2.2 Transport Routes

The site is well connected to public transport corridors, with access to bus routes 304 and 304A along Dublin Road that serve the area and connect it to Limerick city centre and the University of Limerick, University Hospital, retail parks and the train station. The area is well-connected by roads, with the R445 to the immediate north of the site being a strategic route running east - west. Other important roads include Bloodmill Road which is part of a strategic connection to recently developed mixed uses within the opportunity areas in the study area. There are also designated cycling routes in and around the study area, facilitating bicycle commuting and leisure cycling for residents, the closest of these is approximately 100m to the north of the site at its closest point

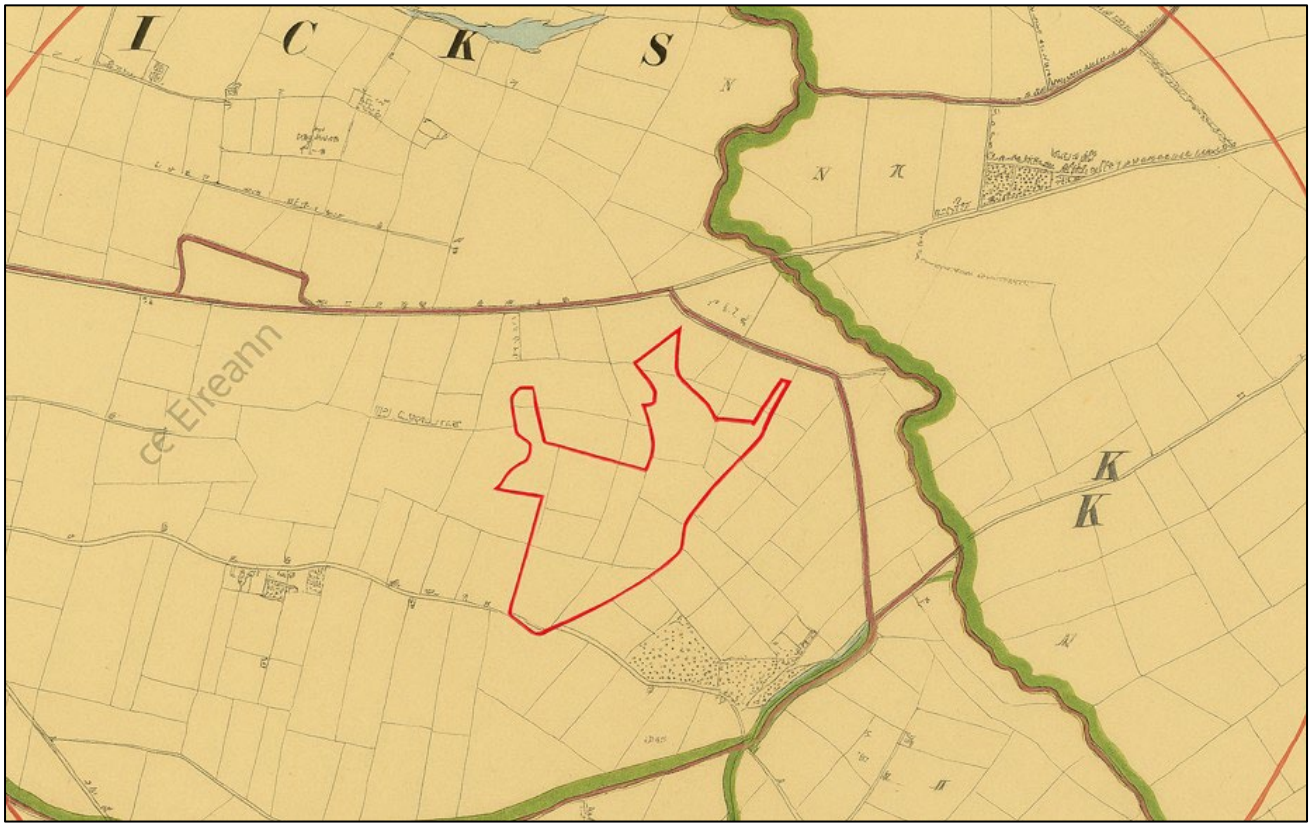
11.3.2.3 Public Amenity and Heritage Features

There are few archaeological and architectural features present in the study area that are open to the public / attract visitors (visual receptors). The only notable of which are Dromroe House and Glanleam House located approximately 850m and 950m to the northeast of the proposed site. The study area includes the local sports club Claughaun GAA pitch which lies approximately 200m southwest of the site. There are pocket of amenity green space consisting of grassland and occasional trees within the residential area to the west and southwest of the site. There is evidence in satellite imagery of walking routes within the Groody Valley to the east of the site. There is a walking trail along the Shannon in the northern extent of the study area.

11.3.2.4 Historical Context of Study Area

The historic and cultural relevance of the site and the wider landscape is dealt with in specific detail within the Cultural Heritage Assessment. However, consideration is given to cultural associations that have influenced the townscape evolution and patterns that are evident in today's townscape character.

Figure 11.6 Historic 6-inch Map (1837 to 1842)



The site formed part of a wider agricultural landscape as shown in Figure 11.6 above. There were no notable settlements or clusters of built form in the vicinity of the site albeit the original course of the Dublin Road can be discerned to the north of the site.

The majority of the built form in the study area appears to date from the 20th century. Through analysis of 21st century aerial photography, it is clear that the landscape surrounding the site has continued to change as a result of continued development pressure and urban expansion.

Land use within the study area is varied with approximately 50% residential, 25% undeveloped floodplain, 15% commercial/retail and the remainder infrastructure and industrial. There is a distinct area of

landscape change within the Towlerton opportunity area to the south-east of the site where new built form and infrastructure is being provided as part of planned change.

11.3.3 Visual Context

Given the concentration of built development in the townscape surrounding the site, views towards the site are restricted from many locations in the wider study area. Views of the site are generally contained within the immediate streetscape of residential development within approximately 500m of the site boundary.

There are two notable view typologies relevant to the site: channelled and cross-valley views. Channelled views of the site occur east-west along Dublin Road and north-south along the Overhead lines passing through the site. Cross-valley views occur from the east facing valley flanks of the Groody Valley.

Whilst the study area placed a proportionate focus on the townscape within approximately 1km of the site, it is likely that the Proposed Development would be most visible and influential on views within around 500m of the site given the presence of other built form, vehicular movement, activity associated with the surrounding residential landcover, and other characteristics of the townscape. Beyond this distance, views of the development would be partial and part of a broad and diverse urban skyline.

11.4 Characteristics of the Proposed Development

Full details of the Proposed Development, and its architectural design, can be found in the supporting Architectural Design Statement. The design of the proposals has been subject to an iterative design approach, with contextual analysis underpinning the proposals ensuring that careful consideration has been given to the receiving townscape.

The proposals have sought to deliver a varied, contemporary development in line with the ambitions for this urban area, and capitalise on the development potential of the gateway site. The architectural design of the buildings, has also sought to respond positively to the urban characteristics of the surrounding area.

The layout of the apartment blocks allows space for landscaping including raised podiums. In addition to making the internal areas of the development human-scale and inviting, the generous gaps between blocks allows for physical and visual permeability through the site and breaks up the massing. This is aided by considered modulation of heights and massing and variety in the elevation and façade treatments including articulation, colouration and materiality. This provides both visual interest and variation that supports strong placemaking.

11.5 Potential Impacts of the Proposed Development

11.5.1 Assessment of Receptor Sensitivity – Townscape

In accordance with Section 5.5 of the GLVIA-2013, a townscape character assessment requires a particular understanding of, among other criteria, "the context or setting of the urban area and its relationship to the wider landscape."

The brownfield site is zoned for a mixed use gateway site with access onto Dublin Road. There is an opportunity for redevelopment of the site and the achievement of policy PV 01 of the LDP. Currently the vacant site has a confusing identity with no sense of place and reads as an underachieving gateway and visual detractor.

In terms of the wider area of townscape, it comprises a broad mix of building types, heights, and characteristics. The neighbouring Singland residential area lies to the immediate south-west of the site

and there is a retail park to the northwest. The strategic route to the immediate north is the main townscape contributor to gateway character. The Groody Valley to the immediate east of the site contributes to a transitional and peri-urban character of the local townscape.

The site and local townscape have a complex mixed character due to the juxtaposition of built and natural influences. There is a transitional character due to ongoing change including the recent construction of new areas of townscape to the immediate south-east of the site along Bloodmill Road.

The local townscape does not contain elements of a recognisable recreational and heritage value at a local level albeit it is noted that the Groody Valley has greenway potential and may currently be used for informal recreation. The local townscape has a functional and visual connection to the River Shannon to the north via the Groody Valley green corridor. The local valley landform is distinct from the wider topography of Limerick that is broadly flat. Local character is influenced by a variety of land uses including energy with high voltage overhead lines and pylons immediately east of the Site.

There is undoubtedly capacity and scope for development of the site. This is supported by the mixed use zoning of the site that promotes a larger scale and intensity of development as well as quality of design and placemaking for this strategic site. Nonetheless, the prevalence of residential properties in the surrounding area generates some sensitivity to taller built form in the immediate surrounds of the site. Given the reasons presented above, the townscape sensitivity of the site and its immediate context (<100m) is deemed to be of Low sensitivity due to its brownfield condition and underlying zoning, whilst the surrounding study area is considered to be of Medium-low sensitivity containing occasional higher sensitivity features.

11.5.2 Assessment of Receptor Sensitivity – Visual

All of the viewpoints are located within a visually contained urban area, with a key differential in visual receptor sensitivity relating to whether or not the viewpoint represents residential receptors or people travelling along residential streets or located within other parts of the surrounding townscape.

In terms of visual receptor sensitivity, it is noted that the site is located in an extensively urban context where visual receptors are influenced by a mix of built forms of various heights and architectural characteristics, including residential terraces and extensive low and mid-rise commercial/industrial premises. This urban context is also set within a busy road network, the audible and visual influence of which is notable at a local level. There are not considered to be any particularly notable or important panoramic views present, and the townscape does not appear to be valued for its scenic qualities.

On the basis of the factors outlined above, visual receptor sensitivity is generally considered to range between Medium-low and Low. Specific receptor sensitivity is assigned to each viewpoint using the factors outlined in methodology.

11.5.3 Magnitude of Townscape Effects - Construction Phase

During the construction stage, construction-related activity within and around the site, and nearby approach roads is anticipated. This will include, but is not limited to:

- Site preparation works and groundwork operations;
- Intrusive foundation work including the installation of foundations and services;
- HGVs transporting materials to and from the site;
- Movement of heavy machinery on-site;
- Presence of tower cranes
- Temporary storage of demolition debris/construction materials on-site;
- Security fencing/hoarding and site lighting.

Construction phase effects will be at their greatest when the apartment blocks emerge above the surrounding existing buildings, but remain veiled in the temporary clutter of scaffolding and dust/debris sheets and surrounded by tower cranes. Construction work on sites throughout this wider urban area is a common feature, albeit the scale of construction associate with this development will be more akin to a city centre site.

In terms of townscape character, construction activities tend to not to be strongly associated with townscape detriment as they are temporary/short term and transient (relates to different sites at different times) and can be associated with positive progression and / or rejuvenation. Notwithstanding, during the construction period of this substantial urban project within an outer suburb of the city, the partially completed development combined with intense activity and movement of machinery will detract from the character of the immediate townscape.

Construction stage impacts on landscape/townscape character will be 'short-term' (i.e. lasting 1-7 years), in accordance with the EPA definitions of impact duration.

Based on the reasons outlined above, the magnitude of construction stage impact is deemed to be High in the immediate context of the site, which when combined with the Low sensitivity assigned to this portion of the study area is deemed to result in no greater than a Moderate significance of townscape effect, albeit of a Negative quality. The Medium-low sensitivity of the receiving townscape of the surrounding study area (>100m from site), combines with a reducing magnitude of impact of High-medium such that the significance of effect will also not be greater than Moderate / Negative and will continue to reduce with increased distance and broader context.

11.5.4 Magnitude of Visual Effects - Construction Phase

Effects during construction will be highly variable depending on the activity taking place, the angle of the view, and the degree to which the activity would be visible. Visual effects will arise as a result of the highly visible construction-related machinery, views of fencing/hoarding, site lighting and temporary structures, and movement associated with the intensity of activity at the site. They will also relate to the emergence of the partially completed structures draped in dust sheets and scaffolding and surrounded by tower cranes.

Construction phase visual effects are an inevitable consequence of the development proposal being brought forward, and there are a range of standard best practice construction management measures able to moderate these during construction.

Construction stage visual effects will be most noticeable in the immediate landscape/townscape setting of the site, and key approach roads where increased construction traffic volumes may also be noticeable. The highest magnitude of construction stage visual impacts will occur when the site is at its peak of construction activity and the main structures have emerged but are incomplete and draped / surrounded by construction related paraphernalia and temporary structures. The scale and intensity of these construction stage effects will have a detrimental effect on visual amenity, but this is only a short-term impact (1-7 years).

Based on the reasons outlined above, the magnitude of visual impact is deemed to be High for visual receptors immediately surrounding the site and reducing with increased distance and visual context. When combined with the Medium-low and Low sensitivity of the visual receptors within the near context, the overall significance of effect is considered to be no greater than Moderate / Negative. Accordingly construction stage visual impacts are assessed as Not Significant.

11.5.5 Magnitude of Townscape Effects - Operational Phase

Following the completion of the proposed works, townscape impacts will relate entirely to the development's impact on the character of the receiving townscape and whether this is positive or negative.

The most notable impact in this regard will result from the permanent presence of the new mixed use apartment blocks rising well above the surrounding built context, together with public realm enhancements within and around them.

The Proposed Development includes varied and contextually derived architectural design and finishes, that enhance the character of the road frontages and local townscape of the site in a manner that is promoted by the underlying 'Mixed Use' zoning. The bulk and massing has a strong horizontal emphasis and it is assessed that this will function as an anchor and complement future tall buildings along Dublin Road to the immediate north of the proposals where a strong gateway character is required to achieve LDP policies.

The buildings provide a sense of place and identity within the local townscape. The proposed permeability of the site for non-motorised users will result in further positive townscape effects and assist in the achievement of planning policies and strategies including those associated with recreational activity in the Groody Valley.

The Proposed Development will generate the most notable influence on the immediate area of townscape, where it will be most visible, and the prominence of the apartment blocks will be most notable. Beyond the 1km radius study area, although potentially visible, the influence of the development reduces and it is perceived as part of the wider cityscape, where other prominent features are also influential on urban character. In this regard the taller and more intensive form of the development stands in strong contrast to its surroundings and will substantially alter the townscape character. However, this contribution, aside from being of generally greater intensity and scale, is generally of a more varied design and materiality than is currently present within the prevailing 20th century development of Singland.

The most fundamental change in a townscape sense is that the Proposed Development will assist in repairing the urban fabric, notably the brownfield void represented by this site, which is currently an underutilised and detracting townscape element. It takes the opportunity provided by the strategic gateway location of the site and presents a carefully considered infill development that has the potential to be vibrant and improve sense of place and identity. In this regard, it represents a marked change and considerable uplift in scale and intensity of development, but one that makes a welcome contribution to the placemaking of a gateway site

Based on the reasons outlined above, the magnitude of townscape impact is deemed to be High within the immediate context of the site. When combined with the Low sensitivity of the site and its immediate surrounds, the overall significance of effect is considered to be Moderate and Positive. With greater distance and broader context the magnitude of townscape impact will reduce and the quality of the change will remain positive due to the provision of a positive landmark capable of supporting an eventual cluster of taller gateway buildings.

11.5.6 Magnitude of Visual Effects - Operational Phase

The assessment of visual impacts is based on a series of representative viewpoints and the assessment at each of the selected viewpoints is aided by photomontages of the Proposed Development. Photomontages are a 'photo-real' depiction of the scheme within the view, utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale.

Summer views have been presented and an assessment is made as to whether seasonality is material to the overall visual assessment, but on the basis that the most visible scenario is most relevant to the assessment of potential significant effects. Due to the timeline of the project and the iterative process of the final viewpoint selection, it has not been possible to capture winter photography. It is important to note that the GLVIA3 (2013) guidelines do not require a separate assessment of summer and winter views, only an acknowledgment of whether effects are likely to materially differ across seasons.

Representative assessment viewpoints seek to reflect a range of different receptor types, distances and orientations, to help to inform the conclusions being made. Where views are precluded by built form and

vegetation, they seek to demonstrate the absence of visibility. 16 viewpoints were selected and are detailed in Table 11.4 and illustrated in the verified views (Appendix 11.1). It is not warranted to include every location that provides a view towards the Proposed Development as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the Proposed Development.

For each of the representative viewpoints, an existing (baseline) view is presented, together with a Photomontage that superimposes the Proposed Development within the view. Cumulative views are also included thereafter showing the general massing of potential Phase 2 development within the Parkway Valley masterplan area. Photomontages provide a 'photo-real' depiction of the scheme within the view utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. Where there is no visibility of the Proposed Development, an outline view has been produced to illustrate where the Proposed Development lies relative to intervening screening.

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
VP1	The north-westerly view consists of a recently constructed road and associated infrastructure in the foreground with grassland and a retail unit beyond. Bare patches of earth, embankments and overhead powerlines are visual detractors. For the majority of the view there is a relatively close-range horizon beyond the sweeping curve of the new road. The skyline consists of vegetation within the Groody River Valley, glimpses of roofscape, and hills in County Clare in the background. The site is approximately 835 m distant, beyond a well vegetated vegetation.	Medium-low	The upper parts of the proposals would be a noticeable component of the view, appearing in the mid distance as a coherent new townscape element as part of planned change. The modulated heights do not provide sufficient articulation to the roofline such that the massing reads as bulky with a strong horizontal emphasis. The vertical colouration pattern breaks up the massing and provides necessary vertical expression to the appearance. The black coloured elements at the tops of the buildings strike a discordant tone. At this distance, the changes to the scene are quite subtle. Whilst the proposals obscure landform in the distant background the overall mixed character of the view would remain and overall, the proposals offer neither an improvement nor deterioration to the existing view. Overall, the magnitude of visual impact is deemed to be **Low**. The quality of the effect is **neutral.**	**Slight / Neutral / Permanent**
VP2	This is a view from an internal road in a newly constructed housing estate on the valley flanks of the River Groody. This estate is situated just off the local road - Bloodmill Road. This view will be experienced by residents and visitors to the housing area, users of the public open space, cyclists and road users. The northerly view towards the site takes in housing fronting onto public open space beneath an overhead lines corridor with a glimpse of hills in County Clare in the far distance. The houses on the right side of the photograph are located on lower lying land compared to those on the left. There is a cycleway running through the open space. Most of the houses are two story high and there is one four story apartment block present on the right side of the photograph.	Medium-low	The proposals would appear against the background sky in the midground and in the context of the existing overhead line corridor. The colours and the material finishes are in harmony with the housing on both sides of the open space. There are some negative effects due to the bulky horizontal scale and massing albeit these are mitigated to neutral by the vertical colouration pattern which provides vertical expression. The development's presence here will be noticeable and will reduce some of the openness and expansive views currently afforded through this open space. Overall, the magnitude of visual impact is deemed to be **medium**, the quality of the effect is **neutral**.	**Moderate / Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
VP3	This view will be experienced by residents and visitors to the housing area. The view takes in estate grassland, a line of foreground vegetation , glimpses of roofscapes with the hills of County Clare in the background.	Medium-low	The Proposed Development will completely alter the view due to its proximity and massing. The upper parts of the proposed buildings will be prominent and visible against a background sky. The material finishes and colour scheme are not striking or distracting and are of a high quality of design and finish. The difference in various brick facade colours help to break up the massing. Articulation to the elevations helps to create variety and mitigates the horizontal bulk and massing. There will be negative effects overall due to the loss of openness, but this is balanced by the infill of this brownfield site with a high quality of development. Overall, the magnitude of visual impact is deemed to be **high -** the quality of the effect is marginally **negative**.	**Moderate / Negative-Neutral / Permanent**
VP4	The view will be experienced by residents and visitors to this housing area. This viewpoint is looking in the northeast direction towards the site. It is located on an internal road with a footpath from the housing area immediately west of the site. The road and footpath are visible towards the left side of the view. The right side of the photograph consists of grassland which terminates at a vegetated fenceline marking the site boundary. There are cross valley views across the Groody Valley and despite built forms and overhead lines, the character of these views is mostly green, lush and expansive. On the left side of the photograph the Travelodge building breaks the skyline and forms a local landmark.	Medium-low	The residential blocks of the Proposed Development will be clearly visible at a close distance completely obscuring the cross valley prospect. The proposed 4 storey medical facility rises to a slightly greater extent to the left of the Travelodge, which is seen in a gap between the proposed blocks. Together, the blocks provide a much greater degree of spatial containment than currently occurs. A mix of various brick colours and render façade materials creates interesting variation in the way the residential buildings appear and highlights the high quality of design and finish for the development. However, the mass of the building appears slightly bulky from this angle. It is noted that the massing steps down towards the Travelodge. The medical facility has a distinctly commercial appearance with a high degree of glass and a façade that notably varies from the residential block. This provides welcome variation and a richer mix of façade treatments that highlight the mixed use of the site. It is also likely that the residents of this housing area will experience some sense of overlooking from the proposed apartment blocks considering the difference in the building heights between the proposals and the two storey vernacular.	**Moderate / Negative-Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
			However, the overlooking can be considered as passive surveillance on the foreground open space rather than reducing the sense of privacy for dwellings which also front onto the open space. The buildings will appear prominently against the background sky and will completely alter the character of the cross valley views, but in the context of infilling the urban fabric void with a high quality of development. Overall, the magnitude of visual impact is deemed to be **high -** the quality of the effect is marginally **negative.**	
VP5	This is a view looking at the site in the east from the shopping centre car park which is located to the west of the site. This view will be experienced by shoppers at the shopping centre. The supermarket car park roundabout is visible in the centre-left of the view. On the right side, the ground floor of the edge of the shopping centre building is visible and is fronted by a patch of grass and a pedestrian path. Lighting columns are visible on both sides. In the midground, the trimmed hedges that mark the extent of supermarket parking are visible. In the midground beyond the roundabout there are hoardings marking the site boundary. The opposing valley flanks of the Groody River form a distant, well vegetated horizon.	Medium-low	The Proposed Development will be clearly visible from the shopping centre parking at a close distance. The most prominent feature in the foreground is the proposed medical facility building, which has a high quality of architectural design and finish. It is an appropriate transition between the shopping centre and the proposed residential block, which is partially visible just beyond the medical building on the same alignment. There will be a partial loss of openness, but in a manner that reflects the appropriate scale and mixed-use nature of the Parkway Valley masterplan lands and therefore the zoning objective. The overall effect is of a marginally positive quality due to the balance of factors outlined above and the appropriate infill of this void in the prevailing landscape fabric . Overall, the magnitude of visual impact is deemed to be **Medium** - the quality of effect is **Neutral-Positive.**	**Slight-Moderate / Neutral / Permanent**
VP6	This view would be experienced by road users located on the regional road R445, Dublin Road, which radiates east from central Limerick towards Castletroy. The road marks the northern boundary of part of the site, while the viewpoint itself is from approx. 350 m west of the site.	Low	Most parts of the Proposed Development are screened by roadside vegetation and built form. There will be glimpsed views of the upper parts of some of the buildings in the distance. The proposals would be barely perceptible to road users. There would be a slight increase in the density of built form in fleeting views. In	**Slight / Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
	The four lanes of the carriageway dominate the foreground of the view. The midground consists of road infrastructure and there is a petrol station to the left while on the right there is a shopping centre beyond a green verge. Both sides of the road have footways. The view is taken from the central point of the road and converges into a single point. Along the road, intermittent mature trees and light columns are visible.		winter months there would be a higher magnitude of change with filtered views of the northernmost extents of the massing through the trees flanking the road. Overall, the magnitude of visual impact is deemed to be **low** and the quality of the effect is **neutral.**	
VP7	This view would be experienced by users of a local road and cycleway to the north of the site. The nearest part of the site is at approx. 165 m. The short section of road, roughly 650 m long, stretches from a roundabout on the R445 past a residential estate, the Travelodge local landmark, a supermarket and other amenities and runs parallel to the strategic Dublin road. It also provides access to the housing estates located to the north and northwest of the view location. The view itself faces south towards the site. The road is visible in the foreground terminating abruptly in a retaining concrete wall with fencelines, rear gardens, grassland, weeds and a line of vegetation against the skyline beyond.	Medium-low	The site and the buildings are visible in only small glimpses due to the intervening topography and vegetation at this point. Only the upper parts of a few of the buildings will be visible, forming a coherent new townscape element on the skyline and introducing depth and a potential new landmark into an otherwise unremarkable view. This is a summer view, and it shows the presence of more foliage on the trees. In winter, there will be a little more of the development visible depending on the foliage, however the topography and distance will impact the visibility even in winter, therefore, there will be no significant difference in visual impact due to seasonality. Overall, the magnitude of visual impact is deemed to be **Medium-low** - the quality of effect is **positive.**	**Moderate-slight / Positive / Permanent**
VP8	This viewpoint is from a regional road R445, Dublin Road, which radiates east from central Limerick towards Castletroy and then connects to the M7. There is an access road leading to a shopping centre on the right hand side of the photograph. Road infrastructure including a set of traffic lights and lighting columns are key components in the foreground. The pedestrian path on the left side of the road is visible. The midground of the view takes in the northwest corner of the site, which is located a little further behind the trimmed hedges visible in the centre-right of the photograph. Black hoardings on the right side of the road	Low	The Proposed Development would appear against the background sky in the midground and the massing would be broken up somewhat by intervening vegetation. The proposals would introduce built form into an undeveloped part of the skyline and would represent a pleasing addition. It is assumed that the future baseline would include landmark taller, more slender buildings nearer to the view location and drawing the eye. The colouration pattern of both the residential and medical blocks provides useful vertical expression to break up the massing and provide welcome richness and variation to the mixed use facades. The development's presence here will be noticeable and will reduce	**Slight / Positive-Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
	mark the site boundary. There are glimpses of the vegetation within the Groody Valley on the left hand side of the photograph appearing above the site hoardings.		openness slightly, albeit overall the effect is marginally positive as the buildings provide some depth and visual interest compared to the existing vacant site. This is a summer view. In winter there will be more of the development visible depending on the foliage, albeit one can still sense its overall scale and extent. Therefore, there will only be a slight difference in visual impact due to seasonality. Overall, the magnitude of visual impact is deemed to be **low** and the quality of the effect is marginally **positive**.	
VP9	This viewpoint is from a regional road R445, Dublin Road, which marks the northern boundary of the site. The viewpoint is orientated towards S/SE directly at the site. The road is visible in the foreground with the boarded up area of site on the other side of the road. A few tops of trees are visible beyond the boards.	Low	The upper parts of the northernmost extents of the massing proposals would appear against the background sky in the midground. The proposals would introduce built form into an undeveloped part of the skyline. It is assumed that the future baseline would include landmark, taller, more slender buildings nearer to the view location and drawing the eye. In its current form the building complex will serve as a minor landmark and will help with wayfinding on this road and the articulation and symmetry breaking provides visual interest. Overall, the effect is positive as the buildings provide depth and visual interest compared to the existing vacant site and featureless horizon. Overall, the magnitude of visual impact is deemed to be **low** and the quality of effect is **positive**.	**Slight / Positive / Permanent**
VP10	This viewpoint is from a regional road R445, Dublin Road, which radiates east from central Limerick and goes towards Castletroy and then connects to M7. This view is taken from roughly 260 m northeast of the site boundary. This view will be experienced while entering Limerick from Castletroy and Newcastle. The view is from the point just outside the Travelodge building which is a 10 story high structure, thus a similar view will be experienced by users of Travelodge and other buildings in that building complex. The four lane road forms a major part of this view with a cycle path	Medium-low	The Proposed Development is offset to the south of the road alignment and will not be visible from this particular location due to intervening vegetation. However, the upper levels of the Proposed Development may come into view at different points along this section of road. The Proposed Development will have little effect on visual amenity from here even during winter months and is deemed to have a visual impact of **Low-negligible** with a quality of effect that is **Neutral**.	**Slight-imperceptible / Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
	running on the right side of the road. The road has lamp posts on both sides. There is a pedestrian path on the left side of the road. The land beyond on the left side is marked by a stone wall boundary. Further along going west, both sides of the road have mature trees.			
VP11	This viewpoint is from a roundabout about regional road R445, Dublin Road, located on the western edge of Castletroy. The view is pointing towards the site which is located in the southwest direction approx. 515 m away. On the right side of the view part of the centre of the roundabout is visible with grass and a mature tree. Further along on the road beyond the roundabout, on the right side, the tall Travelodge building is visible. Electricity pylons and lampposts add vertical elements towards the left side of the road. A road turning left (towards south) from the roundabout is just visible at the left edge of the view. The land at the corner is fenced up and some trees and vegetation are visible beyond the fence with a glimpse of a building in between.	Medium-low	The upper parts of the proposal would be a fleeting glimpse and barely noticeable component of the view for users travelling at speed. At this distance, the changes to the scene are subtle and overall the proposals offer neither an improvement nor deterioration to the existing view. This is a summer view and it shows a more lush setting. In winter there will be more of the development visible depending on the foliage, however one can still sense its overall scale and extent. Therefore, there will be no significant difference in visual impact due to seasonality. Overall, the magnitude of visual impact is deemed to be **low** and the quality of the effect is **neutral.**	**Slight / Neutral / Permanent**
VP12	This viewpoint is from a roundabout on Groody Road which is a local road that runs along the western edge of Castletroy along the river Groody and its meadow. River Groody is a tributary of river Shannon. The viewpoint is approx. 550 m east of the site boundary. This viewpoint will be experienced by users of this road, cyclists and pedestrians walking along the footpath as well as residents from the housing areas on the left side of the road. The road and part of the roundabout are visible in the background. The edge of the road has a cycle path and a fence beyond which the meadow is visible. There are some trees along the road and behind the meadow in the background. In the distant background, electricity pylons are visible. Towards the right side of the view, the Travelodge building located on R445 is visible behind trees and vegetation.	Medium-low	The full eastern view of the development will be visible across the meadow from this viewpoint and the viewer will be able to see the extent of various building blocks. The sense of openness that the view across the meadow provides currently will be affected but overall the impact will not be significant. The composition of the built form creates a progression of scale with taller elements towards the centre of the massing. The visual effect is pleasing and the proposals offer a slight improvement to the existing view. This is a summer view and it shows a more lush setting. In winter there will be more of the development visible depending on the foliage, however one can still sense its overall scale and extent. Therefore, there will be no significant difference in visual impact due to seasonality.	**Slight / Positive/ Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
			Overall, the magnitude of visual impact is deemed to be **low** - the quality of effect is **positive.**	
VP13	This viewpoint is from a roundabout on Groody Road further south from VP12. The viewpoint is approx. 870 m southeast of the site boundary. This viewpoint will be experienced by users of this road, cyclists and pedestrians walking along the footpath as well as residents from the housing areas on the left side of the road. The central part of the roundabout is visible on the right side of the viewpoint with grass and a tree in the middle. Low hedges and vegetation are visible on the edges of the roundabout. Through a gap in the vegetation, the meadow is visible with some cattle grazing. Trees are visible in the background. Towards the right side in the distant background, the Travelodge building is visible.	Medium-low	The upper parts of the proposals would be a noticeable component of the view due in part to their contrasting appearance compared to the well vegetated intervening landscape. The black coloured elements at the tops of the buildings strike a discordant tone. At this distance, the changes to the scene are subtle and overall the proposals offer neither an improvement nor deterioration to the existing view. This is a summer view and it shows a more lush setting. In winter there will be more of the development visible depending on the foliage, however one can still sense its overall scale and extent. Therefore, there will be no significant difference in visual impact due to seasonality. Overall, the magnitude of visual impact is deemed to be **low** and the quality of the effect is **neutral.**	**Slight / Neutral / Permanent**
VP14	This view is from a local road in a housing area in Kilbane and is located roughly 1.15 kms southeast of the site boundary. In the foreground the road is visible. The left side of the road has a wooden fenced edge with a mixture of vegetation beyond that includes hedges and mature trees. The vegetation is in various layers and does not afford the view of the meadow which lies in front. In the very distance, a hill is visible.	Medium-low	The development site is not visible due to the presence of layers of intervening vegetation. Overall, the magnitude of visual impact is deemed to be **negligible**. This is a summer view and it shows a more lush setting. In winter there might be very small glimpses of the development visible from a far distance. However, there will be no significant difference in visual impact due to seasonality.	**Imperceptible / Neutral / Permanent**
VP15	This view is from Tipperary roundabout on a regional road R509. The site boundary is at a distance of approx. 1 km in the northeast direction. The area around is primarily industrial, thus the viewpoint will be mainly experienced by the road users. The view is dominated by the roundabout in the centre. Several cars are present on the roundabout. Towards the right and left side various industrial warehouse buildings are visible. The left side of the view is dotted with mature trees that are along the road and the roundabout.	Medium-low	The development site is not visible due to the distance and its location which is behind several layers of buildings. Overall, the magnitude of visual impact is deemed to be **negligible**.	**Imperceptible / Neutral / Permanent**

