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Environmental Impact Assessment Report (EIAR) Volume 2

PRESENTED TO

Galway City Council

Corrib Causeway Phase 1, Dyke Road

DATE

March 2025

Environmental Consultancy Services

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1 INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by Enviroguide Consulting for Galway City Council, herein after referred to as the Applicant, in conjunction with the Land Development Agency (acting as the agent and lead developer), who is seeking planning permission for a primarily residential development at a Galway City Council (GCC) owned site at Dyke Road, Terryland, Galway.

The Proposed Development (as defined in Chapter 3) comprises of the construction of a scheme of 219 no. apartments, a childcare facility, public landscaped open space, communal open space with associated car and bicycle parking and ancillary works.

This EIAR has been prepared in accordance with all current legislation and good practice guidance.

This chapter describes the methodology by which the Environmental Impact Assessment (EIA) was carried out and the EIAR was completed. The methodology used is broadly consistent across all chapters to ensure the EIAR is clear to navigate for the reader.

1.2 Quality Assurance and Competency of Experts

Under Article 5(3)(a) of Directive 2014/52/EU (the EIA Directive) it is a requirement that:

> "*the developer shall ensure that the environmental impact assessment report is prepared by competent experts"*

This EIAR has been prepared by Enviroguide Consulting, supported by sub-consultants on certain specialist assessments (see Table 1-4).

Founded in 2010, Enviroguide Consulting is an award-winning, multi-disciplinary environmental consultancy specialising in environmental compliance, ecology, planning, waste management, contaminated land, engineering, and sustainability. Providing an extensive variety of environmental consultancy services, Enviroguide Consulting consultants hold scientific, engineering, and/or legal qualifications with extensive technical knowledge and extensive practical experience within the environmental consultancy and management sectors. Professional memberships include the Chartered Institute of Ecology and Environmental Management, the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association, the Institute of Environmental Management and Assessment (IEMA), Engineers Ireland, the Institute of Geologists of Ireland, and the Royal Town Planning Institute.

This chapter was prepared by Louise Hewitt, Environmental Consultant with Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide Consulting since 2021 and has prepared many Environmental Impact Assessment (EIA) Screening

Reports and a number of EIAR chapters including Introduction, Description, Population and Human Health, Material Assets and Risk for projects similar in scale and nature to this project.

This chapter has been reviewed and approved by Catherine Keogan, Technical Director and EIA Lead at Enviroguide. Catherine is an environmental consultant with over 20 years' experience in consultancy, specialising in EIAs for a range of developments, working closely with a range of developers, planning consultants and architects within the public and private sector.

For each chapter of this EIAR, the author, qualifications, and experience of working on other development projects are detailed. The EIAR Project Team are identified in Table 1-4 below.

1.3 Definition of EIA and EIAR

EIA is a systematic examination of the potential impacts of a proposed development on the environment. In assessing the environmental impacts, this EIAR evaluates the existing situation and assesses any potential impacts of the Proposed Development. Where potential impacts are identified proposed mitigation measures will be detailed. In addition, the in-combination effects of any other known plans or projects will be identified and assessed.

Under Schedule 5 of the Planning and Development Regulations 2001, as amended (the Planning Regulations), an EIAR is required to accompany planning applications for specified projects as part of the EIA process. The EIAR describes the outcomes of the iterative EIA process which was progressed in parallel with the project design process. Where likely significant environmental effects are identified that are unacceptable, the EIA process aims to quantify and minimise the effects of the impact that the specified development has on the environment through appropriate mitigation measures and where necessary, subsequent monitoring.

This process is illustrated in Figure 1-1 below.