Table 11.4 Operational Phase Visual Effects

	Existing view	Sensitivity	Description and Magnitude of Visual impact	Significance
VP16	This southerly view is from a pedestrian path along river Shannon on the north side of the site. The site boundary is located approx. 900m south of this viewpoint. In the foreground, grassland and a tree are visible, the midground consists of a wide expanse of floodplain grassland. The view stretches south with a part vegetated and part built horizon line in the background and outline of buildings of Limerick in the distant background. Towards the centre of the photography, the Travelodge building punctuates the skyline.	Medium	A glimpse of the uppermost parts of several residential blocks is afforded through and just above intervening vegetation and buildings. The Proposed Development lies just to the right of the considerably more prominent Travel Lodge Hotel building and associated business park units in is much less conspicuous due the relative scale / distance. This is a summer view and in winter, there might be a little more visibility of the built complex, but overall, there will be no significant difference in visual impact as the distance is large and the extent of view is limited. Overall, the magnitude of visual impact is deemed to be low and the quality of the effect is **neutral.**	**Slight / Neutral / Permanent**

11.6 Mitigation Measures

11.6.1 Construction Phase

It is not considered that there are any additional mitigation measures required to reduce the anticipated construction phase townscape/visual effects over those that would be considered standard best practice construction management measures. It is anticipated that this may include aspects such as the timing of construction activities, which will be restricted per local authority guidance, and will likely be consistent with those enforced on nearby sites. A site hoarding will also screen ground level clutter and activity from view.

11.6.2 Operational Phase

Landscape and urban design measures are integral to the development and will help to soften and assimilate the built form within its surrounding context in a general sense whilst adding to the quality of the development. However, it is not a case where the consideration of landscape and visual impacts before and after landscape planting establishment would result in a materially different impact judgements.

Other than those features and characteristics of the development proposals that have been embedded into the design of the scheme, there are no specific townscape and visual mitigation measures considered necessary in this instance.

11.7 Monitoring or Reinstatement Measures

11.7.1 Construction Phase

Landscape tender drawings and specifications will be produced to ensure that the hard and soft works are implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

The planting works will be undertaken in the next available planting season after completion of the main civil engineering and building work.

All tree protection requirements will be installed on commencement of the development and removed on a phased basis as stages of the development are completed.

11.7.2 Operational Phase

This will consist of weed control, replacement planting, pruning etc. All townscape works will be in an establishment phase for the initial three years from planting. All works will be monitored on an ongoing basis to ensure the quality of the development is maintained.

11.8 Residual Effects of the Proposed Development

All the townscape and visual mitigations are primary/embedded hence this section is not relevant to this topic. The effects assessed in section 11.5 can be considered the residual townscape and visual effects of the project.

11.9 Cumulative Impacts of the Proposed Development

Within a cumulative assessment, the baseline against which landscape and visual effects are assessed is extended to consider other relevant schemes that are not currently present but that are subject to a valid planning application,have been permitted, or are part of a current masterplanned zoning objective, as being operational. Cumulative effects therefore represent any increased effects that may be generated by the development in a scenario where other relevant schemes in the locality are operational.

As is typical of any evolving urban environment, it is acknowledged that there are numerous development projects planned and permitted within the wider urban area. In this case, the most relevant would be the realisation of the full Parkway Valley masterplan in accordance with Development Plan zoning objectives. This relates to intensive and large scale mixed-use development between the subject site and the R445 entrance into Limerick City from the east.

►
To aid the cumulative assessment, the likely form of the future phases of the Parkway Valley masterplan have been included as 'mass model' cumulative views within the photomontage volume. These are assessed in Table 11.5 below.

Table 11.5 Magnitude of Change - Visual

Viewpoint	Cumulative effect in combination with later phases of Parkway Valley Masterplan
VP1	The future cumulative development of the Parkway Valley masterplan will be seen to fill the gap between the Proposed Development and the foreground Lidl supermarket. There will be a marginal increase in the intensity and extent of cumulative development that will give this setting a slightly more urban rather than peri-urban character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse.
VP2	The future cumulative development of the Parkway Valley masterplan will be seen to the right of the Proposed Development but is partially screened by it. There will be a noticeable increase in the height, intensity and extent of cumulative development that will give this setting a slightly more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on an infill site.
VP3	The future cumulative development of the Parkway Valley masterplan will not be visible from here due to screening by the Proposed Development. Consequently, there will be no material cumulative effects arising from it.
VP4	The future cumulative development of the Parkway Valley masterplan will be seen between the medical and residential blocks and is partially screened by them. There will be a noticeable increase in the height, intensity and extent of cumulative development that will give this setting a slightly more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on an infill site and provides a greater sense of site utility.

Viewpoint	Cumulative effect in combination with later phases of Parkway Valley Masterplan
VP5	The future cumulative development of the Parkway Valley masterplan will be seen to the left of the Proposed Development forming a coherent street between them that will be accessed from the foreground roundabout. There will be a substantial increase in the height, intensity and extent of cumulative development that will give this setting a much more urban and enclosed character rather than an underutilised peri-urban one. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on this infill site that currently reads as a void in the urban fabric where consolidated street frontage to the R445 eastern approach to Limerick is a latent need.
VP6	The future cumulative development of the Parkway Valley masterplan will be seen on direct alignment with the road where it will form a prominent and welcome landmark feature on the eastern approach to Limerick City. It will be much more noticeable than the Proposed Development and there will be a distinct increase in the height, intensity and extent of cumulative development that will give this setting a much more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse.
VP7	The future cumulative development of the Parkway Valley masterplan will rise much more noticeably above intervening vegetation and buildings than the Proposed Development. It will be a distinct increase in the height, intensity and extent of cumulative development that will give this setting a much more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse.
VP8	The future cumulative development of the Parkway Valley masterplan will rise prominently in the foreground forming a welcome landmark feature on the eastern approach to Limerick City. It will screen the residential blocks of the Proposed Development and be much more noticeable as a result. There will be a distinct increase in the height, intensity and extent of cumulative development that will give this setting a much more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on this infill site that currently reads as a void in the urban fabric where consolidated street frontage to the R445 eastern approach to Limerick is a latent need.
VP9	The future cumulative development of the Parkway Valley masterplan will rise prominently in the foreground forming a welcome landmark feature on the eastern approach to Limerick City. It will screen most of the Proposed Development beyond. There will be a distinct increase in the height, intensity and extent of cumulative development that will give this setting a much more urban and enclosed character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on this infill site that currently reads as a void in the urban fabric where consolidated street frontage to the R445 eastern approach to Limerick is a latent need.
VP10	The future cumulative development of the Parkway Valley masterplan will rise prominently in the midground forming a prominent and welcome landmark feature on the eastern approach to Limerick City. However, the Proposed Development will remain substantially screened from view and does not materially contribute to cumulative effects experienced from here.

Viewpoint	Cumulative effect in combination with later phases of Parkway Valley Masterplan
VP11	The future cumulative development of the Parkway Valley masterplan will rise noticeably in the midground and will be more noticeable than the Proposed Development. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse. Indeed, it consolidates the Proposed Development on this strategic infill site on approach to Limerick City.
VP12	The future cumulative development of the Parkway Valley masterplan will be seen just to the fore and to the right of the Proposed Development but is only partially visible due to foreground screening. There will be a marginal increase in the intensity and extent of cumulative development that will consolidate the urban edge character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse.
VP13	The future cumulative development of the Parkway Valley masterplan will be seen just to the right of the Proposed Development but is only partially visible due to foreground screening. There will be a noticeable increase in the height, intensity and extent of cumulative development that will consolidate the urban edge character. The cumulative effect will accord with the masterplan zoning objective for the Parkway Valley site and is therefore not considered to be significant or adverse.
VP14	Neither the proposed or future cumulative development of the Parkway Valley masterplan will be particularly noticeable in this view, thereby limiting the potential for material cumulative effects to occur.
VP15	Neither the proposed or future cumulative development of the Parkway Valley masterplan will be particularly noticeable in this view, thereby limiting the potential for material cumulative effects to occur.
VP16	The future cumulative development of the Parkway Valley masterplan will rise more noticeably above intervening vegetation and buildings than the Proposed Development and will further screen the Proposed Development, thereby limiting the potential for material cumulative effects to occur.

Based on the assessment contained in Table 11.5 The future cumulative development of the Parkway Valley masterplan will not generate any significant or adverse cumulative effects because in conjunction with the Proposed Development it represents the full realisation of the strategic masterplan for the Parkway Valley site. This is a masterplan that seeks a high quality of urban design to fit the requirement for a consolidating eastern landmark development for Limerick City.

In addition to the future cumulative development of the Parkway Valley masterplan another large scale residential development is also relevant to cumulative impacts in this area and this is: Groody Developments Ltd, Groody Road. This is located on the opposing side of the Groody valley, some 250m from the site at its closest point. It consists of student accommodation across 5 no. separate blocks, ranging in height from 5 - 8 storeys. Upon review of the zoning plan this scheme appears to be allocated for residential development. The masterplan for the site shows wetland areas to the west to assist in the achievement of planning policies related to the Groody Valley Green Wedge which lies between this and the Parkway Valley site. The blocks would not compete in height compared to future landmark and gateway defining features near the site. For these reasons this development is considered to have similar positive placemaking characteristics to the Proposed Development. It is assumed that the architectural detailing and other elements of the masterplan are of sufficient standard of design to gain a planning consent and

provide positive townscape and visual effects. For these reasons significant or adverse cumulative effects are not considered to occur in relation to the potential future Groody Developments project.

11.10 References

- Department of Housing, Planning & Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) publication entitled Guidelines for Landscape and Visual Impact Assessment, 2013 (GLVIA3); and
- 'Photography and Photomontage in Landscape and Visual Impact Assessment', Landscape Institute Technical Guidance Note 06/2019.

Chapter 12 – Archaeological, Architectural and Cultural Heritage

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12. ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

12.1 Introduction

This chapter presents the findings of an archaeological and cultural heritage impact assessment on the site of the Proposed Development. A full project description is presented in Chapter 2 of this EIAR.

The Site has previously been stripped of topsoil, and a development partially constructed on the site in 2007, under a separate grant of planning. No archaeological measures were requested under that grant of planning.

There are no archaeological monuments, as listed in the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR), within the site. The closest Recorded Monument is approximately 40m from the site boundary. It is the site of a small archaeological excavation of a pit (LI005-107----).

A satellite image of the Site is presented in Figure 12-1.

12.2 Methodology

For the purposes of this report, archaeology, architectural and cultural heritage are considered to include the following elements:

- Sites and Monuments Record (SMR)
- Record of Monuments and Places (RMP)
- National Monuments
- Sites reported in the Database of Irish Excavation Reports
- Any previously unrecorded sites
- A list of architectural heritage structures (NIAH)
- A list of Protected Structures (Limerick City and County Development Plan 2022–2028)
- Other documentary sources (townland and placename evidence and Griffith's Valuation)

12.2.1 Forecasting Methods and Difficulties Encountered

No difficulties were encountered.

Figure 12-1. Location of Proposed Development (Landsat 2025)

12.2.2 Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP)

The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. A Sites and Monuments Record (SMR) was issued for all counties in the State between 1984 and 1992. The SMR is a manual containing a numbered list of certain and possible monuments accompanied by 6-inch Ordnance Survey maps (at a reduced scale). The SMR formed the basis for the legally defined Record of Monuments and Places (RMP) - the statutory list of recorded monuments established under Section 12 of the National Monuments (Amendment) Act 1994.

12.2.3 National Monuments

The National Monuments Service website lists Monuments covered by Preservation Orders and in the ownership/guardianship of the Minister for Housing, Local Government and Heritage by county

(https://www.archaeology.ie/about-us/what-we-do/monuments-in-state-care/national-monuments-in-state-care/).

The term 'National Monument' is defined by the National Monuments Act (1930) as being 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto'.

The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 is a major piece of Irish legislation aimed at modernizing and strengthening the protection of archaeological and historical heritage in Ireland. It was enacted in October 2023, after passing both Houses of the Oireachtas and being signed into law. It replaces and consolidates older laws, especially the National Monuments Acts 1930–2014. It creates a single, modern legal framework for protecting monuments, archaeological sites, and objects. Under this Act, newly discovered archaeological monuments are immediately protected by law, without needing formal designation.

12.2.4 Excavations Database

This is an online database of archaeological excavation reports from across Ireland (both the Republic and Northern Ireland). It's based on the Excavations Bulletin. It is available at www.excavations.ie.

12.2.5 The Topographical Files of the National Museum of Ireland

All archaeological objects which are found, and which have no known owner at the time when they are found, are the property of the State. The National Museum of Ireland (NMI) acts as the primary national repository for archaeological objects, tasked with the acquisition, preservation, research, and exhibition of Ireland's cultural heritage. The National Museum of Ireland (NMI) maintains topographical files that record stray archaeological finds and other discoveries, organized by townland and county. These files are part of the museum's broader archive collection and are crucial for understanding the archaeological significance of different areas in Ireland.

12.2.6 Protected Structures and National Inventory of Architectural Heritage Sites

A protected structure is a structure that a local authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social or technical point of view. Details of protected structures are entered by the local authority in its Record of Protected Structures. These are protected under Part IV of the Planning and Development Act 2000, as amended and listed in Volume 3: Architectural Conservation Areas and Record of Protected Structures s in the Limerick Development Plan 2022–2028.

The National Inventory of Architectural Heritage (NIAH) is an Irish government initiative that identifies and records structures of significance built from 1700 to the present. It provides recommendations to local authorities for protecting built heritage, with over 65,000 records available online for viewing, including a Historic Environment Viewer. It was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The list forms the basis for the recommendations for inclusion in the Record of Protected Structures (RPS).

12.2.7 Limerick Development Plan 2022-2028

The Limerick Development Plan 2022-2028 was adopted by the Elected Members of Limerick City and County Council at a Special Meeting on 17th June 2022 and came into effect on 29th July 2022.

12.2.8 Cartographic Sources and Aerial Imagery

Several cartographic sources were consulted as part of this assessment, namely Down Survey Map of County Limerick, 1656; Down Survey map of Parish of Limerick South Liberties, Jean de Dodt map of the Siege of Limerick 1691 (Royal collection Trust). The First edition Ordnance survey map (surveyed 1840-41 – printed 1844) and revised edition (revised 1900, published 1903) Ordnance Survey 25-inch map published 1900. Aerial photographs dating between 1995 and 2018 from the Ordnance Survey of Ireland (OSi), available on www.archaeology.ie were also examined, as was Google Earth imagery dating between 2008 and 2025.

12.2.9 Archaeological Reports

The following reports were also consulted in order to inform the assessment of all aspects of the archaeological resource within the Proposed Development site.

12.2.9.1 Archaeological Impact Assessment

An archaeological impact assessment is a desktop-based report on the findings of a study of available archaeological, historical, cartographic and photographic sources, as well as a site visit. It aims to identify and describe the known and potential archaeological and cultural heritage constraints within the site and its wider environs and offer recommendations for mitigation measures. It includes the results of any archaeological investigations carried out within or adjacent to the site.

Only one report has been carried out to date within the subject site:

- Archaeological Impact Assessment Report for a Proposed Development at Parkway Valley LRD, Singland Townland, Limerick (Coyne 2025).

12.2.8.1 Site Inspection

A site inspection was carried out to examine the subject site in the light of desk-based research. The site inspection identifies the nature and extent of any surviving above-ground archaeological or cultural heritage remains (if any), and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection was conducted by Frank Coyne of Aegis Archaeology Ltd. on 28 April 2026. The site is overgrown and contains the foundations and walls of the previous incomplete development, spoil heaps and overgrowth. No archaeological features were noted.

12.2.10 Documentary research

Additional desktop research included the following resources:

12.2.10.1 Townland and Placename Databases

The Irish Townlands Database (https://www.townlands.ie/), the Irish Placename Database (https://www.logainm.ie/en/) were consulted The database provides information on over 60,000 townlands. The Placenames Database of Ireland website (www.logainm.ie) was consulted. The

Placenames Database of Ireland was created by the Gaois research group in Fiontar & Scoil na Gaeilge (DCU) in collaboration with The Placenames Branch (Department of Culture, Heritage and the Gaeltacht). It is a comprehensive management system for data, archival records and placenames research conducted by the State. Duchas.ie was also consulted for any relevant folklore relating to the site.

12.2.10.2 Griffith's Valuation (1847–1864)

Griffith's Valuation as a nationwide survey of property carried out between 1847 and 1864. The valuations were published in a series of over 300 volumes, detailing the names of all the property occupiers in Ireland and the value of their house and land. It is available at www.askaboutireland.ie.

12.2.11 Standards and Guidelines

This chapter has been prepared in compliance with all relevant EIAR legislation and guidance, including 'Guidelines on the information to be contained in Environmental Impact Assessment Reports', published by the Environmental Protection Agency (2022).

12.2.12 Significance Criteria

The impact assessment undertaken in this chapter is based on the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA guidelines 2022) and detailed in Chapter 1 (Introduction) of this EIAR. A potentially significant impact in terms of archaeology and cultural heritage is described as an impact to a potential feature/area of archaeological or cultural heritage that could be significant without mitigation measures being implemented, e.g. potential sub-surface archaeological remains.

The main purpose of this chapter is to identify, describe and present an assessment of the likely significant effects of the Proposed Development on archaeological and cultural heritage remains (known and unknown if present). An effect can be positive, negative, or neutral/none, direct or indirect. The effect may result from the construction phase and/or the operation phase of the project.

The potential effects are assessed for each component of the development as described above, as well as cumulatively.

12.3 Receiving Environment

The development site is located within the townland of Singland in Limerick City. It measures 6.18 hectares in extent and consists a brownfield site. The site has previously been stripped of topsoil, and a development partially constructed on the site, under a separate grant of planning. No archaeological mitigation measures were requested under that grant of planning. The partially constructed development was demolished in 2020, with the retaining walls left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground. The site can be accessed from the north via the old Dublin Road (R445). The partially constructed development was located on the western and central portions of the site. Analysis of aerial photographs (see figures 12-4 and 12-11) show that topsoil was stripped from almost the entire site, but no construction occurred on the eastern and northeastern side. Therefore, while topsoil has been stripped at the eastern and northeastern side, it still has the potential to contain small archaeological features.

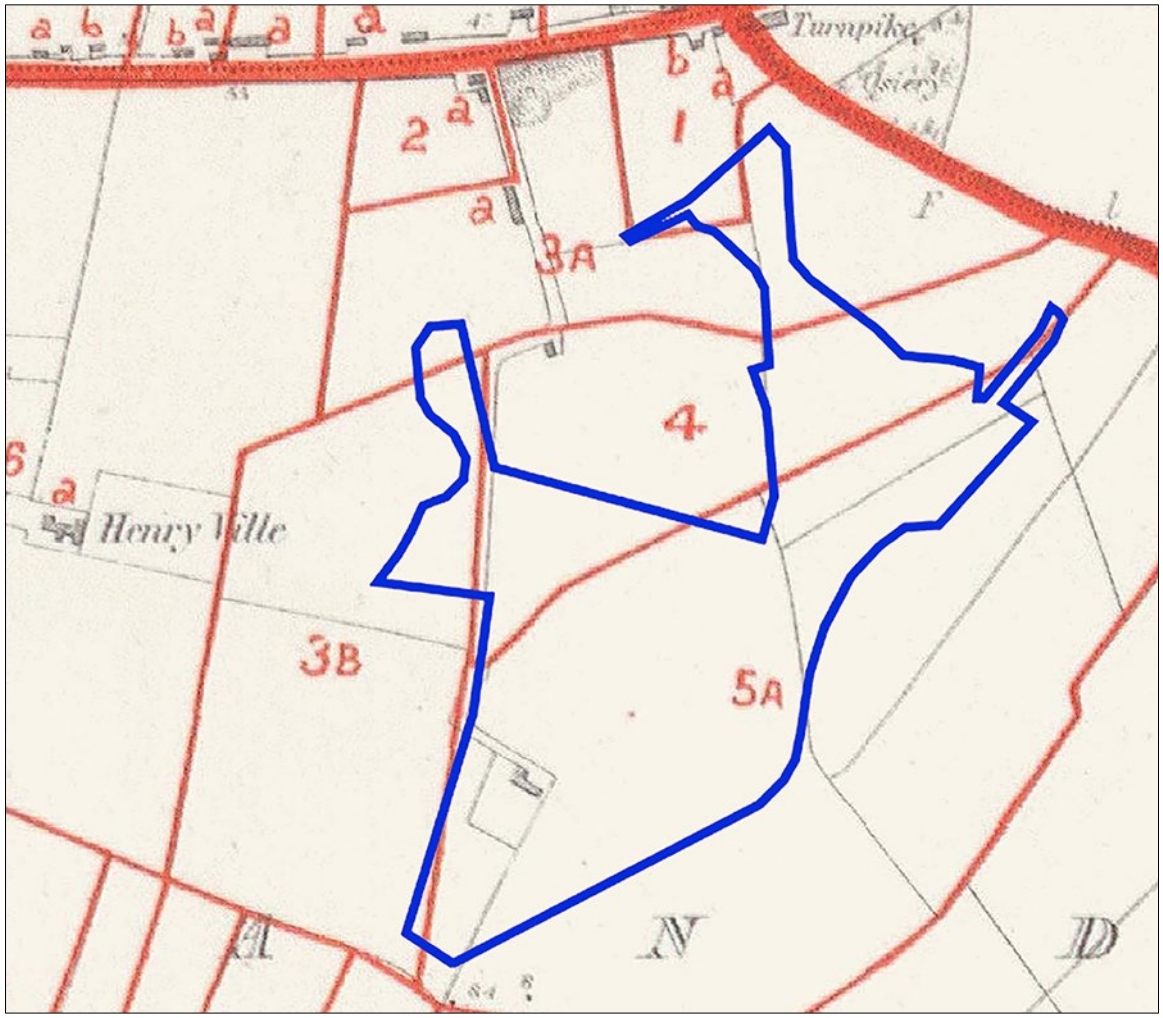
Cultural Heritage is considered here to include all recorded monuments listed in the Record of Monuments and Places (RMP) and in the Sites and Monuments Record (SMR), National Monuments (i.e. those in the ownership/guardianship of the state), Protected Structures, National Inventory of Architectural Heritage

(NIAH) sites, previously unrecorded sites, sites reported in the Excavations Database if not included in the RMP/SMR, and stray listed in the Topographical Files of the National Museum of Ireland.

12.3.1 Historical and Archaeological Background

The Site is located in the townland of Singland, the barony of Clanwilliam, and the civil parish of Saint Patrick's. in the County of Limerick The name Singland is translated from the Irish word *Shaingil*. On the The Down Survey map (1656–58) and associated terrier it is listed as consisting of 9 profitable acres. The owner of the townland in 1641 is listed as Dr. Thomas Arthur (Protestant) with the same occupier listed in 1670. Griffith's Valuation database, archives and associated map were examined (https://www.askaboutireland.ie/griffith-valuation/index.xml?action=placeSearch). The lands at Singland were rented by several different people at the time of the survey. These are 1a, rented by James Redding, owned by John Joseph Henry. Plots 3 a and 3b were rented by John Joseph Henry from the owners, the Vicars Choral of the Cathedral of Limerick. Plot 4 was rented by James McNamara, roger Ryan and Eleanor McNamara from the owner john Jospeh Henry. Plot 5 was rented by Patrick Coughlan from the owner, John Jospeh Henry.

Figure 12-2 Griffith's Valuation map



There are no Recorded Monuments listed in the Record of Monuments and Places (RMP) for County Limerick within the subject site.

12.3.2 Recorded Archaeological Monuments (RMP/SMR Sites)

The Site does not contain any monuments as listed in the Record of Monuments and Places (RMP) or the Sites and Monuments Record (SMR). The nearest such site is a pit /excavation (LI005-107----) situated c. 40m from the boundary of the Proposed Development site. This site was identified during monitoring of topsoil stripping associated with roadworks in 2001, and was fully excavated at that time under excavation licence no. 01E0946, (see section 12.3.5.1.).

Figure 12-3 Closest Recorded Monument (RMP).

12.3.3 National Monuments

The are no National Monuments located within the Site. The closest national Monuments are situated in Limerick City (King John's Castle LI005-017014-, National Monument in State Guardianship No. 288; Fanning's Castle LI005-017004-, Nation Monument in State Ownership No. 383), approximately 2.5 kilometers to the northwest of the subject site.

12.3.4 Previously Unrecorded Sites

No previously unrecorded archaeological features were noted on the subject Site.

12.3.5 Previous Archaeological Investigations

There have been no previous archaeological investigations on the subject Site.

12.3.5.1 Archaeological excavations in the environs of the site

A number of small pits were noted during monitoring of the realignment of the N7 from the Parkway roundabout to Plassey Park Road on the eastern outskirts of Limerick City. Following monitoring and initial investigation by Celie O Rahilly (Excavations 2001, No. 801), the writer was contracted to undertake an excavation of several of the features. Two of the pits were located near the centre of the road. The first was oval in plan and measured 0.69m north–south by 0.4m by 0.22m in depth. There were no finds in the charcoal-rich fill and the base was heat-reddened, indicating an in situ burning activity. This pit was disturbed by a later circular pit, which measured 0.44m in diameter and 0.22m in depth. The fill of this pit contained occasional flecks of charcoal and a small sherd of prehistoric pottery, tentatively identified as dating from the Neolithic period. Another pit was uncovered 5m to the north-west. This measured 0.98m east–west by 0.7m by 0.25m in depth. The eastern side had been oxidised and the fill contained frequent amounts of charcoal, which indicated that this pit was also used in a burning activity. A small burnt spread 10m to the north-east was found to be modern in date. The function of these pits was unclear. The burning may suggest a domestic cooking activity but there was no habitation evidence in the stripped areas surrounding the pits. They may also have had some ritual function, such as burial or votive offerings. However, there were no traces of cremated bone in any of the pits and only one contained a possible sherd of pottery. The interpretation of this site was hampered by the fact that it had been extensively disturbed in recent centuries by a field boundary bank and ditch, tree root activity and cultivation furrows

12.3.6 Record of Protected Structures (RPS)

There are no Protected Structures, as recorded in the *Limerick Development Plan 2022–2028*, within the site boundary. The closest Protected Structures are in excess of 400m from the subject site (see figure 12-4).

- RPS 1629, Blood Mill, 450m from subject site.
- RPS 1630, Singland Mill, 502m from subject site.
- RPS 1631, Singland House, 425m from subject site.

Figure 12-4 Closest Protected Structures (RPS).

12.3.7 National Inventory of Architectural Heritage (NIAH)

There are no sites listed in the National Inventory of Architectural Heritage (NIAH) within the Site boundary. The closest structure listed on the NIAH (21820001) is 780m to the northeast. This is Dromore House gate lodge.

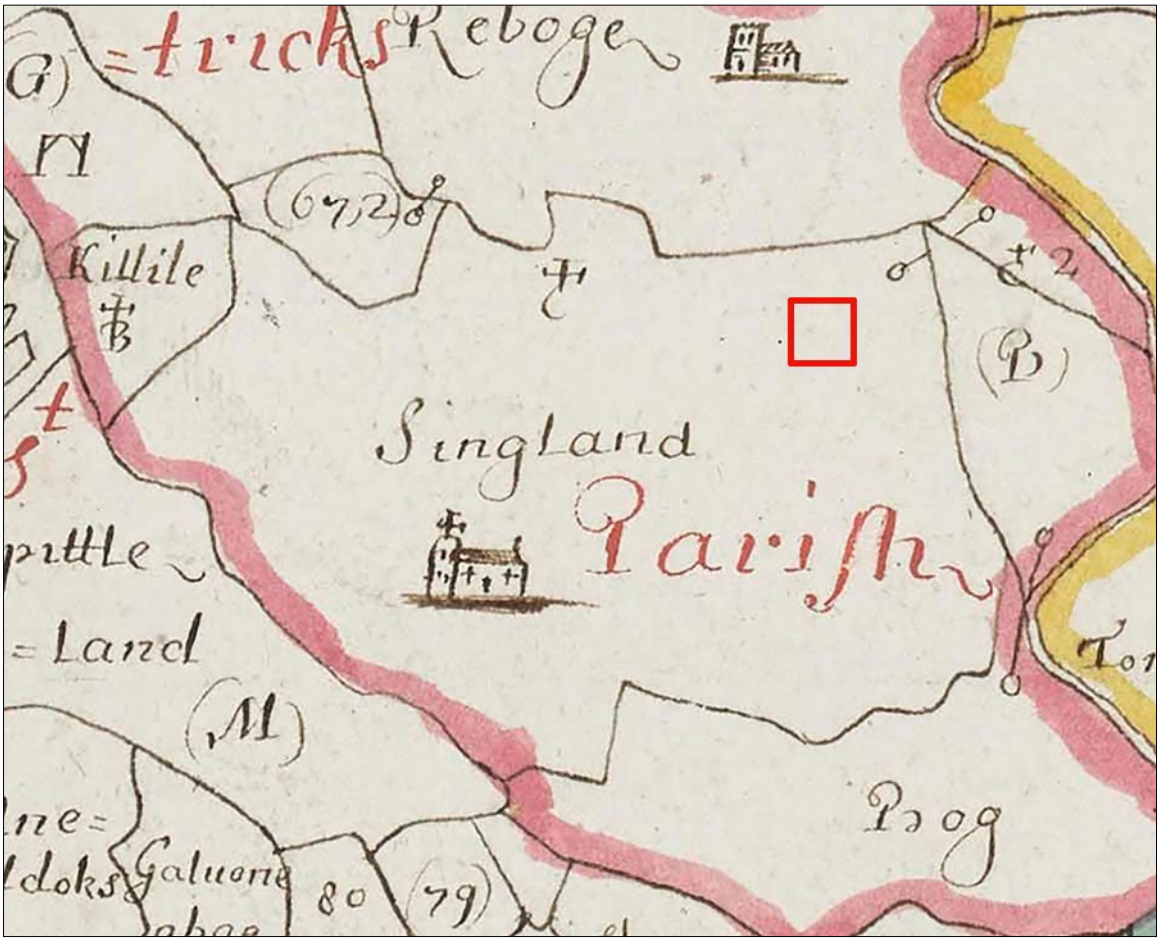
12.3.8 Cartographic Sources and Aerial Imagery

A review of available historical mapping for the area was carried out to include the Down Survey of Ireland AD 1656–58 (5), the Jean de Bodt map of the Siege of Limerick 1691 (6) and the Ordnance Survey (OS) of Ireland 6-inch (1841-2) (7) and 25-inch (190) (8) maps.

The Down Survey was a national land survey, managed by Sir William Petty then surgeon-general of the English army. Its purpose was to measure the land that was to be forfeited by Irish Catholics, so that it could be redistributed by the Crown as payment to adventurers and soldiers of the Protestant faith for

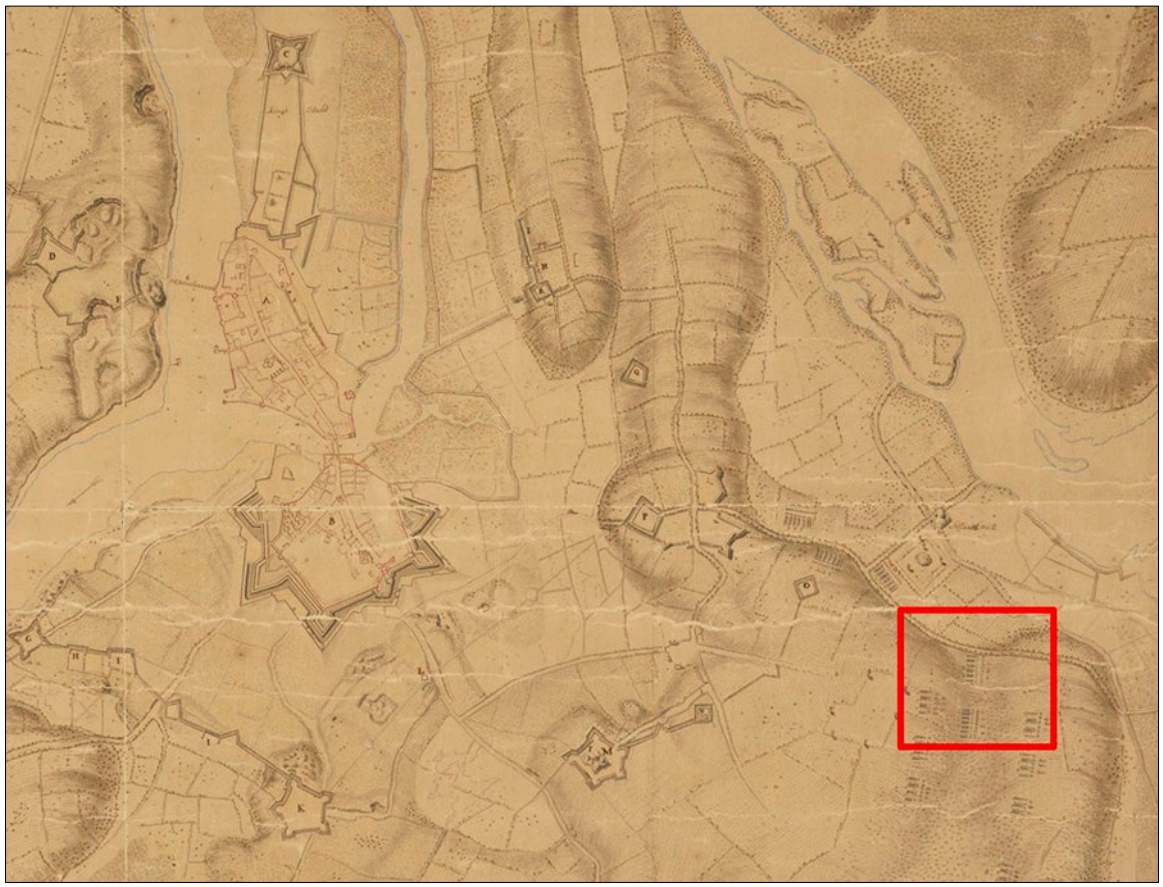
services rendered. The survey was undertaken in 1656-1658. The Down Survey generated an all-island map, and more detailed maps on a county, barony, and civil parish basis. The Down Survey map shows the townland of Singland, at that time depicted as part of the South Liberties of Limerick,. It is listed as consisting of 9 profitable acres. The owner of the townland in 1641 is Thomas Arthur (Protestant) with the same occupier listed in 1670. There is no detail of the subject site on the map of the South Liberties. The only detail marked is a church, most likely St Patrick's Church (LI005-029001-). This site is located approximately 900m to the southwest, and is no longer extant.

Figure 12-5 Extract from Down Survey map of Limerick South Liberties. Approximate location of subject site indicated by red box.



The next map which shows any detail of the general area of the subject site is the Siege of Limerick map, c. 1691. The author of this map, Jean de Bodt, was born in Paris. Training as an architect, he joined the party of William of Orange, and saw service in Ireland during 1690-91. He was probably attached to General Ginkell's forces when he made this map, which is possibly the earliest large-scale survey for this area. Attention has been paid, in particular, to representing the relative levels of the terrain. The general area of Singland is indicated by the red box (annotated by writer) , showing that the Williamite forces occupied a large area of the high ground in the general area of the subject site in 1691 (https://militarymaps.rct.uk/other-17th-century-conflicts/map-of-the-siege-of-limerick-1691-limerick-munster-ireland-52deg3953n-08deg3723w-0).

Figure 12-6 Jean de Bodt map of the Siege of Limerick 1691



The first edition OS six-inch map (Fig. 12.7), surveyed 1840-41, published 1844 shows the site as series of fields, with a lane leading to a house along the western side of the site, and a small structure at the north.

The later 25 inch map (Fig. 12.8), dated c. 1900 shows a slightly altered layout from the first edition map. The structures are now gone and the site is a series of fields. A series of drains are depicted at the eastern side of the site, attesting to the marshy nature of the ground.

Figure 12-7 Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1840-41, published 1844), showing location of site

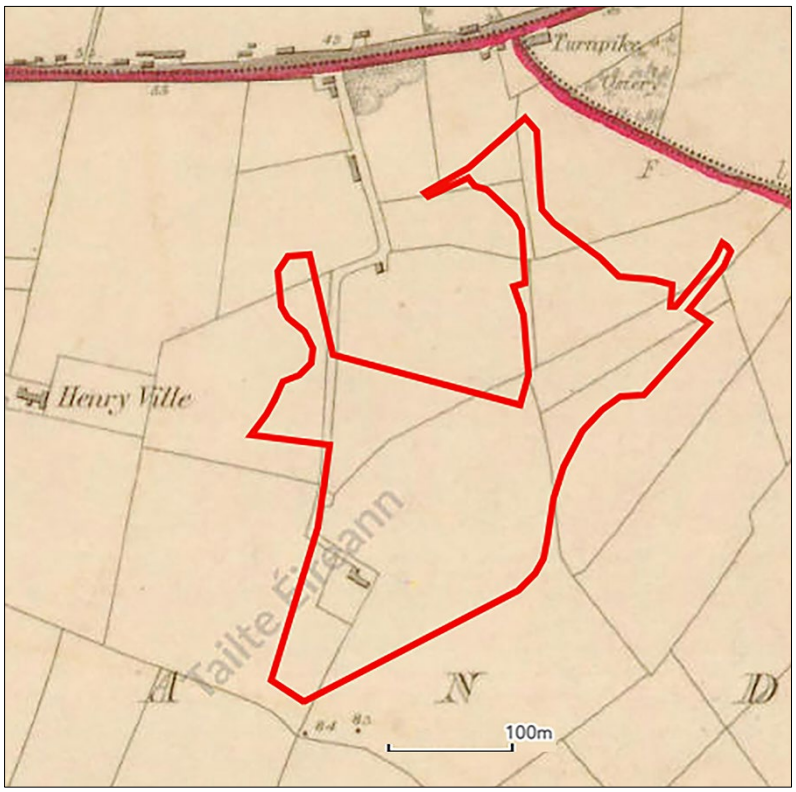
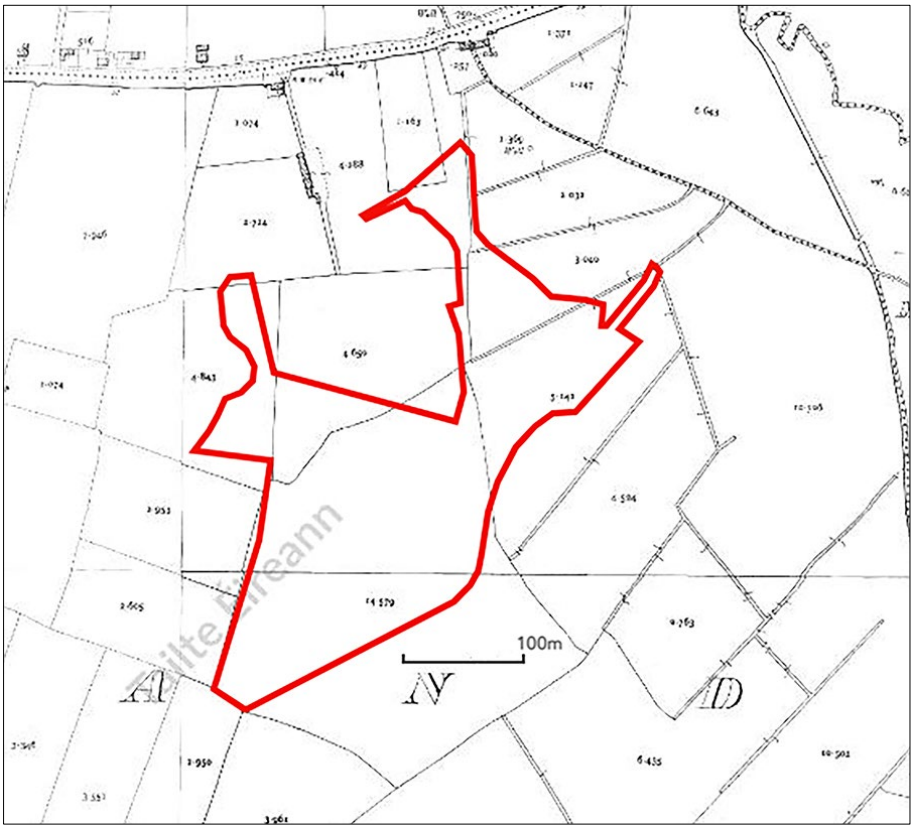


Figure 12-8 Extract from 2nd Edition Ordnance Survey (OS) 6-inch map (1900), showing location of site



12.3.8.1 Aerial Imagery

A review of available aerial photography was undertaken as part of this assessment. Aerial photographs dating between 1995 and 2005 from Tailte Éireann and Google Earth imagery dating between 2007 and 2025 were assessed (Figs 12.9 to 12.11).

An aerial image from 1995 shows that the field layout has remained almost the same as that depicted on the 25 inch map of 1900, with the exception of a new field boundary in the largest field. The new roadway at north has yet to be constructed. No potential archaeological features were noted.

Aerial imagery from 2001–2005 (figure 12.10) shows a small adjustment in the northern field boundary, and a possible spoil heat at the northwest side of the site.

A Google Earth image from 2007 (figure 12.11) shows construction of the previous permitted development underway, with the subject site almost completely stripped of topsoil.

12.3.9 Topographical Files

The Topographical Files of the National Museum of Ireland were consulted. No finds were recorded for the townland of Singland.

12.3.10 Field Inspection

A site inspection was carried out by the writer in 28 April 2026. The majority of the subject Site was previously built on. The area surrounding the area of the structure (now partially demolished) was previously disturbed during construction works and is now overgrown. No previously unrecorded archaeological features, or features of cultural heritage interest were noted.

Figure 12-9 Aerial view of site 1995.

Figure 12-10. Aerial view of site Map Genie 2001-2005.

Figure 12-11. Aerial view of site Google Earth 22 September 2007.

12.4 Characteristics of the Proposed Development

The Proposed Development comprises five residential apartment blocks with a total of 403 no. residential units, ranging from five to eight storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development. The current proposals also extend to the R445 to accommodate a proposed entrance from the R445. They will also include a proposed nature-based surface water drainage solution within the neighbouring Groody Valley green wedge. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant documents in order to define the Proposed Development.

The effect on archaeological and cultural heritage will be during the construction stage. The main source of archaeological effects will be as a result of the groundworks associated with the construction. The groundworks have the potential to impact on unknown archaeological features that might be present within the site if not appropriately mitigated. If appropriately mitigated at the construction stage there will be no effects during the operational phase.

12.5 Potential Impacts of the Proposed Development

12.5.1 Construction Phase

12.5.1.1 Archaeological Heritage

There will be no effects, direct or indirect, on recorded archaeological monuments. There are no monuments, as listed in the Record of Monuments and Places (RMP) or in the Sites and Monument Record (SMR), located within the site.

A potential direct effect on the archaeological resource lies in the uncovering of sub-surface archaeological features during groundworks associated with the Proposed Development and related infrastructure within the eastern and northeastern side of the site. However, this side of the site has been disturbed during the previous construction phase, and so there is only a small chance of previously unrecorded small isolated archaeological features being uncovered.

Should previously unknown archaeological features be present within the site, the Proposed Development will have a direct, negative, permanent and profound or very significant effect on such remains. The effect on archaeological heritage will need to be mitigated at construction phase.

12.5.1.2 Architectural and Cultural Heritage

There will be no effects, direct or indirect, on recorded architectural heritage as no Protected Structures or sites listed within the National Inventory of Architectural Heritage (NIAH) are located within the site.

12.5.1.3 Indirect Effects

Indirect effects are those whereby the Proposed Development may have a negative (or positive) effect on the wider archaeological landscape or surrounding architectural and cultural heritage. Indirect effects may include a visual impact on the surrounding archaeological and/or architectural landscape.

The introduction of the Proposed Development to the area will result in no effect on the setting of any Recorded Monuments or Protected Structures as none are present within the Site.

12.5.2 Operational Phase

There will be no effect on archaeological and cultural heritage during the operational phase.

12.6 Mitigation Measures

12.6.1 Archaeological Heritage

The predicted effects on the known archaeological heritage (SMRs/RMPs) are regarded as being none. There will be no indirect or visual effects on Recorded Monuments as none are present within the site.

A potential direct effect on previously unknown archaeological heritage lies in the uncovering of sub-surface remains. Accordingly, the following mitigation measures will be carried out subject to the approval of the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH),:

- Archaeological monitoring at construction phase of the area of the site outside of the previously partially constructed building (see Figure 12-12 below). Should any further archaeological features, deposits or artefacts be identified during the course of the development, works in that area should be halted and the appropriate authorities informed. The archaeological remains will be preserved *in situ* or by record (excavation) following consultation with the National Monuments Service.
- A report is required to be compiled on completion of archaeological monitoring, and any archaeological excavation (if necessary) and will be submitted to the relevant authorities.

Figure 12-10 Location of area proposed for archaeological monitoring at construction stage in blue (Landsat 2025).

4.6.2 Architectural and Cultural Heritage

The predicted effects on the known architectural heritage are regarded as being none. No effects on Protected Structures (RPS) or sites in the National Inventory of Architectural Heritage (NIAH) were identified, and no indirect or visual effects on the nearest such site outside the Proposed Development site boundary were noted.

12.7 Residual Effects of the Proposed Development

The residual impacts are likely to be neutral and none to imperceptible if the mitigation measures are implemented. The table below summarizes the residual effects of the Proposed Development on the archaeological, architectural and cultural heritage landscape. Residual impacts are defined as the overall effect of the development on archaeology, architectural and cultural heritage, on the basis of implementing the mitigation measures outlined in this report.

Table 12-1. Residual Effects of the Proposed Development Table

Potential Effects	Mitigation Strategy	Residual Impacts
Construction Effects		
Effects on Recorded Monuments - none	No effect, as no Recorded Monuments within the site.	None
Effects on previously unknown archaeological, architectural and cultural heritage sites – Groundworks and service trenches, etc.	Archaeological monitoring of the eastern and northeastern portion of the site. Consultation with the Licensing Section of the National Monuments Service should be undertaken if archaeological sites or features are uncovered. Excavation of any archaeological features identified.	None
Effects on Protected Structures - none	None	None
Operational Effects		
None	None	None

12.8 Cumulative Effects of the Proposed Development

Cumulative effects include the combined effects of multiple developments or activities on a range of receptors, in this case, archaeological monuments and architectural/cultural heritage sites.

There are no significant cumulative effects on the archaeological and cultural heritage resource of the area as a result of the Proposed Development. There are no predicted effects on the known archaeological and architectural features of the site and the surrounding area.

Subject to the implementation of the appropriate mitigation measures during the construction phase, it is predicted that there will be no residual effects on the archaeological, architectural and cultural heritage and therefore no possibility of cumulative effects in combination with other plans or projects.

12.9 Summary of Significant Effects

Should previously unknown archaeological, architectural or cultural heritage features be present within the footprint of the Proposed Development, it will likely result in the permanent loss of these remains once mitigation (preservation by record/excavation) is applied, and, as such, the magnitude of the effect is profound or very significant.

12.10 Monitoring or Reinstatement Measures

No monitoring or reinstatement measures will be necessary as all effects on archaeological, architectural and cultural heritage features will be mitigated at the pre-construction or during construction phase.

12.11 References

- Coyne, F. (2025) Archaeological Impact Assessment Report at Singland, Co. Limerick; unpublished report by Aegis Archaeology Ltd.
- Database of Irish Excavation Reports (www.excavations.ie, accessed July 2025).
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf; accessed July 2025).
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report.
- Griffiths Valuation by the National Library of Ireland (https://www.askaboutireland.ie/griffith-valuation/, accessed April 2026).
- Historic Environment Viewer (https://heritagedata.maps.arcgis.com/apps/webappviewer, accessed July 2025).
- Irish Townland and Historical Map Viewer (https://osi.maps.arcgis.com/apps/webappviewer/, accessed April 2026).
- National Inventory of Architectural Heritage Database (https://www.buildingsofireland.ie/, accessed July 2025).
- National Monuments in State Care: Ownership and Guardianship, Limerick (4 March 2009) (https://www.archaeology.ie/app/uploads/2025/03/monuments-in-state-care-waterford.pdf, accessed July 2025).
- National Monuments Service (https://www.archaeology.ie/, accessed April 2026).
- Placenames Database of Ireland (https://www.logainm.ie/en/, accessed July 2025).
- Record of Monuments and Places for County Limerick (1997)
- Record of Protected Structures; Appendix 9 (chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.limerick.ie/sites/default/files/media/documents/2025-04/3a-record-of-protected-structures-metropolitan-district-rev-a_0.pdf, accessed April 2026).
- The Down Survey of Ireland by Trinity College Dublin (https://www.downsurvey.iel, accessed April 2026).
- Limerick Development Plan 2022–2028. (https://www.limerick.ie/council/services/planning-and-placemaking/development-plan-strategies/limerick-development-plan-0, =accessed April 2026).

Chapter 13 – Material Assets – Traffic and Transportation

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13. MATERIAL ASSETS – TRAFFIC AND TRANSPORTATION

13.1 Introduction

This chapter presents the likely and significant impacts associated with the material asset (Traffic and Transport) environments associated with the Proposed Development.

The purpose of this chapter is to assess the impact of the Proposed Development on the surrounding road network and transport infrastructure on the Dublin Road. The assessment is not only relating to the potential impact of traffic anticipated from the Proposed Development but also the projected increase in traffic in the area from the future build out of the entire masterplan site.

13.2 Methodology

A Traffic and Transportation Assessment (TTA) was completed for the planning application submission and the results of the assessment have informed this chapter. The TTA is included as Appendix 13.1 of this chapter.

The assessment is based on the following documents which outline the methodology required for traffic assessments:

- TII's Traffic and Transport Assessment Guidelines PE-PDV-02045 (May 2014)
- TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017 October 2021)
- Design Manual for Urban Roads & Streets (DMURS).
- Sections from the Limerick Development Plan (2022-2028)
- Cycle Design Manual (September 2023)

Site visits were made at various dates in 2025 and 2026 to review the character and issues associated with the surrounding road network.

The scope of the TTA was discussed and agreed with Limerick City & County Council Engineering representatives.

Traffic surveys at 4 junction locations (refer to Figure 13-1) were undertaken on Thursday 13th of March 2025 to establish baseline traffic flows on the existing road network. Surveys on a Thursday during school term are generally considered representative of peak traffic times for residential developments.

Figure 13-1 Junction Turning Count Locations

The impact of the Proposed Development was assessed using Junctions 9 software analysis for priority-controlled junctions and Linsig software analysis for signal-controlled junctions by comparing the baseline traffic flows with the Proposed Development added up to two Design Years – 2033 and 2043.

A public transport capacity occupancy survey was undertaken on Tuesday 16th September 2025 at 2 no. bus stops in close proximity to the Site as per industry practice. The results of the survey capacity were compared to the potential future additional commuters using the service from the Proposed Development.

A DMURS Quality Audit including Stage 1 & 2 Road Safety Audit has been carried out by an independent auditor on the Proposed Development and surrounding network. The auditor visited the Site and reviewed the Proposed Development drawings for safety concerns relating to roads and active travel measures in the Proposed Development. The recommendations of the audit have been incorporated into the design proposals for the Proposed Development, where possible.

13.2.1 Difficulties Encountered

No significant difficulties were encountered in completing this chapter.

13.3 Receiving Environment

13.3.1.1 Site Location

The Site is located at Singland, Limerick, on the south side of the Dublin Road, adjacent to Parkway Retail Park and approximately 4 km east of Limerick City Centre. The 6.18-hectare brownfield site is bounded by the Dublin Road to the north, greenfield lands to the east and southeast, residential properties to the southwest, and Parkway Valley Retail Park to the west.

Previous construction for a mixed-use development was commenced but not completed; all structures have since been demolished except for a retaining wall along the western boundary. The Site now comprises a gravel surface with generally flat ground levels ranging from 8.4mAOD to 9.64mAOD. Access is provided via an existing entrance from the Parkway Retail Park Roundabout to the west.

13.3.1.2 Road Network

Dublin Road (R445) forms the northern boundary of the Proposed Development Site. It is a dual carriageway with two lanes in each direction and carries high traffic volumes, with an AADT of approximately 22,000 vehicles in 2019 and a projected 26,900 vehicles in 2025. The road provides direct access between Limerick City Centre and the M7 motorway, serving as a key regional route.

To the west, the Parkway Roundabout (Junction 1) provides a five-arm junction connecting the Dublin Road (east/west), Childers Road (R509), Bóthar Bhaile Átha Cliath, and access to Parkway Shopping Centre. Further east, the Groody Roundabout (Junction 4) connects Dublin Road with Groody Road and Plassey Park Road, providing access to University of Limerick, Annacotty, and Monaleen. These roads generally feature two-way carriageways with good connectivity to the local and regional network.

The traffic survey completed in March 2025 found that the AM & PM Peaks for each of the survey sites were varied as set out in Table 13-1.

Table 13-1 Traffic Survey AM/PM Peak Times

Development Type	AM Peak	PM Peak
Junction 1: Parkway Roundabout	10:45 – 11:45	12:00 – 13:00
Junction 2: Dublin Road/Parkway Retail Park Signalised Intersection	10:30 – 11:30	15:30 – 16:30
Junction 3: Parkway Retail Park Roundabout	11:00 – 12:00	13:30 – 14:30
Junction 4: Groody Roundabout	07:45 – 08:45	16:00 – 17:00

A junction capacity analysis of the existing 2025 traffic flows was carried out with the following results:

- Junction 1 (Parkway Roundabout) is shown to be operating currently at 0.84 and 0.91 of the junction capacity during the AM and PM peak period respectively during the survey year 2025. The Childers Road arm of the junction is where the most vehicle queueing is observed.
- Junction 2 (Dublin Road/Parkway Retail Park Signalised Intersection) is shown to be operating at a Maximum Degree of Saturation (DOS) of 53.1% and 56.4% during the AM and PM peak period respectively during the survey year 2025.
- Junction 3 (Parkway Retail Park Roundabout) is shown to be operating at 0.21 and 0.25 of the junction capacity during the AM and PM peak period respectively during the survey year 2025. Minimal queuing is observed on each arm. There are no existing issues with capacity at this junction as it mostly serves as access in and out of the Parkway Retail Park with no conflicting movements.
- Junction 4 (Groody Roundabout) is shown to be operating at 0.93 and 0.87 of the junction capacity during the AM and PM peak period respectively during the survey year 2025.

The design threshold for roundabouts and priority-controlled junctions is a Ratio of Flow to Capacity (RFC) of 0.85. The design threshold for signal-controlled junctions is 90% Degree of Saturation (DOS).

Junctions 2 & 3, located at the Parkway Retail Park, are operating within normal design thresholds.

The Parkway and Groody Roundabouts on the Dublin Road are already performing at or above the design threshold during the peak times assessed. It is considered that in urban areas a certain level of congestion is to be expected during peak times.

13.3.1.3 Pedestrian Facilities

Pedestrian infrastructure in the area is generally good, with footpaths provided on both sides of the Dublin Road, Childers Road, Bóthar Bhaile Átha Cliath, Groody Road, and Plassey Park Road. Uncontrolled pedestrian crossings are provided at key junctions, including the Parkway Roundabout (zebra crossing) and the Groody Roundabout area. These facilities offer safe pedestrian movement between the retail, residential, and institutional areas surrounding the Site.

13.3.1.4 Cycling Facilities

Dedicated cycle facilities are limited along the Dublin Road, except for small waiting areas at the signalised junction to Parkway Retail Park. However, designated cycle lanes are present along Childers Road (R509), Bóthar Bhaile Átha Cliath, Groody Road, and Plassey Park Road, including two-way cycle lanes on the latter two routes. These provide key cycling connections between the University of Limerick, residential areas, and the wider city network.

The National Transport Authority (NTA) published LSMATS to set out the framework for the delivery of the transport system developments. Under the strategy, cycling infrastructure will be developed along several primary routes. Portions of the Dublin Road are designated as primary cycle routes, while other sections are classified as secondary. Refer to Figure 13-2 below. The timeline of the delivery of this cycle infrastructure is currently unknown.

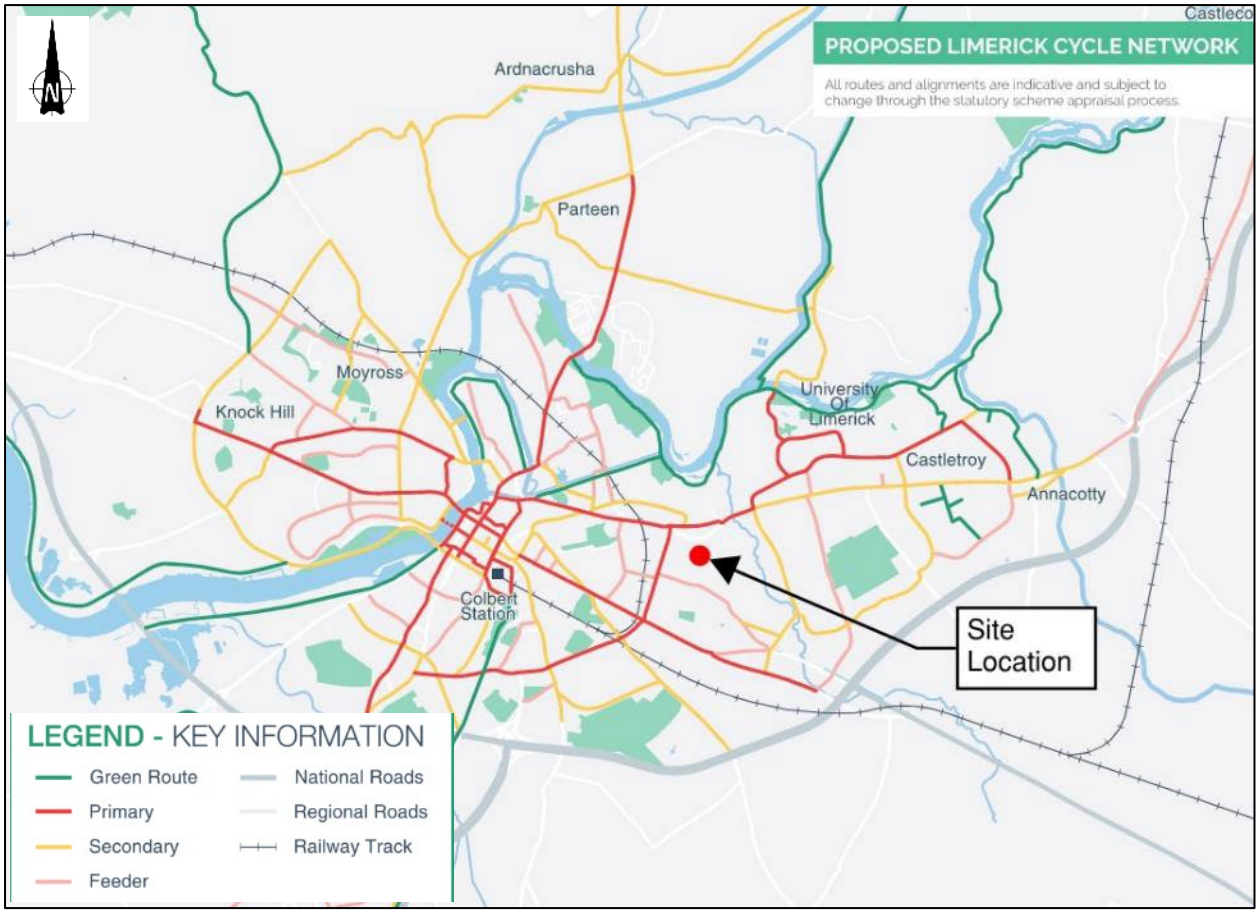

Figure 13-2 Limerick Proposed Cycle Network as per LSMATS

13.3.1.5 Public Transport Facilities

The Site is well served by the existing bus network with 3 no. Bus Éireann routes passing the Site along the Dublin Road namely Route 304 (Ballycummin - University of Limerick), Route 304A (Raheen University Hospital Limerick - University of Limerick) and Route 323 (City Centre - Castleconnell).

Figure 13-3 below, shows the location of all the Bus Stops within 500m and 1km of the Proposed Development. Table 13-2 below includes the frequency (in each direction) of bus routes in close proximity to the Proposed Development.

Table 13-2. Existing Local Bus Routes

Number	Route	Provider	Weekday Frequency	Sat/ Sun Frequency
304	Ballycummin -UL	Bus Éireann	15 min	15/30 min
304A	Raheen UHL - UL	Bus Éireann	30 min	30 min
309	Kilduff - Glentworth	Kelly Travel	Tuesday – Friday One Trip	Saturday One trip
310	City Centre – National Technology Park	Dublin Coach	30 min	30 min
323	City Centre - Castleconnell	Bus Éireann	3 hours	3 hours
323X	Limerick - Birr - Athlone	Bus Éireann	One trip	N/A
332	Limerick - Killaloe - Nenagh - Birr	Bus Éireann	2 – 21/2 hours	21/2 – 3 hours

Figure 13-3 Bus Stop Locations in Relation to Site Location

A public transport capacity occupancy survey was undertaken on Tuesday 16th September 2025 at 2 no. bus stops in close proximity to the site as per industry practice. The overall survey results indicate an average occupancy of 53% during the morning period, 69% during the evening period, and an overall occupancy of 60%.

BusConnects Limerick is a strategy developed by the National Transport Authority (NTA) to greatly improve bus services in Limerick City. The aim of BusConnects is to "deliver an enhanced bus system that is better for the city, its people and the environment" (busconnects.ie). At the time of writing, the Bus Connects website notes that the new network is scheduled to be delivered on a phased approach from 2027.

The proposed network is shown in Figure 13-4 below. The following routes are proposed near the development:

- Bus route (no.2) located 900 south of the Proposed Development. This route will operate with a 15-minute frequency and will connect Moylish to UL North Campus.
- Bus route (no.4) also located on Dublin Road. This route will connect St Nessan's Church to University of Limerick and will operate with a 10-minute frequency.
- Bus route (no. 6). which is located along Dublin Road. This route will connect Coonagh Shopping Centre and University of Limerick at 30-minute frequencies.

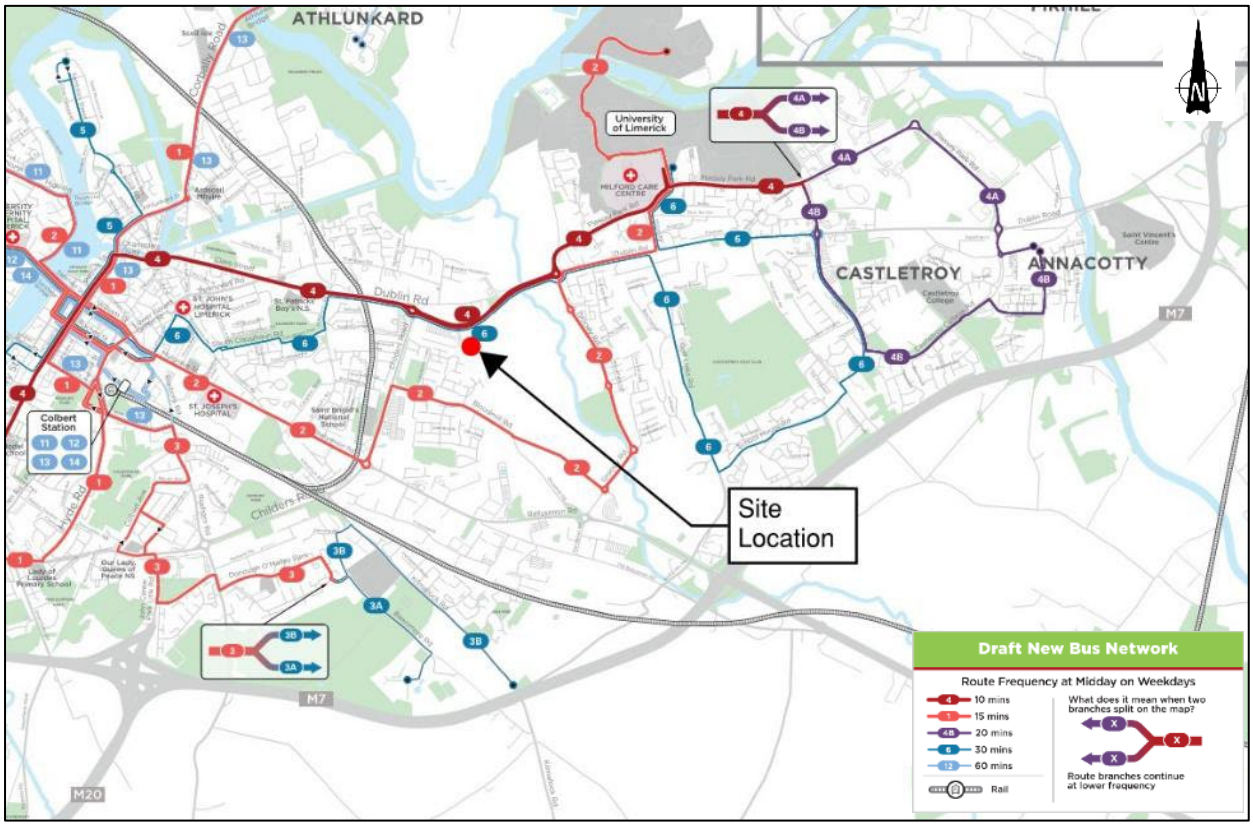

Figure 13-4 Proposed BusConnects Limerick

The Limerick Colbert train station is located 2.5km from the Proposed Development Site. This offers reliable intercity transport to Dublin, Galway, Waterford, Cork and Tralee.

13.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase relating to traffic and transportation elements of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report.

It is planned to access the Proposed Development via a new vehicular site entrance off the Dublin Road (R445) and via the existing Parkway Retail Park Roundabout. The new vehicular entrance will operate as a Left-In/Left-Out (LILO) junction arrangement facilitating left-turn ingress and egress movements only.

It is proposed to provide 138 no. car parking spaces on the development Site. 12 no. spaces will be accessible and a minimum of 20% will have EV chargers. All spaces will be cabled for future EV use. 5 no. parking spaces will be dedicated for car club use only in this car space provision.

In order to estimate the likely volumes of traffic that will be generated by the Proposed Development, trip rates recommended by TRICS (Trip Rate Information Computer System) were extracted from the database and applied pro-rata to the relevant number of residential apartments and gross floor area of commercial units within the development. The estimated AM and PM peak hour traffic (PCUs) generated by the Proposed Development are presented in Table 13-3.

Table 13-3 Estimated AM and PM peak hour traffic (PCUs) generated by the Proposed Development using TRICS

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m2)	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Residential Units	403		0.048	0.138	0.116	0.067	19	56	47	27
Creche		306	2.562	2.194	1.894	2.450	8	7	6	7
Medical Centre		3,082	0.486	0.581	0.571	0.624	15	18	18	19
Total							42	80	70	54

The Proposed Development will provide high quality pedestrian and cyclist access which will promote sustainable transport usage.

As the potential for pedestrian trips to and from the development is high, it is important that the development is properly integrated into the existing footpath network. There are footpaths already along Dublin Road and the Parkway Retail Park access road. A new pedestrian link is being proposed from Dublin Road in addition to the existing access from Parkway Retail Park roundabout. These footpaths further link to a broader network within Limerick City Centre, facilitating easy pedestrian access.

The Site is in close proximity to Parkway Retail Park with a walking time of less than 2 minutes.

The bus stops are situated within a 30-minute walking distance from the Site, making the combination of walking and bus commuting an excellent option for residents, creche and medical facility workers.

The Public Transport Capacity Assessment Report demonstrates that the Proposed Development Site is well served by public transport with large capacity, and frequent services. The existing bus network has sufficient capacity to accommodate passenger trips generated from the Proposed Development Site.

It is proposed to provide 818 no. secure cycle parking spaces on the Proposed Development Site. Cycle parking will be monitored, and additional cycle parking provided if required in the future.

13.5 Potential Impacts of the Proposed Development

13.5.1 Construction Phase

Construction traffic travelling to the Site will use the Dublin Road and the Parkway Retail Park roundabout to the west of the proposed Site for access.

Construction workers will vary greatly over the construction period. At peak times there is estimated to be a maximum of 100-150 staff working on the Site. Construction work will typically start and finish outside of the peak traffic times on the surrounding road network. Vehicle parking for construction personnel will be accommodated within the Site. To the extent possible, personnel will also be encouraged to use public transport, and information on local public transportation will be published on Site.

Approximately 37,000m^3 of existing made ground and subsoil will need to be excavated and removed from site which will require an approximate total number of 4,100 HGV loads.

The superstructure of the buildings will be piled which will result in approximately 700m^3 of arisings from the piling process which will require an approximate total number of 75 HGV loads.

Following the installation of the piles to improve the ground material, hardcore fill with an approximate volume of 50,000m^3 will then be backfilled to building and road formation level resulting in approximately 5,500 HGV loadings to the Site.

This formation level and ground improvement process will be spaced over an approximate 180-day period at the start of the project resulting in a maximum of 20-50 HGVs per day during the busiest period of construction. Refer to Table 13-4 for comparison of predicted maximum construction traffic expected in the peak hours versus the existing background traffic.

Table 13-4 Estimated AM and PM peak hour (Passenger Car Units (PCUs)) generated by Construction Traffic versus Existing Background Traffic

Site	Junction	Trips Generated (PCUs)		Background Traffic (PCUs)	Percentage
1	Parkway Roundabout	AM	10	2,938	0.3%
		PM	10	3,020	0.3%
2	Dublin Road/Parkway Retail Park (Signal-Controlled)	AM	20	2,042	1.0%
		PM	20	2,178	0.9%
3	Parkway Retail Park Roundabout	AM	20	457	4.4%
		PM	20	510	3.9%
4	Groody Roundabout	AM	10	3,308	0.3%
		PM	10	3,477	0.3%

The traffic volume associated with the construction phase is not considered to be excessive when compared to the baseline traffic volumes carried out in September 2025 and will be spread out over the duration of the construction period of the Proposed Development.

As the construction works are off-line and due to the designated access point, which allows delivery vehicles to pull off into the Site, there will be no significant disruption to the traffic flows on the Dublin Road or at the Parkway Valley Retail Park roundabout as a result of the construction of the development. It is not envisaged that any diversions will be required.

Existing public footpaths and cycling facilities in the vicinity of the Proposed Development Site will be unaffected during construction phase.

The Proposed Development will have a potential impact ranging from ***negative slight temporary***, during peak construction, and expected to reduce to ***negative short-term not-significant*** impact to local traffic during the construction phase.

13.5.2 Operational Phase

A total of 138 no. car parking spaces are proposed for the development. The convenient accessible location of the Site supports sustainable transport usage and will therefore not generate high levels of vehicular traffic in the area.

It is proposed to provide 818 no. secure cycle parking spaces on the Proposed Development Site. Cycle parking will be monitored, and additional cycle parking provided if required in the future.

As noted in Section 13.3.1.2, cycling facilities in the area will be improved with the provision of a Primary Radial Cycle Route along the Dublin Road (R445) as identified in the Limerick Shannon Metropolitan Area Transport Strategy (LSMATS). This project will deliver dedicated cycle lanes passing the Site from the City Centre to the University of Limerick and National Technology Park. The timeline of the delivery of this cycle infrastructure is currently unknown.

A public transport capacity occupancy survey was undertaken on Tuesday 16th September 2025 at 2 no. bus stops in close proximity to the site as per industry practice. The overall survey results indicate an average occupancy of 53% during the morning period, 69% during the evening period, and an overall occupancy of 60%. The results of the public transport capacity occupancy survey were compared to the potential future additional commuters using the service from the Proposed Development. It was found that there is adequate capacity within the existing services to accommodate the Proposed Development.

Additionally, as noted in section 13.3.1.2, two proposed new BusConnects routes due to be delivered on a phased approach from 2027 will run via Dublin Road passing directly outside the perimeter of the Proposed Development. These bus routes will provide a quick and sustainable means of transport for residents and users of the Site.

Table 13-5 shows that the Estimated AM and PM peak hour overall traffic generated by the Proposed Development will have a minimal impact on the surrounding external junctions with the Proposed Development in operation.

Table 13-5 Estimated AM and PM peak hour (Passenger Car Units (PCUs)) generated by Proposed Development versus Existing Background Traffic

Site	Junction	Trips Generated (PCUs)		Background Traffic (PCUs)	Percentage
1	Parkway Roundabout	AM	66	2,938	2.3%
		PM	62	3,020	2.1%
2	Dublin Road/Parkway Retail Park (Signal-Controlled)	AM	123	2,042	6.0%
		PM	124	2,178	5.7%
3	Parkway Retail Park Roundabout	AM	123	457	26.9%
		PM	124	510	24.3%
4	Groody Roundabout	AM	56	3,308	1.7%
		PM	62	3,477	1.8%

Where development-generated traffic represents less than 5% of existing background traffic, it is considered to have no significant impact on junction performance. For the current development proposals, traffic volumes equate to less than 5% of background traffic at Junction 1 (Parkway Roundabout) and Junction 4 (Groody Roundabout). Accordingly, detailed junction capacity modelling is not specifically required, as the anticipated development trips would have minimal effect on these junctions.

For completeness, capacity assessment of the 4 No. surrounding junctions was carried out. The 2043 predicted worst-case results are shown in the Table 13-6 below.

Table 13-6 Summary Results of all Surrounding Junctions

Number	Route	2043 Without Development RFC/DOS	2043 With Development RFC/DOS
1	Parkway Roundabout	115%	117%
2	Dublin Road/Parkway Retail Park (Signal-Controlled)	67%	88%
3	Parkway Retail Park Roundabout	30%	30%
4	Groody Roundabout	113%	116%

The design threshold for roundabouts and priority-controlled junctions is a Ratio of Flow to Capacity (RFC) of 0.85. The design threshold for signal-controlled junctions is 90% Degree of Saturation (DOS).

Junctions 2 & 3, located at the Parkway Retail Park, are operating well within normal design thresholds.

The Parkway and Groody Roundabouts on the Dublin Road are predicted to be performing above the design threshold in the design year 2043, however they are predicted to do so also without any further development. It is considered that in urban areas a certain level of congestion is to be expected during peak times.

From the above modelling results we conclude that the surrounding road network and adjacent existing junctions/roundabouts will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.

Overall, at operational phase, there is potential to be a ***long-term neutral not significant*** impact on the surrounding roads as a result of the Proposed Development.

13.6 Mitigation Measures

13.6.1 Construction Phase

The following mitigation measures are proposed for the construction phase of the Proposed Development with reference to Material Assets: Traffic and Transport:

1. To address the potential Construction Phase impacts, the appointed Contractor shall prepare a Construction Transport Management Plan (CTMP) prior to the commencement of development. All deliveries shall be provided with instructions/directions on accessing the site from the Dublin Road, and deliveries shall be scheduled outside of peak commuting hours.

Construction operations on site and deliveries to the site will be in accordance with the Construction and Environmental Management Plan (CEMP).

The preparation of the CTMP will entail an assessment of existing nearby employment, educational, recreational and commercial facilities to establish the peak times for vehicles, cyclists and pedestrians.

This information would be used to develop the optimum start/finish/delivery times to minimise impact on these existing facilities.

The CTMP issued at construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority. There will also be a requirement for comprehensive measures as part of the construction management.

2. To address the potential Construction Phase impacts, the construction vehicle movements will be minimised through:

    a) Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods;

    b) Use of precast/prefabricated materials where possible;

    c) 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works;

    d) Adequate storage space on site will be provided;

    e) A strategy will be developed to minimize construction material quantities as much as possible;

    f) Construction staff vehicle movements will also be minimized by promoting the use of public transport, shared use of vehicles, cycling and walking.

With the implementation of these mitigation measures during the construction phase, the severity of the impact of the Proposed Development on the traffic and transportation will be minimised.

13.6.2 Operational Phase

The design, construction and operation of site access, internal roads and associated infrastructure in accordance with relevant design standards (including DMURS, Limerick Development Plan (2022-2028) and the Cycle Design Manual) ensure the safe and efficient accommodation of development-generated traffic and will minimise potential impacts on the surrounding road network during the operational phase.

13.7 Monitoring or Reinstatement Measures

13.7.1 Construction Phase

The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:

- Limerick City & County Council including Elected Members
- An Garda Siochana
- Irish Rail
- Bus Eireann
- Other relevant statutory bodies
- Members of the community
- Adjacent contractors

The traffic liaison officer/traffic manager will be sufficiently senior in position and will be responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.

13.7.2 Operational Phase

There will be no monitoring requirements of the traffic and transport in the operational phase of the development.

13.8 Residual Effects of the Proposed Development

13.8.1 Construction Phase

Given the short-term nature of the traffic increase, the mitigation measures set out above will ensure that no significant residual effects arise. In summary:

- A Construction Environmental Management Plan (CEMP) will minimise traffic impacts during the construction phase as far as practicable.
- Any increase in construction-related traffic will be temporary and will occur outside peak periods.

Overall, with mitigation in place, the construction phase traffic impact is expected to be not significant, negative and short-term.

13.8.2 Operational Phase

With the design, construction and operation of site access, internal roads and associated infrastructure in accordance with relevant design standards as set out in the mitigation measures above, residual impacts on the surrounding traffic and transportation during the operational phase is considered to be a ***long-term neutral*** and ***imperceptible*** impact.

13.9 Cumulative Impacts of the Proposed Development

Adjacent planning consents/applications granted/submitted in the area have been reviewed and none are considered to have a potential significant impact on the traffic assessment for the Proposed Development as presented in Table 13.7.

Table 13-7. Adjacent Planning Applications Reviewed for Traffic Impact

Application details	Description	Decision & Date	Include/Exclude in TTA
Applicant: Bloodmill Road Estates Limited **Reference**: 201235 **Location**: Bloodmill Road, Singland, Co. Limerick	Alterations to previously approved Planning ref no. 18/434. The alterations consist of alteration to design of Creche to provide a reduced floor area, addition of 3 semi-detached houses together with associated site works.	**Decision**: Grant Permission (with Conditions) **Date**: 27/04/2021	**Exclude:** The Planning Report included as part of the planning submission stated that the Proposed Development will have minimal impact, and as such a Traffic Impact Assessment is not deemed necessary.
Applicant: McCarthy & Woulfe Ltd. **Reference**: 21142	Construction of a single storey house and ancillary site works.	**Decision**: Grant Permission (with Conditions) **Date**: 02/06/2021	**Exclude:** Single dwelling house will have minimal impact on surrounding road network.

Application details	Description	Decision & Date	Include/Exclude in TTA
Location: Brook Place, Rhebogue, Limerick			
Applicant: Osprey Construction Limited **Reference**: 201074 **Location**: Brú na Gruadán, Castletroy, Co. Limerick	A residential development comprising 63 no. residential units.	**Decision**: Grant Permission (with Revised Conditions) **Date**: 06/05/2021	**Exclude:** The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.
Applicant: McCarthy & Woulfe Ltd. **Reference**: 20827 **Location**: Anglers Walk, Rhebogue, Limerick	Construction of two no. dwelling houses and ancillary site works on an existing serviced road.	**Decision**: Grant Permission (with Conditions) **Date**: 23/07/2021	**Exclude:** 2 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Sharon Ryan **Reference**: 21823 **Location**: Castletroy View Childers Road, Co. Limerick	Removal of existing porch and construction of a new porch and bay window extension to the front of dwelling with lean-to roof over and removal of existing domestic store at the side of the dwelling and construction of an extension at the side and rear of dwelling and all associated site work	**Decision**: Grant Permission (with Conditions) **Date**: 03/08/2021	**Exclude:** Single dwelling house will have minimal impact on surrounding road network.
Applicant: McCarthy & Woulfe Ltd. **Reference**: 211395 **Location**: Rhebogue Road, Rhebogue, Limerick	Construction of a residential development comprising 6 no. terrace units with site entrance.	**Decision**: Grant Permission (with Conditions) **Date**: 17/05/2022	**Exclude:** 6 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Granville Rangers AFC **Reference**: 2223 **Location**: Granville Rangers AFC, Glenbrook, Bloodmill Road, Singland, Limerick.	The installation of an all-weather training pitch with a 3.0-metre-high surrounding fence and floodlighting on masts with ancillary site works.	**Decision**: Grant Permission (with Conditions) **Date**: 20/09/2022	**Exclude:** No additional traffic generated due to nature of development.
Applicant: Kearock Investments Ltd. **Reference**: 221216 **Location**: Old Dublin Road, Rhebogue, Limerick City	Large-Scale Residential Development (LRD) on lands (0.53 Ha) at Old Dublin Road, Rhebogue, Limerick City. The Proposed Development comprises of the construction of a Purpose-Built Student Accommodation (PBSA) scheme consisting of 26 no. apartments with a total of 202 no. student bedspaces.	**Decision**: Grant Permission (with Conditions) **Date**: 17/01/2023	**Exclude:** Traffic Assessment Report included as part of the planning submission stated that the Proposed Development will have minimal impact on traffic flows on the local road network due to low parking provision.

Application details	Description	Decision & Date	Include/Exclude in TTA
Applicant: John Conroy **Reference**: 23240 **Location**: Groody Toll House, Old Dublin Road, Singland, Limerick	Renovation of the protected structure No. 1628, known as the 'Groody' Toll House and the construction of a new extension. Connect to public services and carry out all ancillary site works at the above address. Previous permission granted under Planning Ref. No.18/774	**Decision**: Grant Permission (with Conditions) **Date**: 05/05/2023	**Exclude:** No additional traffic generated due to nature of development.
Applicant: Aldi Stores(Ireland) Limited **Reference**: 23205 **Location**: Aldi, Dublin Road, Limerick, Co. Limerick	The development will consist of the construction of a single store Deposit Return Scheme(DRS) Kiosk (Gross Floor Area: 17 sq. m), including 2 no. signage panel areas for branding on the side elevation of the DRS Kiosk (1.0m x 2.0m), and all associated site development works. The development will result in the removal of 3 no. existing car parking spaces in the car park that serves the existing Aldi store	**Decision**: Grant Permission (with Conditions) **Date**: 06/06/2023	**Exclude:** The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.
Applicant: Aileen & John McCarthy **Reference**: 221208 **Location**: Rhebogue Meadows, Dublin Road, Limerick	Construction of a new detached dwelling house with connection to existing services and all ancillary site works	**Decision**: Grant Permission (with Conditions) **Date**: 21/08/2023	**Exclude:** Single dwelling house will have minimal impact on surrounding road network.
Applicant: Targeted Investment Opportunities ICAV **Reference**: 2360940 **Location**: Unit 3, Parkway Retail Park, Dublin Road, Co. Limerick, V94 TX68	The development that will consist of a proposed mezzanine level to provide for additional trading floorspace, proposed internal alterations to facilitate the development, proposed new signages to the front elevation, and all associated site works necessary to facilitate the development	**Decision**: Grant Permission (with Conditions) **Date**: 15/02/2024	**Exclude:** The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.
Applicant: Limerick City and County Council **Reference**: JP91.317686 **Location**: Ballysimon, Co. Limerick	Proposed Development of the Bloodmill Road Extension Scheme.	**Decision**: Grant Permission (with Conditions) **Date**: 22/02/2024	**Exclude:** Road extension scheme will have positive impact on traffic flows.
Applicant: Louise Ryan **Reference**: 2438 **Location**: Villa Nova, Dublin Road, Limerick, V94YOET	The demolition & removal of front wall, associated groundworks, internal surface water system and creation of off-road parking	**Decision**: Grant Permission (with Conditions) **Date**: 02/05/2024	**Exclude:** Single dwelling house will have minimal impact on surrounding road network.
Applicant: Singland Leasing Ltd. **Reference**: 24232 **Location**: Dublin Road, Castletroy, Co. Limerick	The installation of a cold store to the south side of the petrol station and all ancillary site works	**Decision**: Grant Permission (with Conditions) **Date**: 02/05/2024	**Exclude:** No additional traffic generated due to nature of development.

Application details	Description	Decision & Date	Include/Exclude in TTA
Applicant: Dermot Coffey **Reference**: 23605 **Location**: Bloodmill Road, and Oakwood, Singland, Limerick	Construction of 7 no. two storey, 3-bedroom, terraced dwelling houses, all with off street car parking.	**Decision**: Grant Permission (with Conditions) **Date**: 23/10/2024	**Exclude:** 7 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Silvergrove Developments Limited **Reference**: 2460713 **Location**: Rhebogue Road, Drominbeg Road, Rhebogue, Limerick City.	Provision of 25 No. apartments in a two and three-storey height block on a site of 0.243 hectare.	**Decision**: Grant Permission (with Conditions) **Date**: Due 06/11/2024	**Exclude:** The TTA included as part of the planning submission stated that with the minimal provision of 17 no. car parking spaces, the Proposed Development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.
Applicant: Board of Management of St. Brigid's National School **Reference**: 2460575 **Location**: St. Brigid's National School, Singland, Limerick City, Limerick.	Construction of a new two-storey school building extension of 622.3m² at the ground floor and 613.3m² at the first floor, together with a single storey link connecting to the existing building.	**Decision**: Grant Permission (with Conditions) **Date**: 07/11/2024	**Exclude:** Will have minimal impact on traffic flows due to emphasis on public transport use.
Applicant: Cathal Glynn **Reference**: 2460178 **Location**: Groody Student Park, Castletroy, Co. Limerick	Construction of 6 No. student accommodation, duplex type units over three floors.	**Decision**: Grant Permission (with Revised Conditions) **Date**: 02/04/2025	**Exclude:** 6 no. duplex units will have minimal impact on surrounding road network.
Applicant: Groody Developments Limited **Reference**: 2560113 **Location**: Groody Road, Newcastle, Castletroy, Limerick	A Large-Scale Residential Development (LRD) - development of a Purpose-Built Student Accommodation (PBSA) scheme on land fronting the Groody Road and Dublin Road.	**Decision**: Grant Permission (with Conditions) **Date**: 25/09/2025	**Exclude:** The TTA included as part of the planning submission stated that with the minimal provision of 32 no. car parking spaces, the Proposed Development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.

Application details	Description	Decision & Date	Include/Exclude in TTA
Applicant: Ann Hannan **Reference**: 2560151 **Location**: Sandybrook House, Bloodmill Road, Limerick	A residential development comprising 31 no. residential units.	**Decision:** Grant Permission (with Conditions) **Date**: 23/10/2025	**Exclude**: The TTA included as part of the planning submission stated that with the minimal provision of 32 no. car parking spaces, the Proposed Development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.
Applicant: The Estate of the late Dermot Coffey **Reference**: 25220 **Location**: Oakwood, Singland, Limerick.	1 no. two storey 3 bedroom detached dwelling house with off street car parking, connection to main sewer and associated site works	**Decision**: Grant Permission (with Conditions) **Date**: 25/02/2026	**Exclude:** Single dwelling house will have minimal impact on surrounding road network.

In assessing the traffic impacts of the Proposed Development, consideration was also given to the overall Masterplan for the remaining zoned area of the subject site.

In addition to the residential apartments, creche and medical centre included in this Proposed Development, the Masterplan provides for two potential options for the future building out of the remainder of the site.

- The first option, based on the current provisions of Objective PV01 of the Limerick Development Plan 2022 - 2028, provides for primarily employment and commercial uses on the remainder of the masterplan site, with the following mixed-uses proposed:
  - A Hotel
  - 3 no. Office Buildings
  - A Life Sciences Building
- The second option, based on the revised Objective PV01 proposed under Proposed Variation No. 3 of the Limerick Development Plan 2022 - 2028, provides for primarily residential use on the remainder of the masterplan site as follows:
  - 500 Residential Units
  - A Hotel

Table 13-8. Estimated AM and PM peak hour traffic (PCUs) generated by Option 1 of the Masterplan with Primarily Employment / Commercial Further Development using TRICS

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m2)	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Proposed Development							42	80	70	54
Masterplan - Offices		23,736	0.839	0.100	0.080	0.850	199	24	19	202
Masterplan - Hotel		6,326	0.313	0.272	0.286	0.256	20	17	18	16
Total							261	121	107	272

Table 13-9. Estimated AM and PM peak hour traffic (PCUs) generated by Option 2 of the Masterplan with Primarily Employment / Commercial Further Development using TRICS

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m2)	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Proposed Development							42	80	70	54
Residential Units	500		0.048	0.138	0.116	0.067	26	76	64	37
Masterplan - Hotel		6,326	0.313	0.272	0.286	0.256	20	17	18	16
Total							88	173	152	107

From a traffic volume perspective, office developments are generally associated with higher traffic generation and more pronounced peak-hour movements due to commuter travel patterns, whereas residential developments typically result in lower overall trip volumes with trips distributed more evenly throughout the day. As a result, the estimated overall masterplan peaks presented in Table 13-8 for Option 1 above portrays the worst-case scenario.

The traffic modelling examines the worst-case peak hourly scenarios for both the AM and PM weekday peak periods for the Proposed Development. However, supplementary modelling has also been conducted to account for the additional Masterplan elements. Refer to Table 13-10 for comparison of Masterplan results which is minor in accumulation with the Proposed Development.

Table 13-10. Summary Results of all Surrounding Junctions with Masterplan Assessment

Number	Route	2043 Without Development RFC/DOS	2043 With Development RFC/DOS	2043 With Development & Masterplan RFC/DOS
1	Parkway Roundabout	115%	117%	119%
2	Dublin Road/Parkway Retail Park (Signal-Controlled)	67%	88%	99.6%
3	Parkway Retail Park Roundabout	30%	30%	32%

Number	Route	2043 Without Development RFC/DOS	2043 With Development RFC/DOS	2043 With Development & Masterplan RFC/DOS
4	Groody Roundabout	113%	116%	116%

13.10 References

- TII's Traffic and Transport Guidelines PE-PDV-02045 (May 2014)
- TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017 October 2021)
- Design Manual for Urban Roads & Streets (DMURS).
- Limerick Development Plan (2022-2028)
- Cycle Design Manual (September 2023)

Chapter 14 – Material Assets – Waste Management

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

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14. MATERIAL ASSETS – WASTE MANAGEMENT

14.1 Introduction

This chapter evaluates the likely impacts, if any, which the Proposed Development may have on Material Assets (related to waste management) as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) and the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (2022).

It addresses issues associated with material assets (waste management) during the construction and operational phases of the Proposed Development as described in Chapter 2 (Description of the Proposed Development).

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting to guide and manage the waste generated during the construction phase of the Proposed Development (including excavation works) and has been included as Appendix 14.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021).

A separate Operational Waste Management Plan (OWMP) has been prepared by AWN Consulting for the operational phase of the Proposed Development and is included as Appendix 14.2 of this Chapter.

This Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), and the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (2022).

These documents will ensure the management of wastes arising at the development site in accordance with legislative requirements and best practice standards.

14.2 Methodology

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the Proposed Development, as described in Chapter 2 (Project Description) and considers the following aspects:

- Legislative context;
- Construction phase (including site excavation works); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the Proposed Development have been calculated and are included in Section 14.4 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research, as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 14.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale is presented in Chapter 5 (Land & Soils). Chapter 5 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the Proposed Development.

14.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 14-1).

Figure 14-1 Waste Hierarchy (Source: European Commission, 2018).

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products (Figure 14-2).

Figure 14-2 Circular Economy (Source: Repak, 2021).

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, *Waste Action Plan for a Circular Economy (WAPCE) – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity*, in 2012.

One of the first actions to be taken from the WAPCE was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021)* to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The *Circular Economy and Miscellaneous Provisions Act 2022* was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's '*Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects*' (2021). The following guidance document was also consulted in the preparation of this assessment:

- Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002).

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including:

- The National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024);
- BS 5906:2005 Waste Management in Buildings – Code of Practice;

- City and County of Limerick (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2019);
- The EPA National Waste Database Reports 1998 – 2020;
- The Circular Economy and National Waste Database Report 2021-2023 (2025); and
- EPA National Waste Statistics Web Resource

14.2.1.1 Terminology

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

- a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
- b) the adverse impacts of the generated waste on the environment and human health; or
- c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

14.2.2 Forecasting Methods and Difficulties Encountered

The assessment of waste generation at the Proposed Development has been carried out using standard forecasting methods informed by published guidance, including the *EPA Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects* (2021) and *BS 5906:2005 Waste Management in Buildings – Code of Practice*.

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

While it is possible to initially select a licensed waste facility for soil disposal, there is potential to encounter contaminated material or material with naturally occurring variations in minerals and chemicals that necessitates sending it to a different suitably licensed facility. The sampling and testing carried out in the Site Investigations (SI) process provides spot samples, and further testing is required during the excavation process, as the true condition of all excavated material cannot be ascertained with certainty until this is undertaken.

There are numerous licensed, permitted and registered waste facilities in the Limerick City and County Council Local Authority Area, Southern Region, and across Ireland and Northern Ireland. However, facility availability, capacity, and contractor service constraints may limit options at a given time. Facilities operate under annual intake limits, which means that committing to a single receiving facility for the duration of works is not feasible. In practice, contractors will utilise facilities with available capacity at the time of removal, prioritising recovery and recycling opportunities in line with the waste hierarchy.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria; proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

Where uncertainty existed, conservative assumptions were applied to ensure robustness of the forecast. These uncertainties are typical for projects at the planning stage.

14.3 Receiving Environment

In terms of waste management, the receiving environment is largely defined by Limerick City and County Council (LCCC) as the local authorities responsible for setting and administering waste management activities in the areas. This is governed by the requirements set out in the *NWMPCE 2024 – 2030* and the *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland.*

The waste management plans set out the following targets for waste management in the region:

- *Achieve a recycling rate of 55% of managed municipal waste by 2025; and*
- *Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices*.

The Regional Waste Management Planning Offices have issued a National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) in March 2024, which supersedes the Southern Region Waste Management plan and the two other regional waste management plans. The NWMPCE does not however dissolve the three regional waste areas. The NWMPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector.

The Limerick City and County Development Plan 2022 - 2028 set out the policies and objectives for the LCCC area which reflect those set out in the regional waste management plan and can be found in Appendix 14.1 and 14.2.

In terms of physical waste infrastructure, LCCC no longer operates municipal landfills. Waste generated in the region is managed through licensed, permitted, and registered facilities across Limerick and the wider southern region, soil recovery sites, inert C&D waste facilities, municipal recovery facilities, transfer stations and material recovery facilities. Availability of these facilities varies depending on contractor selection, haul distance and real-time intake capacity.

However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more

suitably placed waste facilities or recovery facilities to become operational in the future which will be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

14.4 Characteristics of the Proposed Development

The Proposed Development comprises a large-scale residential development to provide 403 no. residential units over 5 no. apartment blocks ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

A full description is included in Chapter 2 (Description of the Development) of this EIAR and in the statutory notices.

The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

14.4.1 Demolition

There will be waste materials generated from the demolition of part of the existing concrete slab and hard standing areas on site. The project engineers, Punch Consulting Engineers, have advised that this will amount to c. 40 m^3 of concrete.

14.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, cladding, plastics etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated.

In general excavations will be limited as existing site levels will need to be raised using imported fill to achieve floor levels for Blocks A to D. Excavations will however be required to facilitate the floor levels for Block E, for road development, installation of services and landscaping purposes. In addition, localised excavations will be required to facilitate pile installation. It has been estimated by the quantity surveyors for the project, Mitchell Mc Dermott, that c. 41,275 m^3 of made ground and subsoil will need to be excavated to facilitate construction. There are limited opportunities for reuse of excavated material on site, and it is currently envisaged that around 10% of this, c. 4,127.5 m^3 will be able to be retained and reused onsite for landscaping and fill.

The remainder, c. 37,147.5 m^3 will need to be removed off site by a licensed contractor and will be taken for appropriate reuse, recycling or disposal. In the case that any excavated soil is tested and deemed contaminated and unfit for reuse on-site, it will need to be removed offsite. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

When material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 14.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Any surplus excavated material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 14.1). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 14.1**,** below.

Table 14.1 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	730	10	73	80	584	10	73
Timber	620	40	248	55	341	5	31
Plasterboard	221	30	66	60	133	10	22
Metals	177	5	9	90	159	5	9
Concrete	66	30	20	65	43	5	3
Other	332	20	66	60	199	20	66
Total	**2146**		**482**		**1459**		**205**

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the Proposed Development as the exact materials and quantities may be subject to some degree of change and variation during the construction process. However, the above estimates are considered to be the worst-case scenario.

14.4.3 Operational Phase

Waste will be generated from the residential units, medical centre, and the creche unit. All waste materials will be segregated into appropriate categories and will be stored in appropriate bins in designated waste storage areas (WSAs), in easily accessible areas of the site.

The total estimated waste generation for the Proposed Development for the main waste types, based on the AWN waste generation model (WGM) incorporating EPA National Waste reports data, EPA National Waste Statistics Web Resource, predicted occupancy of the units and floor use per m^2 of the Proposed Development, is presented in Table 14.2 and Table 14.3, below, and is based on the uses and areas as advised by the project architect. Further break down of the estimated waste generation during the operational phase for each of the residential units can be found in the OWMP (Appendix 14.2).

Table 14.2 Estimated Waste Generation for Residential Blocks A-C

Waste Type	Waste Volume (m3 / week)		
	Block A	Block B	Block C
Organic Waste	1.07	1.27	1.21
Dry Mixed Recyclables	7.60	8.98	8.57
Glass	0.21	0.25	0.23
Mixed Non-Recyclables	3.99	4.72	4.51
Total	**12.87**	**15.21**	**14.53**

Table 14.3 Estimated Waste Generation for Residential Blocks D, E, Creche and Medical

Waste Type	Waste Volume (m^3 / week)			
	Block D	Block E	Creche	Medical Centre
Organic Waste	1.14	0.86	0.03	0.07
Dry Mixed Recyclables	8.08	6.08	1.06	1.60
Glass	0.22	0.17	0.00	0.01
Mixed Non-Recyclables	4.25	3.20	0.58	0.69
Medical Waste	-	-	-	0.50
Confidential Paper	-	-	-	0.16
Total	**13.70**	**10.30**	**1.67**	**3.40**

The residents, medical centre staff, and creche unit staff will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. As required, the residents and creche unit/medical centre tenants will need to bring these segregated wastes from their units to their respective Waste Storage Areas (WSAs). All WSA's can be viewed on the plans submitted with the application and in the OWMP (Appendix 14.2 of this Chapter).

The OWMP seeks to ensure the development contributes to the targets outlined in the NWMPCE and the LCCC Waste Bye-laws.

14.5 Potential Impacts of the Proposed Development

14.5.1 Construction Phase

The impact assessment in this section relates to all phases of construction including demolition of parts of the concrete slab and site excavation works.

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during demolition, site excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, short-term, significant and negative.*

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management

practices. In the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, long-term, significant and negative.*

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the Southern Region which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, short-term, significant* and *negative*.

There is a quantity of material which will need to be demolished and excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale is presented in Chapter 5 (Land and Soils). It is anticipated that c. 4,127 m^3 will be reused on site and c. 37,147.5 m^3 (in addition to c. 40 m^3 of concrete from demolitions) will need to be removed off site by a licensed contractor and will be taken for appropriate reuse, recycling or disposal. In the event that excavated material is found to be contaminated it will need to be removed off-site. 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 as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, short-term, significant* and *negative.*

14.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, long-term, moderate* and *negative*.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, short-term, moderate* and *negative*.

Waste contractors will be required to service the Proposed Development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be *indirect, long-term, significant* and *negative*.

14.6 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'Waste Hierarchy' and 'Circular Economy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The circular economy principle aims to keep materials, components, and products in-use in the economy for as long as possible. In circularity, the key objective is to design consumption and production systems to create and retain value. Both principles have been applied and will further be applied during the detailed design, construction and operational phases.

The waste management objectives for the Proposed Development are as follows. These measures will facilitate material reuse and recycling, where possible, and seek to divert waste from landfill:

- **Prevention (Construction Phase)**: The main Contractor will prevent and minimise waste generation where possible by ensuring large surpluses of construction materials are not delivered to the site through coordination with the suppliers, operating a 'just-in-time' delivery scheme and ensuring sub-contractors conform to the Contractor(s) RWMP. The RWMP submitted with this application outlines the overarching principles, and a more detailed, site-specific version will be prepared by the Main Contractor prior to the commencement of the works. Prevention measures will also include careful planning of excavations to maximise the reuse of excavated materials on-site and minimise surplus volumes requiring off-site management;
- **Reuse (Construction and Operational Phases):** Reuse of waste and surplus materials including the reuse of suitable excavated soil and stone as fill material to facilitate construction, and associated works, where appropriate. Surplus construction materials will be repurposed on-site where feasible. During the operational phase, reuse will be encouraged through appropriate segregation of waste streams to support recovery and minimise disposal;
- **Recycle (Construction and Operational Phases):** Recycling will be implemented during construction with segregated skips or containers provided for recyclable C&D waste streams such as metals, timber, plastic and cardboard. During the operational phase, designated waste storage areas will be provided in easily accessible areas of the site to facilitate segregation of waste at source; and
- **Disposal (Construction and Operational Phases):** Where waste disposal is unavoidable, it will be carried out in accordance with the Waste Management Act 1996 (as amended) and relevant guidance. This applies to both construction waste and operational waste streams. Only licensed / permitted waste contractors will be used, and waste will be sent to authorised facilities. Disposal will remain a last resort in line with waste hierarchy principles.

14.6.1 Construction Phase

The primary waste management objective during construction will be to prevent waste from arising in the first place and to reuse, recycle or recover waste materials, where possible.

As previously stated, a project specific Resource and Waste Management Plan (RWMP) has been prepared in line with the requirements of the EPA Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 14.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in the RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the Proposed Development.

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 14.1) in agreement with LCCC and in compliance with any planning conditions, or submit an addendum to the RWMP to LCCC, detailing specific measures to minimise waste generation and

resource consumption, and provide details of the proposed waste contractors, hauliers and destinations of each waste stream.

- The Contractor will implement the RWMP throughout the duration of the proposed demolition, excavation and construction phases and should treat the document as outlined in the guidance as a live document.
- A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. The project design team have anticipated that c. 4,127 m^3 will be reused on site and c. 37,147.5 m^3 will need to be removed off site by a licensed contractor and will be taken for appropriate reuse, recycling or disposal. In the event that any excavated soil is found to be contaminated it will need to be removed off-site. 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 as well as on water and soil environments, both on and off-site.
- Building materials will be chosen to 'design out waste', in line with circular economy principles and green procurement strategies outlined in the RWMP. Product selection will, where practicable, favour materials with recycled content and take-back schemes.
- On-site segregation of waste materials will be carried out where possible to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Plasterboard;
  - Metals; and
  - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).
- A Resource Manager (RM) will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works.
- All construction staff will receive training in site-specific waste management procedures as part of the induction process.
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the *EC (Waste Directive) Regulations (2011-2020)*. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with the provisions of the *Waste Management Act 1996, as amended,* associated Regulations and the *Litter Pollution Act 1997*, the *NWMPCE* (2024). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

14.6.2 Operational Phase

The primary waste management objective during the operational phase will be to ensure that all waste generated within the Proposed Development is managed in accordance with the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997 and the NWMPCE. Measures will focus on segregation, reuse, recycling, and recovery, with disposal as a last resort, in line with the waste hierarchy and circular economy principles.

The following mitigation measures will be implemented during the operational phase of the Proposed Development:

- All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in the designated waste storage areas (WSAs), in easily accessible areas of the site.
- The facility management personnel and medical centre / creche tenants and will be responsible for ensuring – allocating personnel and resources, as needed – for the implementation of an Operational Waste Management Plan (OWMP), ensuring a high level of recycling, reuse and recovery at the site of the Proposed Development.
- The Staff/ Facilities Management will regularly audit the onsite waste storage facilities and infrastructure and maintain a full paper trail of waste documentation for all waste movements from the site.
- Healthcare Risk Waste generated in the medical centre will be managed in accordance with the strategy outlined in Section 5.3 of the OWMP (which is included as Appendix 14.2 of this Chapter) and with the relevant best practice guidance which include the following:
  - Health Service Executive (HSE), Waste Policy (2016)
  - Health Service Executive (HSE), Waste Management Awareness Handbook (2011)
  - HSE and Department of Health and Children (DOHC), Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition (2010)
  - Environmental Protection Agency (EPA) Green Healthcare, best practice guides for the reduction and segregation of hospital waste.
- The Residents/ Staff / Facilities Management will ensure on-Site segregation of all waste materials into appropriate categories, including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Cardboard;
  - Plastic;
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
  - Cooking oil;
  - Cleaning chemicals (paints, adhesives, resins, detergents, etc.);
  - Furniture (and from time-to-time other bulky waste); and
  - Abandoned bicycles.
- Facilities management and medical centre / creche tenants will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in the allocated WSAs. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- Facilities management and medical centre / creche tenants will ensure that all waste collected from the site of the Proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- Facilities management and medical centre / creche tenants will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, the NWMPCE (2024) and the LCCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

14.7 Monitoring or Reinstatement Measures

14.7.1 Construction Phase

The management of waste during the construction phase will be monitored by the Contactor's appointed Resource Manager (RM) to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation. Monitoring proposals for the construction phase are summarised in Table 14.4.

Table 14.4 Monitoring Proposals Construction Phase

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits.
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of Waste Classification	An appointed RM will monitor all on-site waste segregation, volumes, and classification.

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting schedule targets. The mitigation measures set out in the RWMP specify the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required.

Where targets are not being met, the RM will identify the reasons for this and work to resolve any issues. Recording waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and support identification of trends or opportunities for improved resource efficiency. The data should be maintained to inform future developments.

14.7.2 Operational Phase

The management of waste during the operational phase will be monitored by the Facilities Management Company to ensure effective implementation of the mitigation measures outlined in Section 14.6 internally and by the nominated waste contractor(s). Monitoring proposals for the operational phase are summarised in Table 14.5.

Table 14.5 Monitoring Proposals Operational Phase

Likely Significant Effect	Monitoring Proposals
Litter Pollution	Waste storage areas will be monitored by the Facilities Management Company
Unlicensed Waste Collection (Illegal Dumping)	The Facilities Management Company will maintain waste receipts onsite for a period of 7 years and make available to LCCC as requested.
Poor Waste Segregation	Waste generation volumes and cross contamination will be monitored by the Facilities Management Company.

There may be opportunities to reduce the number of bins and equipment required in the WSAs, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

14.8 Residual Effects of the Proposed Development

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

The implementation of the mitigation measures outlined in Section 14.6 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

14.8.1 Construction Phase

A carefully planned approach to waste management as set out in Section 14.6.1 and adherence to the RWMP (which includes mitigation) (Appendix 14.1) during the construction phase will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of prevention reuse, recycling and recovery is achieved, the predicted impact of the construction phase on the environment will be ***short-term, imperceptible*** and ***neutral.***

14.8.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 14.6.2 and adherence to the OWMP (which includes mitigation) (Appendix 14.2) during the operational phase will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, imperceptible*** and ***neutral***.

14.9 Cumulative Impacts of the Proposed Development

14.9.1 Construction Phase

Developments that potentially could overlap during the construction phase are identified in Chapter 2 (Description of the Proposed Development). All cumulative developments outlined in Chapter 2 have been taken into account.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be *short-term, not significant* and *neutral.*

14.9.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely to improve the efficiency of waste collections in the area.

Other developments in the area and the developments planned for the surrounding land will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a *long-term, imperceptible* and *neutral*.

14.10 References

- Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by Directive 2014/52/EU)
- Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)
- Environmental Protection Agency (EPA) 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (2021).
- European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).
- Waste Management Act 1996 (No. 10 of 1996), as amended.
- Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (Sept 2020).
- DCCAE, Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)
- The Circular Economy and Miscellaneous Provisions Act 2022
- FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and site Managers (2002).
- Regional Waste Management Planning Offices, National Waste Management Plan for a Circular Economy 2024 – 2030 (2024).
- BS 5906:2005 *Waste Management in Buildings* – Code of Practice;
- Limerick City and County Council (LCCC) City and County of Limerick (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2019).
- Environmental Protection Agency (EPA), National Waste Database Reports 1998 – 2020 and the Circular Economy and National Waste Database Report 2021 – 2023 (2025)
- Limerick City and County Council (LCCC), Limerick Development Plan 2022-2028 (2022)
- Environmental Protection Agency (EPA), Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2019)
- Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
- Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended.
- Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
- Department of Environment and Local Government (DoELG) Waste Management – Changing Our Ways, A Policy Statement (1998).
- Forum for the Construction Industry – Recycling of Construction and Demolition Waste.
- Planning and Development Act 2000 (No. 30 of 2000) as amended
- US EPA, Characterisation of Building Uses (1998);
- EPA and Galway-Mayo Institute of Technology (GMIT), EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015)

Chapter 15 – Material Assets – Utilities

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15. MATERIAL ASSETS – UTILITIES

15.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) evaluates the potential impacts that the Proposed Development may have on a range of Material Assets as defined in the EPA Guidelines '*Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022).

The EPA Guidance (EPA, 2022) discuss material assets as follows: *" In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."*

The EPA Guidelines (EPA, 2022) specifically lists and provides sample headings and topics for material assets that include: Roads and Traffic, (Construction Phase, Operational Phase, Unplanned Events [i.e. Accidents]), Built Services (Electricity, Telecommunications, Gas, Water Supply Infrastructure, and Sewerage), Waste Management (Construction Waste, and Operational Waste).

The impact assessment presented in this chapter aims to identify potential impacts that have not been previously addressed in other sections of the EIA report.

The purpose of this chapter is to identify and evaluate any potential significant impacts that the Proposed Development may have on these utilities, such as damage to infrastructure or disruptions to essential services. By conducting this assessment, appropriate mitigation measures can be developed and implemented to minimise any negative impacts and ensure that the development project is carried out in an environmentally responsible manner.

15.2 Methodology

15.2.1 Relevant Legislation and Guidance Notes

The following legislation and guidance notes were referred to in preparing this impact assessment including:

- EPA Guidelines 2022; on the Information to be contained in Environmental Impact Assessment Reports:
- EPA Advice Notes for Preparing Environmental Impact Statements (Draft September 2015);
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended);
- Waste Water Discharge (Authorisation) (EIA) Regulations 2016 (S.I. No. 652/2016);
- Electricity Regulation Act 1999 (Restricted Electrical Works) Regulations 2013;
- Health & Safety Authority (2016) Code of Practice for Avoiding Danger from Underground Services;
- Safety, Health and Welfare at Work Act 2005; and
- Safety, Health and Welfare at Work (Construction) Regulations 2013.

In this EIAR, the impacts on the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will not be addressed in specific detail within this chapter.

- Chapter 4 – Human Health and Population;
- Chapter 5 – Land, Soils and Geology;
- Chapter 6 – Hydrology and Hydrogeology;
- Chapter 8 – Air Quality;
- Chapter 9 – Climate;

- Chapter 10 – Noise and Vibration;
- Chapter 11 – Landscape and Visual Impact
- Chapter 12 – Archaeological, Architectural and Cultural Heritage;
- Chapter 13 – Material Assets - Traffic and Transportation; and
- Chapter 14 – Material Assets – Waste Management

This chapter assesses material assets major infrastructure and utilities which have not already been addressed elsewhere in this EIAR. The potential impacts, if any, are assessed in terms of the following:

- Land Use, Property, and Access.
- Power and Electrical Supply.
- Telecommunications.
- Surface water infrastructure.
- Foul drainage infrastructure; and
- Potable Water infrastructure.

15.2.2 Sources of Information

This chapter has been prepared having regard to the following documents, which accompany the planning application:

- A range of design site plans and drawings, as submitted with this planning application.
- Moloney Fox Consulting Engineers (May 2026), Utility Report which outlines electricity and telecommunications design information for the Proposed Development.
- Punch Consulting Engineers (May 2026), Engineering Planning Report which provides detailed water supply and drainage design information for the Proposed Development.
- Punch Consulting Engineers (May 2026), Traffic and Transportation Assessment (TTA)
- Punch Consulting Engineers (May 2026), Mobility Management Plan (MMP)
- Punch Consulting Engineers (May 2026), Construction Environmental Management Plan (CEMP)
- Punch Consulting Engineers (May 2026), Stage 2 Flood Risk Assessment.
- Moloney Fox Consulting Engineers (May 2026), Site Lighting Report which outlines the site lighting design intent and considerations to be taken with regards to the Proposed Development.
- Macro Works Ltd (April 2026), Glint and Glare Assessment which assesses the potential for solar reflectance effects upon aviation receptors in respect of proposed roof-mounted solar PV installations on the roofs of the residential buildings. Included as Appendix 15.1 of this EIAR chapter.

The assessment of impact on utilities is considered with respect to the availability and capacity within the utility network(s) and consultation with Uisce Éireann, ESB Networks and telecommunication companies (EIR and Enet).

15.2.3 Difficulties Encountered

Compiling the material assets (utilities) chapter of an EIAR can be a complex process, especially when it involves ongoing consultations between the design team and the various service providers like Uisce Éireann, ESB Networks, EIR and Enet.

It is difficult to predict the exact impact the construction phase will have on utilities until construction methodologies have been confirmed by the Main Contractor appointed.

The finalisation of agreements related to utilities may only be concluded at the connection agreement stage after planning permission has been granted. This introduces an additional layer of complexity, as the terms and conditions of these agreements may not be fully known until later stages of the project, potentially impacting the accuracy and completeness of the assessment.

15.3 Receiving Environment

15.3.1 Land Use, Property, and Access

15.3.1.1 Land Use and Property

The Proposed Development is to be located on a site known as 'Parkway Valley' on the Dublin Road (R445), Singland, Limerick, County Limerick. It is approximately 6.18 hectares in extent. The lands are bounded to the east by the Groody Valley Green Wedge and the suburb of Castletroy, to the north by the Dublin Road (R445), to the west by the Parkway Retail Park, and to the south and southwest by the Castletroy View and Carn Na Ree residential areas.

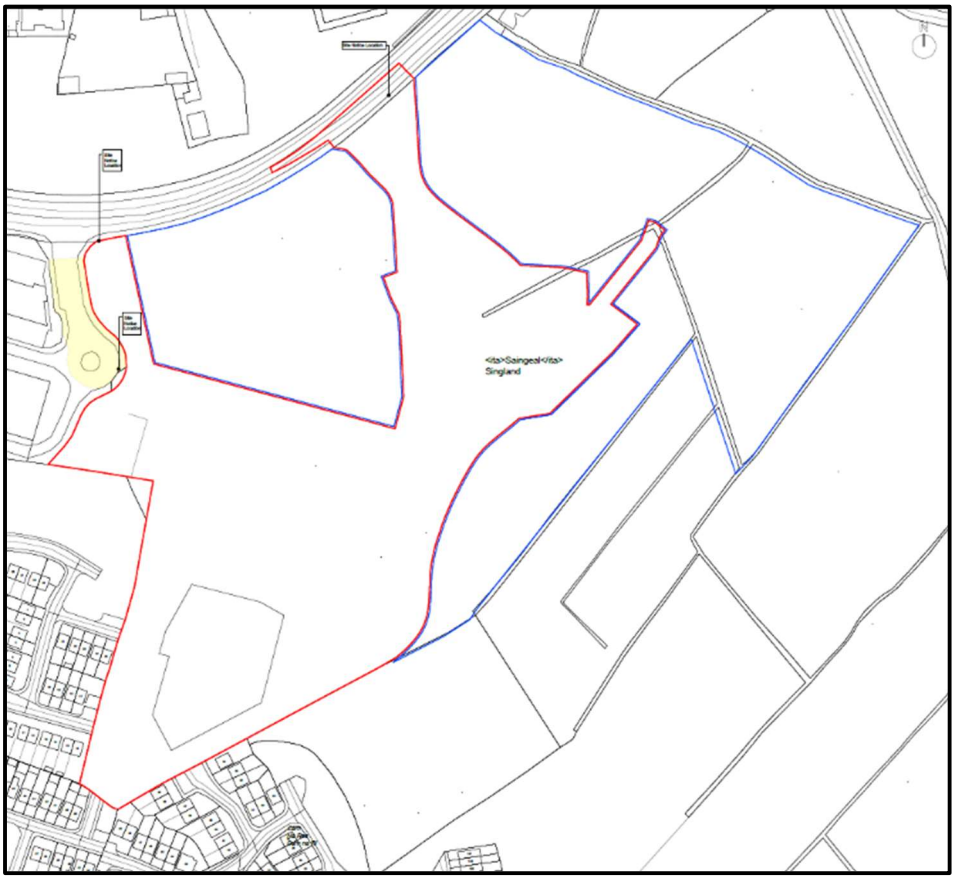
A review of early historical mapping records dated from 1829 to the early 20th century coupled with historical aerial imagery dated from 1995 to the present day indicated that the subject site was unoccupied by any building structures until 2007. A shopping centre, referred to as Horizon Mall, was partially constructed on the site in 2007 and was demolished in 2020, with reinforced concrete retaining walls left in situ. It is understood that much of the material from the demolition was used for backfilling and land raising purposes on the site such that the site is now predominately covered in made ground.

The subject site currently consists of a gravel footprint, buried concrete where the previous development was demolished in the centre, and some brownfield areas towards the southern and eastern boundaries which were likely reworked during the construction / demolition phase of the previous project. The ground level of the site is elevated above the Groody River floodplain to the east. The current site sits at elevations between 5 m and 17 m above ordnance datum (AOD) Malin, with majority of the site generally flat (between 8.4 m and 9.64 mAOD) and falling to the east. Figure 15-1 presents aerial views of the existing Site.

Figure 15-1 Aerial Views of the Existing Site (Source: Reddy A+U, May 2026)

The majority of the site is in the ownership of the Applicant, extending beyond the ownership boundary just onto the Dublin Road (R445) to facilitate establishing a new site access. Part of the neighbouring 'Groody Valley Green Wedge' zoned land to the east, is also in the ownership of the Applicant, a portion of which has been incorporated into the Proposed Development design to provide for connectivity between the development and the green wedge and also to provide for nature-based SuDS drainage proposals to serve the development. The area which is the subject of this application (red line boundary) and the land within the ownership of the Applicant (blue line boundary) are illustrated in Figure 15-2.

Figure 15-2 Site Plan illustrating Application and Ownership Boundaries (Source: Reddy A+U, Drawing Ref. PVAL-02-SW-ZZ-DR-RAU-AR-1001 May 2026)



15.3.1.2 Access

There is one existing entrance to the site which is via the Parkway Retail Park Roundabout to the west.

It is planned to access the Proposed Development, during construction and once operational, from the existing Parkway Retail Park Roundabout and a new site entrance off the Dublin Road (R445). The new entrance will operate as a left in and left out junction arrangement facilitating left-turn ingress and egress movements only. Figure 15-3 shows the planned access points to the Site.

Further details on access are discussed in Chapter 13 (Materials Assets - Traffic and Transportation) of the EIAR, and also in the Traffic and Transportation Assessment (TTA) prepared by Punch Consulting Engineers (Appendix 13.1) and the Mobility Management Plan (MMP), also prepared by Punch Consulting Engineers which is submitted with the application documentation.

Figure 15-3 Site Layout Plan showing Proposed Site Access Locations (Source: Site Plan is Extract from Landscape Plan Drawing PAV-JBA-XX-XX-DR-L-0002, JBA, May 2026)

15.3.1.3 Power and Electrical Supply

There are 110kV High Voltage overhead power lines and pylons which transverse the eastern portion of the site. (Note: These are illustrated as dashed lines in Figure 15-3 above.)

The Utility Report prepared by Moloney Fox Consulting Engineers (May 2026) states that the site is well located with regards to ESB infrastructure. The local ESB Medium Voltage infrastructure has available capacity. Refer to the aforementioned Utility Report, which accompanies the planning application for further details in relation to the ESB Services.

15.3.1.4 Telecommunications

The site is also well located with regards to telecommunication infrastructure with existing EIR (voice and broadband) and Enet (fibre) underground ducts in the vicinity of the development on the site, running adjacent to the site boundary along the Dublin Road (R445), and to the south west of the development site in the existing residential developments.

Refer to the aforementioned Utility Report, which accompanies the planning application for further details in relation to the EIR and Enet telecommunication utilities.

15.3.1.5 Surface Water Infrastructure

As outlined in the Engineering Planning Report (Punch Consulting Engineers, May 2025) (included with the planning application documentation), there is no existing artificial surface water drainage network within the proposed site. Run-off from the area is drained via infiltration to ground in surrounding areas under the influence of gravity.

A review of EPA mapping shows two (2) no. unnamed surface watercourses within the Proposed Development Site boundary flowing in an easterly direction towards an OPW arterial drainage channel c. 160 m to the east referred to by the EPA as 'Industrial Estate / Galvone Stream' watercourse. However, based on the site walkovers and surveys undertaken by Punch Consulting Engineers, these are no longer evident on the site. As stated in the Engineering Planning Report (May 2026), no upstream catchments are believed to connect to these drains as all upstream sites have been developed with their own surface water networks which discharge into the main drainage network. There is an open drain at the eastern site boundary connected to Industrial Estate / Galvone Stream which ultimately discharges to the Groody River. The Groody River (EPA Code: IE_SH_25S012600), a tributary of the Shannon (Lower), is located c. 200 m to the east of the site and flows in a northerly direction. The local hydrological environment is illustrated in Figure 6-3 in Chapter 6 (Hydrology and Hydrogeology).

A review of record drawings provided by LCCC shows no evidence of a surface water pipe network in the area. A review of record drawings provided by Uisce Éireann shows evidence of surface water sewers in the adjacent residential development west of the site. There are also existing surface water sewers 200m northwest of the site. There is no recorded evidence of surface water sewers in the Dublin Road (R445) however there are existing gullies located on the road.

Refer to the Engineering Planning Report (Punch Consulting Engineers, May 2025) included with the planning application documentation for further information on the existing surface water infrastructure.

15.3.1.6 Foul Drainage Infrastructure

As outlined in the Engineering Planning Report (Punch Consulting Engineers, May 2025) (included with the planning application documentation), a review of record drawings provided by Uisce Éireann shows no evidence of foul drainage within the proposed site. There is an existing foul sewer in the Parkway Retail Park which ultimately discharges into a combined sewer on Childers Road.

Refer to the Engineering Planning Report (Punch Consulting Engineers, May 2025) included with the planning application documentation for further information on the existing foul water infrastructure.

15.3.1.7 Potable Water Supply

As outlined in the Engineering Planning Report (Punch Consulting Engineers, May 2025) (included with the planning application documentation), a review of record drawings provided by Uisce Éireann indicates existing watermain layout in the vicinity of the site. There is a 300mm diameter Ductile Iron pipe which runs along the northern Site boundary in the Dublin Road (R445).

15.4 Characteristics of the Proposed Development

This section describes the built services and infrastructure for the Proposed Development during both construction and operational phases.

Chapter 2 (Description of the Proposed Development) provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant documents to define the Proposed Development.

15.4.1 Construction Phase

15.4.1.1 Land Use, Property, and Access

The Proposed Development site covers an area of c. 6.18 ha.

All access and egress will be via the site entrance at the Parkway Valley Roundabout to the west of the site and the planned new site entrance off the Dublin Road (R445), once it has been established.

Perimeter hoarding will be erected at commencement of the project and remain in place until construction is completed. Vehicular and pedestrian gates provided at the site entrance. The gates will be locked outside of working hours.

Security personnel will be present at the entrance/exit of the site to ensure all egressing traffic will do so safely.

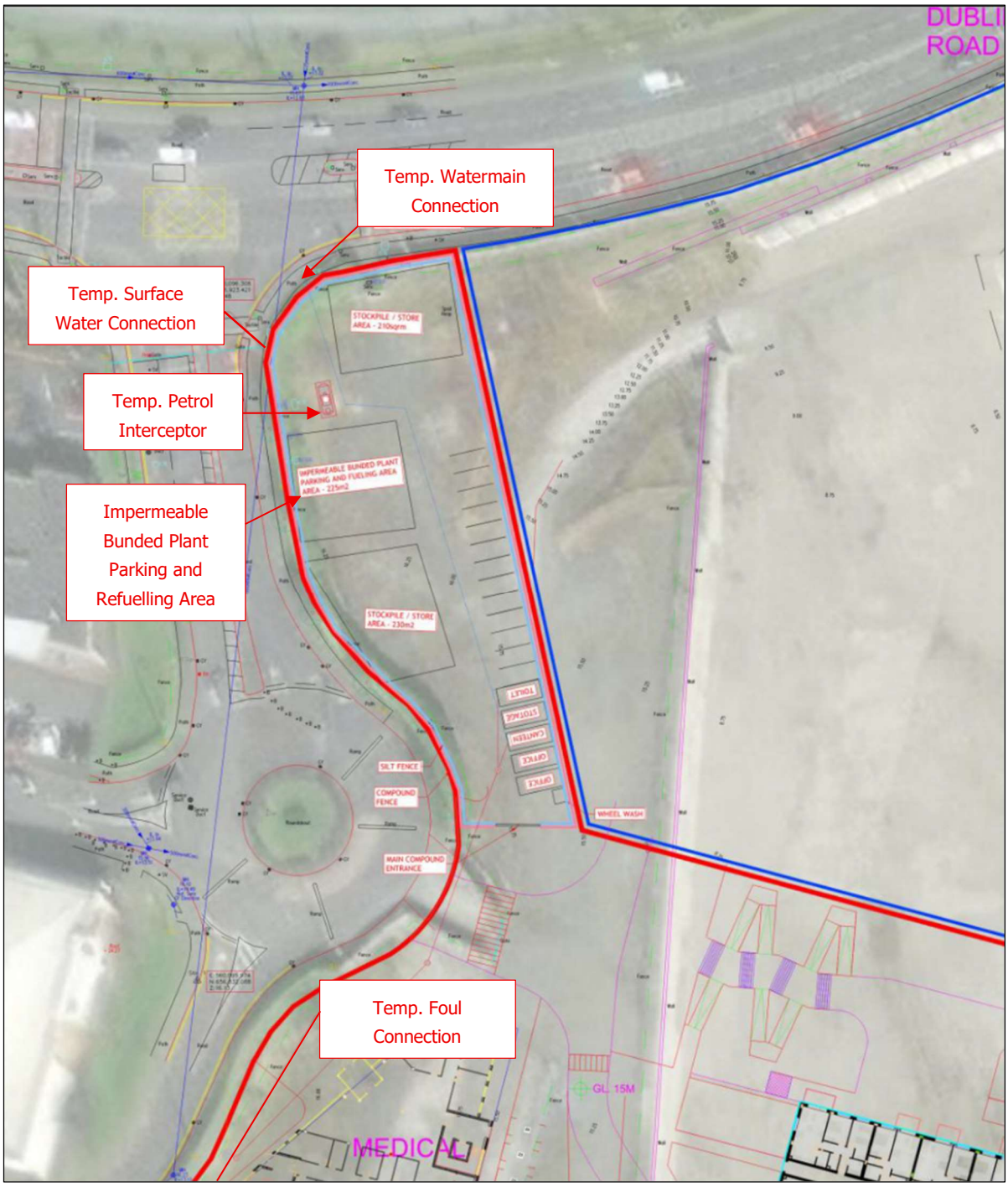
A site compound will be established in the north west corner of the site adjacent to the Parkway Valley Roundabout site entrance. It will facilitate site offices, welfare facilities, canteen, materials drop off and storage area. The proposed location and layout of the site compound is illustrated in Figure 15-4. Refer to CEMP (May 2026) by Punch Consulting Engineers for further details regarding the site compound.

A wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate to prevent any dirt being carried out into the public road. A road sweeper will be employed as required to keep the public road around the site clean.

Carparking for construction personnel will be accommodated within the Site. Construction personnel will also be encouraged to walk, cycle, or use public transport, and information on local transport services will be published on site.

Access arrangements and potential traffic safety impacts are considered in Chapter 13 (Traffic and Transportation) and also in the Traffic and Transportation Assessment (TTA), prepared by Punch Consulting Engineers (Appendix 13.1 of this EIAR).

Figure 15-4 Construction Compound showing temporary connections to Surface Water, Foul and Water Supply Infrastructure (Source: Punch, CEMP, May 2026)



15.4.1.2 Power and Electrical Supply

The 110kV High Voltage overhead power lines and pylons which transverse the eastern portion of the site will remain as is as they do not affect the development works.

During construction, the contractors will require temporary power for onsite accommodation, and construction equipment / plant. Generators will be used until such time as a connection to the ESB Network can be established. The generators will be fuelled with Hydrotreated Vegetable Oil (HVO), rather than with diesel. All temporary electrical infrastructure will be removed when construction is complete.

During construction, the permanent electricity connection will be made to the existing ESB Medium Voltage 10/20kV underground network to supply the development, once operational. The Utility Report prepared by Moloney Fox Consulting Engineers (May 2026) states that local ESB Medium Voltage infrastructure has available capacity. It also states that the extension of the ESB infrastructure has been agreed in consultation with the developer (Applicant) and ESB Network Engineers.

Any above ground lines or underground lines (400Volts) shall be diverted to accommodate the Proposed Development. There is minimum amount of line diversions to be carried on the site, with no impact on electricity supply to neighbouring properties.

As stated in the CEMP (May 2026) prepared by Punch Consulting Engineers, electrical connections will be made by suitably qualified personnel following consultation with the relevant authorities and will be cognisant of subsequent construction works. It also states that high voltage connections will be established for heavy duty equipment and site facilities, as required. All electrical works, including connection to the ESB network will be carried out by a suitably qualified contractor in conjunction with ESB Networks.

Refer to the aforementioned Utility Report by Moloney Fox Consulting Engineers, which accompanies the planning application for further details in relation to the ESB Services.

15.4.1.3 Telecommunications

The construction site will require internet phone connectivity for external communication with clients, contractors, and suppliers. Mobile phones are expected to be used for this purpose. Internet connectivity will be achieved through the use of wireless networks.

Existing EIR and Enet telecommunications infrastructure currently runs underground along the footpath northern Site boundary. As part of the construction phase, the EIR and Enet ducting will be extended into the site to provide both voice and broadband communications to the development to cater for the needs of the residential and commercial occupants. All works on the telecommunications network will be carried out in conjunction with the service providers.

Refer to the aforementioned Utility Report by Moloney Fox Consulting Engineers, which accompanies the planning application for further details in relation to the telecommunication infrastructure.

15.4.1.4 Surface Water Infrastructure

A temporary connection from the proposed site compound to the public surface water drainage network will be established to manage surface water runoff from the site compound for the duration of construction, subject to agreement with LCCC. Refer to Figure 15-4 for the indicative proposed surface water connection location, which is an extract from Figure 3-1 of the CEMP prepared by Punch Consulting Engineers (May 2026). The construction contractor will employ strict quality control measures while establishing the temporary connection. All temporary surface water infrastructure will be removed when construction is complete, where required.

It is proposed to construct a new fully separated drainage network and extensive SuDS features including green roofs, permeable paving, bioretention areas, swales, infiltration trenches, tree-pit attenuation and an attenuation pond which together manage, treat and attenuate runoff generated on site prior to discharge. Discharge from the site will be controlled to the greenfield-equivalent rate via a hydrobrake located upstream of the stormwater outfall, which will convey flows by gravity to the Industrial Estate / Galvone Stream, which discharges to the Groody River, 200m east of the Site boundary. The new surface water drainage system will be constructed following strict quality control measures.

Until such time as the new surface water drainage system is in place, temporary measures will be required to control and treat surface water runoff from the site. Surface water run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. All water

intercepted on-site will be managed and controlled for the duration of the construction works to prevent flow of silt-laden surface water flowing into watercourses. Control measures will include installation of drainage ditches, settlement ponds and/or tanks to allow attenuation, settlement and silt trapping, with testing prior to discharge. Attenuated and treated surface water will either be discharged to the LCCC existing storm water network (subject to agreement with LCCC), discharged to permeable vegetated areas or discharged to the open drain which flows to the Industrial Estate / Galvone Stream. If clean water is to be discharged into the open drain, measures like baffles, geotextiles, sediment mat, or riprap will be set up at the discharge point to avoid disturbing the watercourse. The design of the outfalls and the construction method statements for their installation shall be agreed with IFI prior to construction.

Planned measures for controlling surface water during the construction phase are set out in Chapter 6 (Hydrology and Hydrogeology) of this EIAR. These measures have been incorporated in the CEMP, prepared by Punch Consulting Engineers (May 2026).

15.4.1.5 Foul Drainage Infrastructure

Welfare facilities (canteens, toilets etc.) will be available within the proposed construction compound and these will remain in place for the construction of the Proposed Development. The Main Contractor will ensure that sufficient facilities are always available to accommodate the number of employees on site.

It is anticipated that for the initial stages of construction portable sanitary facilities will be provided. The facilities will need to have the foul water collected by a licensed waste sewerage contractor. Wastewater will be disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations, to prevent the pollution of watercourses.

A temporary connection for foul water drainage will be made to the public network for the construction phase, subject to consultation and agreement with Uisce Éireann. Refer to Figure 15-4 for the indicative proposed foul water connection location, which is an extract from Figure 3-1 of the CEMP prepared by Punch Consulting Engineers (May 2026). All temporary foul water infrastructure will be removed when construction is complete, where required

It is proposed to construct a new foul sewer network to serve the operational phase of the Proposed Development, completely separate from the storm sewer, and will be collected in a pump on the eastern boundary of the Proposed Development. All works on the foul drainage network will be carried out by a suitably qualified contractor in conjunction with Uisce Eireann. A Confirmation of Feasibility from Uisce Eireann was received in October 2025 noting that a wastewater connection is feasible without any infrastructure upgrade.

15.4.1.6 Potable Water Supply

The construction contractor will require a water source for the duration of the construction works. Water will be required for welfare facilities, dust suppression and general construction activities. Initial the contractor will need have water delivered, until such time as a temporary connection to the public watermain at the Dublin Road (R445) can be established, subject to consultation and agreement with Uisce Éireann. The temporary connection will be subject any restrictions and requirements Uisce Éireann may impose.

It is proposed to construct a 225 mm diameter watermain to serve the operational phase of the Proposed Development which will connect to the existing 300mm Ductile Iron watermain in the Dublin Road (R445). All works on the watermain will be carried out by a suitably qualified contractor in conjunction with Uisce Eireann. A Confirmation of Feasibility from Uisce Eireann was received in October 2025 noting that a water supply connection is feasible subject to upgrades of 57 m of existing watermain from 200 mm to 350 mm, to be funded by the Applicant.

15.4.2 Operational Phase

15.4.2.1 Land Use, Property, and Access

The Proposed Development comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

The Proposed Development and the plans for the future build out of the overall Masterplan site to accommodate employment / enterprise uses are compatible with the current 'mixed use' zoning and strategic planning objectives of the site as a 'consolidation and opportunity site' as set out in the Limerick Development Plan (2022-2028). A proposed variation of the Limerick Development Plan 2022 - 2028 provides for primarily residential use on the remainder of the masterplan site. While the proposed variation (revised Objective PV01 proposed under Proposed Variation No. 3) had not been adopted at the time of writing, the masterplan principals have been developed with flexibility to be able to accommodate commercial or residential land uses.

As previously stated in Section 15.3.1.2, access to the Proposed Development, once operational, will be from the existing Parkway Retail Park Roundabout and the new site entrance off the Dublin Road (R445). The new entrance will operate as a left in and left out junction arrangement facilitating left-turn ingress and egress movements only. Figure 15-3 shows the planned access points to the Site.

Access arrangements and potential traffic safety impacts are considered in Chapter 13 (Materials Assets - Traffic and Transportation) of the EIAR, also in the Traffic and Transportation Assessment (TTA) prepared by Punch Consulting Engineers (Appendix 13.1) and the Mobility Management Plan (MMP), also prepared by Punch Consulting Engineers which is submitted with the application documentation.

15.4.2.2 Power and Electrical Supply

The power requirements for the Proposed Development will be supplied via a connection to the National Grid via tying into the local Medium Voltage ESB infrastructure. The existing ESB 10/20kv underground network will be extended into the Site, to new ESB Substations. The development shall be served using one substation per building, based on the quantity of apartments per building. Mini pillars and micro pillars shall be provided to bring local ESB services to serve external services. The proposed locations of the new substations are illustrated on the architectural layout drawings submitted with the application documents.

Provision shall be made to deliver adequate services to the medical centre, creche and each apartment to cater for both the electrical needs of the unit in terms of power for heat pumps and electrical car charging facilities.

The extension of the ESB infrastructure has been agreed in consultation with the Applicant and ESB Network Engineers. A full connection application will be submitted to ESB Network, following planning permission being received for the Proposed Development.

Refer to the aforementioned Utility Report by Moloney Fox Consulting Engineers, which accompanies the planning application for further details in relation to the ESB Services.

The Climate Action Statement by Moloney Fox Consulting Engineers (May 2026) outlines a coordinated suite of design and building services measures aimed at minimising operational energy demand across the Proposed Development. Energy efficiency is embedded within the apartments through the use of high-efficiency exhaust air heat pump systems for space heating and hot water, Demand Control Ventilation (DCV) systems which modulate ventilation rates in response to occupancy and internal air quality, and the incorporation of low-energy LED lighting with advanced control systems to optimise consumption. In addition, roof-mounted solar photovoltaic (PV) arrays will generate on-site renewable electricity, offsetting

grid demand. Further detail is provided in the Climate Action Statement, which is included with the application documents.

15.4.2.3 Telecommunications

Existing EIR and Enet telecommunications infrastructure currently runs underground along the footpath northern Site boundary. The EIR and Enet ducting will be extended into the site to provide both voice and broadband communications to the development to cater for the needs of the residential and commercial occupants. All works on the telecommunications network will be carried out by a suitably qualified contractor.

15.4.2.4 Surface Water Infrastructure

As stated in Section 15.4.1.4, a new surface water sewer network shall be provided for the Proposed Development which will include extensive SuDS features including green roofs, permeable paving, bioretention areas, swales, infiltration trenches, tree-pit attenuation and a nature-based attenuation pond which together manage, treat and attenuate runoff generated on site prior to discharge.

All surface water run-off from roof areas and hardstanding areas shall be collected in the new gravity pipe surface water drainage network. The SuDS measures will retain rainwater until it is used via evapotranspiration in the green areas or filters through the drainage layers to overflow into the proposed new surface water drainage network. In accordance with the SuDS Manual CIRIA C753 the pollution prevention guidelines have been followed to ensure appropriate levels of treatment are provided before surface water run-off from the site is infiltrated to ground. Section 2.5 of the Engineering Planning Report illustrates how the proposed green roof, swales/infiltration trenches and rain gardens will effectively remove pollutants from the runoff prior to discharging into the surface water drainage network, which ultimately flows into the Groody River. In addition, a petrol interceptor (Klargester Class 1 Interceptor or similar approved) will be installed upgradient of the attenuation pond to treat the surface water prior to discharge to the pond.

Refer to the Proposed Drainage Layout Drawings 231171-PUNCH-XX-XX-DR-C-0101 (Sheet 1) and 231171-PUNCH-XX-XX-DR-C-0102 (Sheet 2) prepared by Punch Consulting Engineers which illustrate the surface water (and foul) drainage design. These are included with the planning application drawings.

Discharge flow from the site will be controlled to the greenfield-equivalent rate (2 l/s/ha) via a hydrobrake flow control device located upstream of the stormwater outfall, which will convey flows by gravity to the Industrial Estate / Galvone Stream, which discharges to the Groody River, 200m east of the Site boundary.

This drainage design has been developed in compliance with the LCCC Surface Water Drainage and SuDS Specification with the aim of providing a sustainable drainage solution ensuring, in so far as feasible, that the development has a minimal impact on the existing public surface water sewer system and the receiving environment while also providing amenity and opportunities for enhancing biodiversity.

Further details of the proposed surface water infrastructure drainage design are set out in the Engineering Planning Report and illustrated in the Engineering Drawings prepared by Punch Consulting Engineers (May 2026) which accompany the planning application and in the Chapter 6 (Hyrolology and Hydrogeology) of this EIAR.

15.4.2.5 Foul Drainage Infrastructure

The foul water network for the Proposed Development has been designed using Causeway Flow software, in accordance with the DOEHLG Recommendations for Site Development Works for Housing Areas and the Uisce Éireann Code of Practice for Wastewater Infrastructure. The foul water system is fully separated from the proposed surface water network.

The new foul sewer network is proposed within the site, completely separate from the storm sewer, and will be collected in a pump on the eastern boundary of the Proposed Development. The pump has been designed in accordance with Uisce Éireann with the proposed rising main passing through the site and discharging into the existing drainage in the Parkway Retail Park which ultimately discharges into a combined sewer on Childers Road. The final connection location is to be agreed with Uisce Éireann.

The foul water design is based on the following parameters extracted from the Engineering Report prepared by Punch Consulting Engineers (May 2026):

- Occupancy rate: 2.7 persons per dwelling
- Residential flow rate: 150 L/person/day
- Medical facility flow rate: 450 L/person/day
- Crèche flow rate: 100 L/person/day
- Average demand: 1.25 DWF
- Peaking factor: 6 DWF (Residential) and 4.5 DWF (Creche and Medical Centre)
- Minimum self-cleansing velocity: 0.75 m/s
- Minimum pipe diameter: 150 mm

These parameters inform the hydraulic design to ensure adequate capacity, self-cleansing conditions, and compliance with national wastewater infrastructure standards.

Based on the development's calculated population of 1,507 no. people, the peak effluent flow (Design Flow) has been calculated to be 17.13 l/s (detailed calculations are presented in the Engineering Services Report, Punch Consulting Engineers, May 2025).

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann on 9th June 2025, and a Confirmation of Feasibility (COF) was received from Uisce Éireann on 30th October 2025 which confirms the feasibility of the proposed wastewater connections (COF Ref. DS25006639) without any infrastructure upgrade necessary.

The foul sewer for the Proposed Development eventually discharges to Limerick Wastewater Treatment Plant (WWTP) (D0013) for full treatment. According to the 2024 Annual Environmental Report (AER), WWTP currently has adequate operational capacity to accommodate the additional flows generated by the Proposed Development. Following treatment, the final effluent from Limerick WWTP is discharged into Limerick Dock transitional waterbody.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed foul water management and design.

Further details of the proposed foul water infrastructure drainage design are set out in the Engineering Planning Report and illustrated in the Engineering Drawings prepared by Punch Consulting Engineers (May 2026) which accompany the planning application.

15.4.2.6 Potable Water Supply

It is proposed to construct a 225 mm diameter watermain to serve the Proposed Development based on the above calculated demand. The proposed watermain will connect to the existing 300mm Ductile Iron watermain in Dublin Road (R445). Please refer to PUNCH Consulting Engineers drawing no. 231171-PUNCH-XX-XX-DR-C-0301 for the proposed watermain layout.

This feed will provide potable water to the Proposed Development. A bulk water meter shall be provided at the site boundary at the location of the proposed connection to the existing watermain. The watermain layout has been designed in accordance with "Uisce Eireann Code of Practice for Water Infrastructure". All watermains are to be constructed in accordance with Uisce Eireann Code of Practice and the Local Authority's requirements.

To reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the commercial and retail areas, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals.

It is generally accepted that the design loading for foul drainage can be used to evaluate an approximation of the water demand on the site. With reference to Irish Water's Code of Practice for Water Infrastructure, the average daily flow is calculated as the number of persons multiplied by the flow rate per person. The average day peak week flow is taken to be 1.25 x the average flow, and the peak demand is taken to be the average day peak week flow multiplied by a peaking factor of 5.

The maximum average potable water demand was calculated as 3.969 l/s, with a peak demand of 19.845l/s, as detailed in the calculations shown in the Engineering Planning Report (Punch Consulting Engineers, May 2025).

There will be an underground static fire-fighting water tank with a minimum storage capacity of 90,000 litres. (Note: tank size is provisionally pending a review of fire-fighting flow requirements).

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann on 9th June 2025, and a Confirmation of Feasibility (COF) was received on 30th October 2025 in response, stating that a potable water connection to the public system was feasible subject to upgrades of 57 m of existing watermain from 200 mm to 350 mm, to be funded by the applicant.

15.4.3 Do Nothing Scenario

In the event that the Proposed Development does not proceed, the subject lands would remain in their current state in the short term. However, having regard to the zoning, location and development context of the lands, it is considered likely that they would be subject to a future planning application for an alternative development of a broadly similar nature.

As such, the 'Do Nothing' scenario would not represent a permanent absence of development, but rather a delay in the delivery of development and associated demand for utility services at this location.

15.4.4 Decommissioning

In the event that the Proposed Development is decommissioned, it is anticipated that the buildings and associated infrastructure would be subject to redevelopment for an alternative use, having regard to the planning context of the site.

Any such redevelopment or modification would be required to comply with the relevant planning and environmental legislation in force at the time. This may include the requirement for planning permission and, where applicable, the preparation of an EIAR.

15.5 Potential Impacts of the Proposed Development

The potential impacts of the Proposed Development on material assets specifically utilities in the construction and operational phase are outlined below. These chapters should be read in conjunction with Chapter 6 (Hydrology and Hydrogeology), Chapter 13 (Traffic and Transportation), Appendix 13.1 (TTA), and Chapter 16 (Interactions).

15.5.1 Construction Phase

15.5.1.1 Land Use, Property, And Access

To minimise nuisance for neighbouring properties, the Construction Environmental Management Plan prepared by Punch Consulting Engineers (May 2026) will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Ecological Clerk of Works where relevant.

All mitigation measures outlined within this EIAR, and within the CEMP will be implemented during the construction phase. The construction contractor will update this CEMP to include any additional mitigation required to ensure compliance with any subsequent planning conditions relevant to the Proposed Development.

The potential impact associated with land use, property, and access for the construction phase will be, ***negative, not significant,*** and ***short term.***

15.5.1.2 Power Supply and Electrical Supply

During the initial stages of the construction phase, power requirements will be met by generators fuelled with hydrotreated vegetable oil (HVO). Following connection to the National Grid, the electrical demand associated with construction activities will be limited in scale and is not anticipated to give rise to any perceptible effects on the capacity or reliability of the local electricity supply network.

Any excavations within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. The electrical connection should have no disruptions to the National Grid during connection works.

All utilities work shall be carried out in accordance with the relevant requirements of ESB Networks. These works will be carried out in a manner that is safe, and which minimises interruptions of service which might affect residents and businesses, and adjacent developments.

The potential impact associated with power and electrical supply for the construction phase in the absence of mitigation measures will be a ***negative, not significant,*** and ***short term.***

15.5.1.3 Telecommunications

The use of telecom lines will not be required during the construction phase. The locations of existing EIR and Enet services are presented in the Utility Report prepared by Moloney Fox Consulting Engineers (May 2026) which accompanies the planning application. The connection into the EIR and Enet telecommunications network will be undertaken by suitably qualified and authorised personnel. These works will be carried out in a manner that is safe, and which minimises interruptions of service which might affect residents and businesses, and adjacent developments.

The potential impact on telecommunications infrastructure during the construction phase in the absence of mitigation measures is ***neutral, not significant,*** and ***short term.***

15.5.1.4 Surface Water Infrastructure

During the construction phase, there is potential for rainfall run-off and dewatering water during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or downstream infrastructure or watercourses.

The employment of good construction management practices and full adherence to the mitigation measures set out in Chapter 6 (Hydrology and Hydrogeology) and the Construction & Environmental Management Plan (CEMP) will minimise the risk of pollution of soil, storm water run-off, or groundwater. Such practices include the proper storage of spoil / loose materials on site, such as stockpiled excavated materials to be used for landscaping purposes; Aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. There is no likely impact on surface water infrastructure as a result.

The potential impact on surface water networks during the construction phase in the absence of mitigation measures is ***negative, slight,*** and ***short term.***

15.5.1.5 Foul Drainage Infrastructure

Welfare facilities will be provided for the construction workers on site during the construction works. Initially portable toilets will be provided and foul effluent will be appropriately managed and treated off site. For the temporary connection to the foul drainage infrastructure, the works contractor will be obliged to comply with any conditions of a temporary connection agreement with Uisce Éireann, if required, to control discharge quality and rate of flow and remove any wastewater collected on site.

All works on the foul drainage network for the permanent connections will be carried out by a suitably qualified contractor in conjunction with Uisce Eireann.

The potential impact on foul drainage for the construction phase is ***negative, imperceptible,*** and ***short term.***

15.5.1.6 Potable Water Supply

The water demand during the construction phase will not be significant enough to affect existing pressures. The potential impact on potable water supplies and infrastructure during the construction phase is ***negative, imperceptible,*** and ***short term.***

15.5.1.7 Natural Gas

There is no requirement for natural gas connection, therefore during the construction phase there is no potential impact.

15.5.2 Operational Phase

15.5.2.1 Land Use, Property and Access

During the operational phase the Proposed Development is not anticipated to generate significant air (including odour), noise, water emissions or traffic impacts during normal operating conditions; these have been discussed further in the respective EIAR chapters, Chapter 6 (Hydrology and Hydrogeology), Chapter 8 (Air Quality), Chapter 9 (Climate), Chapter 10 (Noise and Vibration), and Chapter 13 (Traffic and Transportation).

The Proposed Development is consistent with the zoning of these lands.

The overall potential impact associated with land use, property, and access during the operational phase will be ***localised neutral, not significant,*** and ***long term.***

15.5.2.2 Power Supply and Electrical Supply

Once the Proposed Development is operational, electricity will be provided to the site via the National Grid tying in with existing infrastructure, thus, the Proposed Development will increase the demand on existing power and electrical utilities. As detailed in Chapter 2 (Section 2.5.5) sustainable energy measures

including PV (Photovoltaics) on the roof have been considered and incorporated into the design of the Proposed Development. The PV will reduce demand and effects on the mains network.

The Proposed Development does not lie within any Solar Safeguarding Zones (SSZ) set out in the *Planning and Development (Solar Safeguarding Zone) Regulations 2022*. A SSZ is an area around an airport, aerodrome or helipad in which there is a potential for glint or glare from solar panels to impact aviation safety. Out of an abundance of caution, a Glint and Glare assessment has been undertaken to assess the potential impact from the proposed solar PV panels on receptors at Coonagh Airfield and University Hospital Limerick. From the analysis and discussions contained herein, it is considered that there will not be any significant nuisance effects from glint and glare on these receptors as a result of the proposed roof-mounted solar PV panels. The Glint and Glare report, prepared by Macro Works Ltd. is included as Appendix 15.1 of this EIAR.

During the operational phase, maintenance of utilities infrastructure on the site will be carried out in accordance with the relevant requirements of the various utilities' providers / authorities. As such, no significant impacts on services or utilities themselves are predicted to occur as a result of the operational phase. ESB have confirmed the feasibility of the proposal in terms of electrical demand.

Based on these discussions on availability of supply, there is a ***neutral, imperceptible,*** and ***long term*** effect on electrical supply during the operational phase of the Proposed Development.

15.5.2.3 Telecommunications

There will be a marginal increase in demand on the local telecommunications network during the operational phase. The Proposed Development will connect to existing telecommunications infrastructure, with local ducting extended as required to service the site, in accordance with the requirements of the relevant service providers.

Telecommunications services are delivered on a commercial basis and networks are continually upgraded and expanded by operators to meet demand. The connection to the wider telecommunications network will be undertaken by a licensed telecommunications provider.

In this context, the operational phase demand associated with the Proposed Development is not expected to give rise to any material effects on telecommunications infrastructure. The likely impact is therefore assessed as ***neutral, imperceptible*** and ***long-term.***

15.5.2.4 Surface Water Infrastructure

During operation, the primary risk of water quality impact is surface water runoff from roads and car parking areas which can potentially contain elevated levels of contaminants such as hydrocarbons.

With proposed drainage design including extensive SuDS features, the potential impacts during the operational phase on surface water quality are considered to be ***neutral, imperceptible, and long-term.***

15.5.2.5 Foul Drainage Infrastructure

A Confirmation of Feasibility from Uisce Eireann was received in October 2025 noting that a wastewater connection is feasible without any infrastructure upgrade.

The foul sewer for the Proposed Development eventually discharges to Limerick Wastewater Treatment Plant (WWTP) (D0013) for full treatment. According to the 2024 Annual Environmental Report (AER), WWTP currently has adequate operational capacity to accommodate the additional flows generated by the Proposed Development. Following treatment, the final effluent from Limerick WWTP is discharged into Limerick Dock transitional waterbody.

There will be a hydrological connection the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA sites through the wastewater effluent from the wastewater treatment plant (WWTP). However, the WWTP operates under an EPA licence with defined emission limit values and compliance conditions to ensure that treated effluent discharges do not compromise the achievement of Water Framework Directive environmental objectives in the receiving waterbody.

Considering the design of the wastewater infrastructure on and off site, the impact is expected to be ***neutral, imperceptible,*** and ***long-term.***

15.5.2.6 Potable Water Supply

A Confirmation of Feasibility from Uisce Eireann was received in October 2025 noting that a water supply connection is feasible subject to upgrades required to be funded by the Applicant.

Water saving devices are incorporated within the Proposed Development units, in order to conserve the use of water, as part of the internal fit-out. A bulk water meter is to be provided at the connection to the public watermain at the development entrance. All metering is to be provided in accordance with Uisce Éireann requirements.

Based on the feasibility of connection issued by Uisce Éireann, the potential impact on potable water infrastructure for the operational phase is ***neutral, imperceptible,*** and ***long term.***

15.6 Mitigation Measures

15.6.1 Construction Phase

Consultation with LCCC, Uisce Éireann, ESB Networks, EIR and Enet and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to local and business community. The works contractor will be obliged to put best practice measures in place to ensure, any planned interruptions are agreed in advance with the utilities suppliers.

The construction contractor will employ strict quality control measures will be undertaken while laying pipes and utilities to minimise or eradicate infiltration and ex-filtration.

Prior to commencing any construction activities, the contractor shall conduct a comprehensive utility locating survey using advanced technologies such as ground-penetrating radar (GPR) and electromagnetic induction methods. This survey will accurately identify the location and depth of all existing underground services, including high voltage (HV) cables, water and gas pipelines, and telecommunication lines. Based on the results of the utility locating survey, exclusion zones will be demarcated around identified utilities. These zones will indicate areas where construction activities are restricted or subject to specific safety protocols.

Punch Consulting Engineers have prepared a CEMP (May 2026) which is included with the planning application documentation. This outlines the construction techniques and methodologies which will be implemented during construction of the Proposed Development. The mitigation measures set out in this EIAR and the CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. The construction contractor will provide a detailed Construction Environmental Management Plan (CEMP) that will include any subsequent planning conditions relevant to the Proposed Development and set out further detail of the overarching vision of how the construction Contractor of the Proposed Development manage the Site in a safe and organised manner.

15.6.2 Operational Phase

A Confirmation of Feasibility (COF Ref. DS25006639) was received from Uisce Éireann on 30th October 2025 which confirms the feasibility of the proposed wastewater connections without infrastructure upgrade by Uisce Éireann. The COF confirmed the water supply connection was feasible subject to upgrades of 57 m of existing watermain from 200 mm to 350 mm, to be funded by the Applicant. Copy of received Confirmation of Feasibility is included in Appendix G of the Engineering Planning Report (Punch Consulting Engineers, May 2026).

The Proposed Development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is of a suitable quality.

Water metering arrangements are to be upgraded at the connection location, in line with Uisce Éireann standards. A bulk water meter is to be provided at the connection to the public watermain at the development entrance. All metering is to be provided in accordance with Uisce Éireann requirements.

Any necessary maintenance or upgrades of on-site utilities infrastructure during the operational phase of the Proposed Development will be carried out in accordance with the specifications of the relevant service providers and facilitated by facilities management.

15.7 Monitoring Or Reinstatement Measures

No additional monitoring or reinstatement is required.

15.8 Residual Effects Of The Proposed Development

15.8.1 Construction Phase

The works contractor will be obliged to put best practice measures in place and work in accordance with the CEMP. The implementation of mitigation measures within each chapter of this EIAR and measures detailed in Section 15.6.1 of this chapter will ensure that the residual impacts on the material assets considered in this chapter during the construction phase will be ***neutral, not significant,*** and ***short term.***

15.8.2 Operational Phase

The Proposed Development requires electrical power, water supply and connection to the stormwater and foul water networks, respectively.

The implementation of mitigation measures within each chapter of this EIAR and detailed in Section 15.6.2 of this chapter will ensure that the residual impacts on the material assets considered in this chapter during the operational phase will be ***neutral, imperceptible,*** and ***long-term.***

15.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the Proposed Development with any relevant other planned or permitted developments are discussed below. For details on the developments considered for cumulative impacts refer to Chapter 2 and Appendix 2.1 of this EIAR.

15.9.1 Construction Phase

The Proposed Development entails minimal use of public material assets (utilities) during construction therefore there is limited opportunity for the causation of cumulative impacts during the construction phase of the Proposed Development in combination with other planned or permitted developments.

This list of developments (Chapter 2, Appendix 2.1 of this EIAR) have been reviewed all developments are capable of combining with the Proposed Development and resulting cumulative effects on material assets. Coordination and consultation will be had between the construction contractor and relevant service providers within the locality to facilitate the Proposed Development. The Proposed Development will be in accordance with the requirements of statutory providers for electrical infrastructure, surface water drainage, foul drainage, and water infrastructure.

The implementation of mitigation measures during construction works as well as the compliance of adjacent development with their respective agreement with network providers (Uisce Éireann, ESB Networks, EIR and Enet) means that the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption; notable extra demand on a utility; or medium-term disruption to a significant piece of infrastructure. It is unlikely that there will be significant cumulative effects with other planned or permitted developments (as described in Chapter 2).

The residual cumulative effects on the material assets during the construction phase for the Proposed Development will be ***negative, not significant,*** and ***short-term.***

15.9.2 Operational Phase

The Proposed Development and all permitted developments considered are required to engage with Uisce Éireann, ESB Networks, EIR and Enet to ensure that there is sufficient capacity to cater for the increase in water, wastewater, electricity and telecommunication requirements.

This list of developments (Chapter 2, Appendix 2.1 of this EIAR) have been reviewed all developments are capable of combining with the Proposed Development and resulting cumulative effects on material assets.

Consultations have been undertaken with Uisce Éireann and ESB Networks, and no significant supply constraints have been identified for development at this location. Further consultation will take place with subject to the grant of the planning application associated with the Proposed Development. These National Authorities in considering future connections, take into consideration the environmental impacts of planned developments within the wider network. In developing long-term plans for security of supply, these National Authorities for water and energy supply are required to develop resources in compliance with sustainable environmental planning. Therefore, the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption; notable extra demand on a utility; or medium-term disruption to a significant piece of infrastructure. As such, there will therefore be no significant effects on material assets to the wider economy or environment.

Based on the above, it is predicted that the cumulative effects of the Proposed Development with other permitted, planned, and existing developments is, ***neutral, imperceptible,*** and ***long-term*** and during the operational phase.

Chapter 16 – Interactions

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16. INTERACTIONS

16.1 Introduction

This chapter of the EIAR identifies, describes and assesses the potential interactions and inter-relationships between the environmental factors addressed in the preceding chapters, for both the construction and operational phases of the Proposed Development.

Directive 2011/92/EU, as amended by Directive 2014/52/EU, and section 171A of the Planning and Development Act, as amended, both provide that an EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the interaction between the following factors:

- human beings, fauna and flora, population and human health;
- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- land, soil, water, air and climate and landscape; and
- material assets, cultural heritage and the landscape.

This chapter has been produced following the requirements of the EIA Directive and Planning and Development Act 2000, as amended. The contents of the chapter have been prepared following European Commission 'Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report' (2017) and the draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the EPA 2022 Guidance as outlined in Chapter 1 (Introduction). This section of the assessment presents a summary and assessment of the identified interactions.

16.2 Population and Human Health and its interaction with:

16.2.1 Land, Soils and Geology:

16.2.1.1 Construction Phase

A reduction in soil quality via unmitigated pollutants entering the soil has the potential to lead to negative impacts on human health during construction. Hydrocarbons and petroleum products for example have a risk for humans by inhaling the fumes/dust from contaminated soil. Depending on the type of contaminant and the level of exposure, soil contamination can have serious health implications. Any potentially contaminated soils encountered will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method.

Taking into account the design and mitigation measures set out in Chapter 5 of this EIAR, there is no potential for negative interactions between Human Health and Populations, and Land, Soils and Geology during the construction phase. The interaction is considered to be ***neutral, imperceptible*** and ***short term.***

16.2.1.2 Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Land, Soils and Geology during the operational phase.

16.2.2 Hydrology and Hydrogeology:

16.2.2.1 Construction Phase

The construction phase of the Proposed Development has the potential (without mitigation) to impact on the water quality via unmitigated pollutants entering the onsite drainage system and migrating towards the Groody River and Shannon River (Lower). As there are no source pathway linkages to any water supplies or bathing/recreational waters there is no potential for a human health impact, and therefore no interactions.

16.2.2.2 Operational Phase

Given the proposed design and drainage infrastructure, there is no potential for unmitigated offsite flooding arising from the increased hardstanding areas, as operational runoff will be managed and attenuated through the proposed drainage design and SuDS measures.

There is also no potential for offsite contamination from car parking or trafficked areas, including hydrocarbons, as all runoff from these areas will be intercepted, treated, and attenuated within the integrated SuDS network (e.g. permeable paving, bioretention areas, swales, attenuation pond) prior to entering the controlled drainage system.

There are no recorded recreational waters, bathing water bodies, or surface water abstraction points located downstream of or directly hydrologically connected to the site that could be impacted by changes in water quality or flow. In addition, the Geological Survey Ireland (GSI) records no Public Supply Source Protection Areas or Group Scheme Preliminary Source Protection Areas within the zone of influence of the Proposed Development.

As a result, there are no identifiable pathways linking the development to receptors used for drinking water supply, recreation, or other human uses. Consequently, no significant impacts on human health or local populations are anticipated during the operational phase, and therefore no interactions.

16.2.3 Biodiversity:

16.2.3.1 Construction Phase

There are no potentially significant interactions identified between Population and Human Health, and Biodiversity during the construction phase.

16.2.3.2 Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Biodiversity during the operational phase.

16.2.4 Air Quality:

16.2.4.1 Construction Phase

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the Proposed Development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits. Therefore, the predicted impact is ***short-term, negative, localised*** and ***not significant*** with respect to Population and Human Health during the construction phase.

16.2.4.2 Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the Proposed Development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be ***short-term, localised, neutral*** and ***not significant***.

16.2.5 Climate:

16.2.5.1 Construction Phase

There are no potentially significant interactions identified between climate, and human health during the construction phase.

16.2.5.2 Operational Phase

There are no potentially significant interactions identified between climate, and human health during the operational phase.

16.2.6 Noise and Vibration:

16.2.6.1 Construction Phase

As detailed in Chapter 10 (Noise and Vibration), there will be some impact on nearby noise sensitive receptors during construction, due to noise emissions from site activity, traffic, and other activities. The application of noise and vibration limits and limits on the 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.

Taking into account the design and mitigation measures set out in Chapter 10 of this EIAR, there is potential for negative interaction between Human Health and Populations, and Noise and Vibration during the construction phase. The interaction is considered to be ***short-term, negative*** and ***not significant*** at the nearest sensitive receptors.

16.2.6.2 Operational Phase

Once the operational noise levels are controlled to the limit values set out in Chapter 10, there are no expected impacts to sleep disturbance from operational noise sources.

The expected health effect due to noise from the proposed development is ***neutral***, ***not significant*** and ***long-term.***

16.2.7 Townscape and Visual Impacts:

16.2.7.1 Construction Phase

Taking into account the existing sensitivities of the site and the design and the best-practice construction measures set out in Chapter 11 (Townscape and Visual Impact) of this EIAR, there is a potential for effects upon the visual experience of people in the area during the construction phase. The interaction is considered to be at most ***negative, moderate*** and ***short term***, with effects reduced over greater distance from the site and outside of peak construction works.

16.2.7.2 Operational Phase

Whilst the incoming development is notable in scale, it is expected to result in a positive transformation of the site. While some localised and moderate visual impacts will occur, these are limited in extent and are balanced by the long-term benefits of regenerating a prominent brownfield site and enhancing the character and identity of this important gateway location. Overall, the interaction is considered to be ***positive, moderate*** and ***permanent.***

16.2.8 Archaeological, Architectural and Cultural Heritage:

16.2.8.1 Construction Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.2.8.2 Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.2.9 Material Assets, including Utilities, Waste Management, and Transport:

16.2.9.1 Construction Phase

Construction phase impacts to human health as a result of waste are primarily associated the indirect effect of litter issues resulting in increase in vermin. Mismanagement of demolition and soil material can potentially lead to air / dust impacts. There are also potential risks to human health associated with accidents when handling and transporting earthworks and wastes. Removal of waste from the construction works will generate temporary increased traffic levels. With increased traffic movements and reduced engine efficiency, i.e., due to congestion, the emissions of vehicles increase.

The individual chapters of this EIAR Chapters 13, 14, and 15 (Material Assets - Traffic and Transportation, Waste Management and Utilities) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14, and 15 (Material Assets - Traffic and Transportation, Waste Management and Utilities) of this EIAR, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the construction phase. The interaction is considered to be ***neutral, slight,*** and ***short-term.***

16.2.9.2 Operational Phase

Similar risks to those described above for the construction phase associated with improper waste management during the operational phase could lead to litter and associated vermin. There is the potential risks when waste contractors use waste equipment or move waste receptacles improperly.

As outlined in Chapters 8, 10 and 13 (Air Quality, Noise & Vibration and Material Assets - Traffic and Transportation), the level of traffic increase is not likely to have any adverse transport-related environmental effects in terms of potential for air quality, noise or vibrations, etc.

A carefully planned approach to waste management, and the mitigation measures in Chapters 13 and 14, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term, imperceptible*** and ***neutral.***

16.3 Land, Soils and Geology, and its Interaction with:

16.3.1 Hydrology and Hydrogeology

16.3.1.1 Construction Phase

The construction phase of the proposed development has the potential for contaminated run-off from accidental leakages, increased sediment runoff and discharges to ground which has the potential to result in a local impact on soil quality, which could then migrate to the groundwater underlying the site. However, the groundwater flow paths are assessed to be generally local and the potential for offsite migration of contaminants is considered to be low. The proposed construction phase mitigation outlined in Section 6.6 - Chapter 6 (Hydrology and Hydrogeology) of this EIAR, means that the Proposed Development will not result in significant negative impact on groundwater and surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 5 (Land, Soils and Geology) and Chapter 6 (Hydrology and Hydrogeology) of this EIAR, there is potential for neutral interaction between Land, Soils and Geology, and Hydrology and Hydrogeology during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term.***

16.3.1.2 Operational Phase

During operation the majority of the site will be capped by hardstand/building and a drainage system will be installed which features SuDs design measures. Therefore, there is no potential for accidental discharges to ground to contaminate the local soils and underlying aquifer. The interaction is considered to be ***neutral***, ***imperceptible***, and ***long term.***

16.3.2 Biodiversity

16.3.2.1 Construction Phase

In the absence of mitigation, there is potential for silt laden material or pollution to enter nearby surface waterbodies (and impact on local biodiversity and European sites downstream from the works). Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in Chapters 5 (Land, Soils and Geology) and 7 (Biodiversity) of this EIAR, there is potential for neutral interaction between Land, Soil and Geology, and Biodiversity during the construction phase. The interaction is considered to be ***neutral, imperceptible*** and ***short term.***

16.3.2.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Biodiversity during the operational phase.

16.3.3 Air Quality

16.3.3.1 Construction Phase

Construction phase activities such as land clearing, excavations and stockpiling of materials etc. have the potential for interactions between air quality and the land, soils and geological environment in the form of dust emissions. Mitigation measures are proposed in Chapter 8 (Air Quality) to prevent fugitive dust emissions from construction activities including excavation of soils.

Taking into account the design and mitigation measures set out in this EIAR, there is potential for neutral interaction between Land, Soils and Geology, and Air Quality during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term.***

16.3.3.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land & Soils during the operational phase.

16.3.4 Climate

16.3.4.1 Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Climate during the construction phase.

16.3.4.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Climate during the operational phase.

16.3.5 Noise and Vibration

16.3.5.1 Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Noise and Vibration during the construction phase.

16.3.5.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Noise and Vibration during the operational phase.

16.3.6 Townscape and Visual Impacts

16.3.6.1 Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Townscape and Visual Impacts during the construction phase.

16.3.6.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Townscape and Visual Impacts during the operational phase.

16.3.7 Archaeological, Architectural and Cultural Heritage

16.3.7.1 Construction Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.3.7.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.3.8 Material Assets, including Utilities, Waste Management and Transport

16.3.8.1 Construction Phase

During the construction phase, excavated soil, stone and clay will be generated from the excavations required to facilitate site levelling, construction of new foundations and the installations of site services. It is envisaged that some of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 5 (Land Soils, and Geology), Chapter 14 (Material Assets – Waste Management), and the requirements of the RWMP (Appendix 14.1), will ensure the effect is ***long-term***, ***imperceptible*** and ***neutral.***

16.3.8.2 Operational Phase

There are no potentially significant interactions identified between Land, Soils and Geology, and Material Assets during the operational phase.

16.4 Hydrology and Hydrogeology, and its Interaction with:

16.4.1 Biodiversity

16.4.1.1 Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from accidental spillages. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may impact on the underlying groundwater quality and downstream water quality and habitats. Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in this EIAR, there is a negligible negative interaction between hydrology and hydrogeology, and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***imperceptible***, and ***short term***.

16.4.1.2 Operational Phase

To ensure runoff is properly managed and does not exceed pre-development conditions, the proposed drainage system incorporates a suite of Sustainable Drainage Systems (SuDS) and attenuation features. These measures regulate, treat, and attenuate flows before discharge. Overall, with the proposed SuDS measures, attenuation systems, and the fact that the site is already predominantly hardstanding / made ground, no significant operational impacts on surface water or groundwater flow or quantity that would result in a negative interaction with Biodiversity are anticipated. The interaction is considered to be ***neutral***, ***imperceptible*** and ***long term.***

16.4.2 Air Quality

16.4.2.1 Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and hydrology and hydrogeology, in the form of dust emissions that may deposit in surface waters. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and hydrology and hydrogeology. The interaction is considered to be ***negative***, ***not significant*** and ***short term***.

16.4.2.2 Operational Phase

There are no potentially significant interactions identified between air quality, and hydrology and hydrogeology during the operational phase.

16.4.3 Climate

The impact of flood risk has been assessed, and the surface water drainage network will be designed and upgraded to cater for increased rainfall in future years as a result of climate change in accordance with the Greater Dublin Drainage Study. Further, SuDS and FFL will protect the Proposed Development from the already low risk of fluvial flooding. The effect of the interactions between climate and hydrology are ***direct, short-term, neutral*** and ***imperceptible*** during the construction phase and ***direct, long-term, neutral*** and ***imperceptible*** during the operational phase, which is overall ***not significant*** *in EIA terms.*

16.4.4 Noise and Vibration

16.4.4.1 Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Noise and Vibration during the construction phase.

16.4.4.2 Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Noise and Vibration during the operational phase.

16.4.5 Townscape and Visual Impacts

16.4.5.1 Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Townscape and Visual Impacts during the construction phase.

16.4.5.2 Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Townscape and Visual Impacts during the operational phase.

16.4.6 Archaeological, Architectural and Cultural Heritage

16.4.6.1 Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.4.6.2 Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.4.7 Material Assets, including Utilities, Waste Management and Transport

16.4.7.1 Construction Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology and Material Assets, including Utilities, Waste and Transport during the construction phase of the Proposed Development.

16.4.7.2 Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Material Assets including Utilities, Waste and Transport during the operational phase.

16.5 Biodiversity and its Interaction with:

16.5.1 Air Quality

16.5.1.1 Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no European sites or nationally designated sites within 250 m of the Proposed Development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section Error! Reference source not found.. With the implementation of these mitigation measures dust emissions will be ***short-term, negative, localised*** and ***not significant*** with respect to biodiversity.

16.5.1.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

16.5.2 Climate

16.5.2.1 Construction Phase

There are no potentially significant interactions identified between Biodiversity and Climate during the construction phase.

16.5.2.2 Operational Phase

There are no potentially significant interactions identified between Biodiversity and Climate during the operational phase.

16.5.3 Noise and Vibration

16.5.3.1 Construction Phase

There is potential for construction noise and vibration to impact on fauna during construction, primarily through temporary disturbance and displacement effects. With the implementation of mitigation measures as set out in Chapter 7 (Biodiversity) and Chapter 10 (Noise and Vibration) of the EIAR, including the application of best practice construction management, restricted working hours, and adherence to defined noise limits, noise and vibration emissions will be minimised as far as reasonably practicable.

Given the short-term and temporary nature of the construction phase, and the predicted slight to moderate noise effects, any resultant impacts on biodiversity will be temporary and reversible. Accordingly, the interaction is considered to be ***negative, short-term,*** and ***not significant.***

16.5.3.2 Operational Phase

During the operational phase there is potential for noise effects arising from additional traffic movements and mechanical and electrical plant associated with the proposed residential development.

The noise assessment has determined that increases in traffic noise on the surrounding road network will be imperceptible and therefore will not result in any meaningful change to the existing acoustic environment. In addition, all mechanical and electrical plant will be designed to comply with the noise criteria set out in Chapter 10 (Noise and Vibration), ensuring that operational noise levels remain within established daytime and night-time limits at the nearest sensitive receptors.

As a result, no disturbance or displacement effects on fauna are anticipated. Following implementation of these measures, the interaction is considered to be ***neutral, imperceptible***, and ***long-term.***

16.5.4 Townscape and Visual Impact

16.5.4.1 Construction Phase

The construction phase site clearance works will result in permanent changes to the landscape with some loss of local biodiversity.

Taking into account the design and mitigation measures set out in Chapter 7 and 11 of this EIAR, the interaction is considered to be ***negative, not significant*** and ***short term.***

16.5.4.2 Operational Phase

A Landscape Plan has been prepared to increase Biodiversity where possible. This involves saving native tree saplings for future planting, maintaining 'rough or scrub' areas for encouraging biodiversity and planting native and wildflower areas where feasible. Management includes appropriate seasonal vegetation cutting, replanting saplings to replace hedges, rough and grassy verges allowing unmanaged verges to develop natural wildflower components. The Landscape Plan has been prepared in consultation with this EIAR to incorporate elements of the existing environment, consider loss and apply appropriate mitigation with sustainable planting of replacement woodland, scrub and linear features in particular with native species of local type and provenance to enhance biodiversity. The interaction is considered to be ***long term*** and ***positive.***

16.5.5 Archaeological, Architectural and Cultural Heritage

16.5.5.1 Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.5.5.2 Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.5.6 Material Assets, including Utilities, Waste Management and Transport

16.5.6.1 Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets (Traffic and Transportation, Waste Management and Utilities) during the construction phase.

Improper management of construction waste could cause littering, pollution or vermin potentially affecting nearby habitats or faunal species. Mitigation measures in Chapter 14 (Material Assets – Waste Management) and Chapter 7 (Biodiversity) will ensure these risks are minimised. Following mitigation, the effects are expected to be ***short-term, imperceptible*** and ***neutral***.

16.5.6.2 Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets (Traffic and Transportation, Waste Management and Utilities during the operational phase.

Operational waste will be managed through segregation and secure covered storage to prevent litter, pollution or pest attraction. Following mitigation, the effects are expected to be ***long-term, imperceptible*** and ***neutral***.

16.6 Air Quality, and its Interaction with:

16.6.1 Climate

Air Quality and Climate have the potential to interact with a number of environmental attributes.

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels and Hydrotreated Vegetable Oil (HVO) during the construction and operational phases generate both air quality and climate impacts. While the sources of impacts on air quality and climate are strongly linked, there is no impact on climate due to air quality in the context of this assessment.

Problems associated with climate change, such as hotter, drier summers, can often exacerbate the problems associated with poor air quality, and therefore the effect of the interactions between climate and air quality are ***direct, long-term, negative*** and ***imperceptible*** during the construction phase and ***direct, long-term, negative*** and ***imperceptible*** during the operational phase, which is overall ***not significant*** in EIA terms.

16.6.2 Noise and Vibration

16.6.2.1 Construction Phase

There are no potentially significant interactions identified between Air Quality and Noise and Vibration during the construction phase.

16.6.2.2 Operational Phase

There are no potentially significant interactions identified between Air Quality and Noise and Vibration during the operational phase.

16.6.3 Townscape and Visual Impacts

16.6.3.1 Construction Phase

There are no potentially significant interactions identified between Air Quality and Townscape and Visual during the construction phase.

16.6.3.2 Operational Phase

There are no potentially significant interactions identified between Air Quality and Townscape and Visual during the operational phase.

16.6.4 Archaeological, Architectural and Cultural Heritage

16.6.4.1 Construction Phase

There are no potentially significant interactions identified between Air Quality and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.6.4.2 Operational Phase

There are no potentially significant interactions identified between Air Quality and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.6.5 Material Assets, including Utilities, Waste Management and Transport

16.6.5.1 Construction Phase

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the Proposed Development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be ***short-term***, ***negative, localised*** and ***not significant*** during the construction phase.

16.6.5.2 Operational Phase

Taking into account the design and mitigation measures set out in Chapter 8 (Air Quality) and Chapter 13 (Traffic and Transportation) of this EIAR, there remains a residual neutral interaction between Traffic, and Air Quality during the operational phase. As there are very few traffic movements associated with the operational development, the impact of the interactions between Traffic and Air Quality are considered to be ***long-term, direct, neutral*** and ***not significant*** during the operational phase.

16.7 Climate, and its Interaction with:

16.7.1 Material Assets, including Utilities, Waste Management and Transport

16.7.1.1 Construction Phase

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The RWMP (Appendix 14.1) prioritises reuse, recycling, and recovery of materials, which will reduce the volume of waste sent to landfill and associated emissions. The effect of the interactions between waste and climate are considered to be ***direct, long-term, neutral*** and ***imperceptible*** during the construction, which is overall ***not significant*** in EIA terms.

During the construction there is the potential for interactions between climate and traffic as vehicles accessing the site will result in GHG emissions. However, as set out in the Traffic Chapter (Chapter 13) and Air Quality Chapter (Chapter 8) the Proposed Development is not expected to result in an increase in traffic compared to the baseline. The effects of the interactions between traffic and transport and climate are therefore considered to be ***direct, long-term, neutral*** and ***not significant*** during the construction phase

16.7.1.2 Operational Phase

Potential interactions between Traffic and Climate during operational phase are a result of the increased traffic levels which lead to increased GHG emissions. The traffic assessments resulted in a slight increase in traffic levels for operational phase of Proposed Development, with interactions between Traffic and Climate are considered to be ***long-term, neutral*** and ***not significant***.

The OWMP (Appendix 14.2) will promote recycling and minimise residual waste during operation, reducing indirect emissions from waste transport and disposal. The effect of the interactions between waste and

climate are considered to be ***direct, long-term, neutral*** and ***imperceptible*** during the operational phase, which is overall ***not significant*** in EIA terms.

16.8 Noise and Vibration, and its Interaction with:

16.8.1 Townscape and Visual Impacts

16.8.1.1 Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Townscape and Visual Impacts, during the construction phase.

16.8.1.2 Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Townscape and Visual Impacts, during the operational phase.

16.8.2 Archaeological, Architectural, and Cultural Heritage

16.8.2.1 Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.8.2.2 Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.8.3 Material Assets, including Utilities, Waste, Traffic and Transportation

16.8.3.1 Construction Phase

During the construction phase of the proposed development, construction traffic will use public roads and there will be a corresponding increase in traffic noise levels. In order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25%, it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development will not result in a significant noise impact.

Predicted increases in traffic noise levels are such that the resultant noise effects are ***negative, not significant*** and ***short-term.***

16.8.3.2 Operational Phase

The predicted increase in noise levels due to additional traffic is expected to be imperceptible along the existing road network. Within the context of the current noise environment, the overall contribution from induced traffic is considered ***neutral, imperceptible,*** and ***long-term*** in duration at nearby residential locations.

16.9 Townscape and Visual Impacts, and its Interaction with:

16.9.1 Archaeological, Architectural and Cultural Heritage

16.9.1.1 Construction Phase

There are no potentially significant interactions identified between Townscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.9.1.2 Operational Phase

There are no potentially significant interactions identified between Townscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.9.2 Material Assets, including Utilities, Waste Management and Transport

16.9.2.1 Construction Phase

There are no potentially significant interactions identified between Townscape and Visual Impacts, and Material Assets during the construction phase.

16.9.2.2 Operational Phase

There are no potentially significant interactions identified between Townscape and Visual Impacts, and Material Assets during the operational phase.

16.10 Archaeological, Architectural and Cultural Heritage, and its Interaction with:

16.10.1 Material Assets, including Utilities, Waste Management and Transport

16.10.1.1 Construction Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the construction phase.

16.10.1.2 Operational Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.11 Interactions between Material Assets, including: Utilities, Waste Management, and Transport

16.11.1.1 Construction Phase

Removal of waste from the construction works will generate temporary increased traffic levels. The impact, however, will be imperceptible in the context of the overall traffic and transportation increase. A waste management strategy is proposed in the Resource and Waste Management Plan (RWMP) and Chapter 14 (Waste Management) of this EIAR. The proposed waste management strategy promotes site reuse and recycling of waste, minimising the number of vehicle movements for waste removal. Adherence to the mitigation measures in this chapter, Chapter 14 (Waste Management), and the requirements of the RWMP (Appendix 14.1), will ensure the effect is ***short-term, imperceptible*** *and* ***neutral.***

16.11.1.2 Operational Phase

During the operational phase, there will be an increase in vehicle movements as a result of operational waste collections. The impact, however, will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts operational phase is addressed in Chapter 13 (Material Assets – Traffic and Transportation) of this EIAR. Provided the mitigation measures detailed in this chapter and Chapter 14 are adhered to, the predicted effects are ***long-term***, ***imperceptible*** and ***neutral***.

16.12 Summary

In summary, the interactions between the environmental factors and impacts discussed in this EIAR have been assessed and the majority of interactions are neutral or negative interactions. Negative interactions are generally associated with the construction phase and will be short term in nature. There are some long-term positive interactions associated with the operation of the Proposed Development.

The reasoning behind the conclusion that certain interactions are considered to have a positive, neutral or negative effect is outlined in this Chapter. A summary of the potential interactions is presented in Table 16.1 below.

16.13 Table of Interactions

Table 16.1 Summary of Interrelationships between the Aspects

	Population & Human Health		Land, Soils & Geology		Hydrology & Hydrogeology		Biodiversity		Air Quality		Climate		Noise & Vibration		Townscape & Visual Impact		Archaeological Architectural & Cultural Heritage		Material Assets (including Transport & Waste)	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Population & Human Health			o	X	X	X	X	X	–	o	X	X	–	o	–	+	X	X	–o	o
Land, Soils & Geology					o	o	o	X	o	X	X	X	X	X	X	X	X	X	o	X
Hydrology & Hydrogeology							–	o	–	X	o	o	X	X	X	X	X	X	X	X
Biodiversity									–	X	X	X	–	o	–	+	X	X	o	o
Air Quality											–	–	X	X	X	X	X	X	–	o
Climate													X	X	X	X	X	X	o	o
Noise & Vibration															X	X	X	X	–	o
Townscape & Visual Impact																	X	X	X	X
Archaeological Architectural and Cultural Heritage																			X	X
Material Assets (including Transport & Waste)																			o	o

Con.	Construction Phase
Op.	Operational Phase
X	No Interaction

+	Positive Interaction
o	Neutral Interaction
–	Negative Interaction