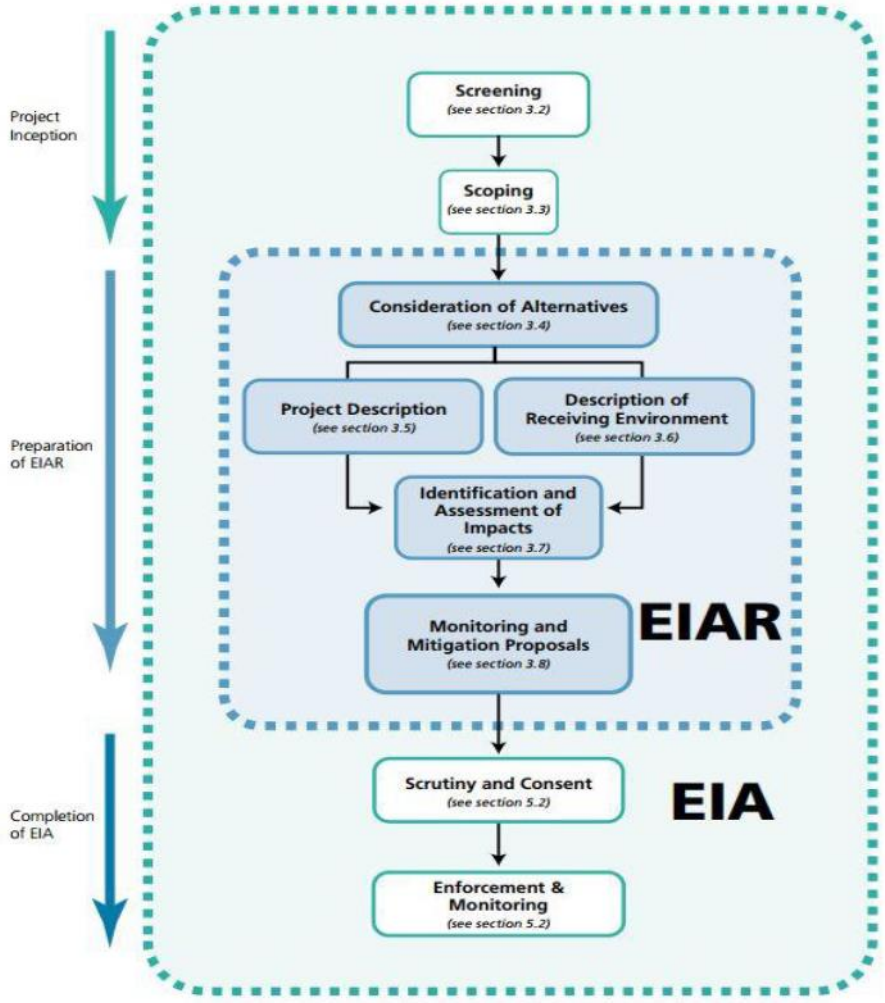


Figure 1-1 EIA Process

The purpose of the EIAR is to provide the relevant competent authority with information on the likely and significant effects on the environment by the Proposed Development. This EIAR was prepared in parallel with the project design process and reflects the potential cumulative impact of other developments.

1.4 EIA Legislation

The EIA Directive requires EIA to be carried out for certain projects as listed in Annex I of the Directive. The EIA Directive is transposed into Irish law through the Planning and Development Act 2000, as amended, and the Planning and Development Regulations 2001, as amended.

1.5 EIA Guidelines

This EIAR has been prepared in accordance with all relevant guidance. The documents listed below are common to all chapters. Additional specific guidelines will be referred to in each specific chapter.

- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA May 2022);
- Environmental Assessments of Plans, Programmes and Projects – Rulings of the Court of Justice of the European Union (European Union 2017);
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Union 2017);
- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union 2013);
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Union 2017);
- European Commission 2017. Environmental Impact Assessment of Projects Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU);
- EU Commission Guidance on Interpretation of definitions of project categories of annex I and II of the EIA Directive (2015);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland 2018);
- Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems; (Department of Housing, Planning, Community and Local Government 2017);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999);
- Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (European Communities 2003); and
- Office of the Planning Regulator (OPR) Environmental Impact Assessment Screening Practice Note (2021).

The EIA Directive defines EIA as a process whereby Article 1(2)(g) states that EIA means:

> "(*i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);*
>
> *(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;*
>
> *(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;*
>
> *(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point;*
>
> *(iii) and, where appropriate, its own supplementary examination; and*

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The EIA Directive requires the EIAR to identify, describe and assess, in an appropriate manner and in light of each individual case, the direct, indirect and cumulative significant effects of the Proposed Development on factors of the environment including:

a) population and human health

b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (respectively, the Habitats Directive and the Birds Directive)

c) land, soil, water, air and climate

d) material assets, cultural heritage and the landscape

e) the interaction between the factors referred to in points (a) to (d)

1.6 Screening for EIA

'Screening' is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or in the case of sub threshold development, by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment. Annex 1 of the EIA Directive requires as mandatory an EIA for all development projects listed therein. Schedule 5, Part 1, of the Planning Regulations transposes Annex 1 of the EIA Directive directly into Irish planning legislation. An EIAR is required to accompany a planning application for development of a class set out in Schedule 5, Part 1 of the Planning Regulations which exceeds a limit, quantity or threshold set for that class of development. The Proposed Development is not considered to fall under any class set out in Schedule 5, Part 1 of the Planning Regulations.

Schedule 5, Part 2 of the Planning and Development Regulations 2001 as amended, defines projects that are assessed on the basis of set mandatory thresholds for each of the project classes including:

"Schedule 5, Part 2 - Infrastructure projects

(b) (i) Construction of more than 500 dwelling units.

The Proposed Development includes 219 no. residential units which is below the threshold of 500 units for a mandatory EIA. It is not considered that the Proposed Development will exceed the threshold for Part 2, Section 10 (b)(i).

> *"Schedule 5, Part 2 - Infrastructure projects*
>
> *10 (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 constitutes an "*urban development*" as it is a housing development. According to the Interpretation of Definitions of Project Categories of Annex I and II Document (European Commission, 2015), "*Housing developments, in particular, are frequently included in the 'urban development projects' category*".

Under the Galway City Development plan 2023-2029, the site is zoned as "*CI Enterprise, Light Industry and Commercial*" which has an objective "*To provide for enterprise, light industry and commercial uses other than those reserved to the CC zone*". The Proposed Development is therefore within a "*business district*", the 2-hectare threshold is applicable in this case.

The Proposed Development comprises 219 no. residential units and a creche on a site of 1.144 hectares. The Proposed Development forms part of an overall three phased masterplan, the Corrib Causeway Development Framework, which has an overall site area of 1.78 hectares. The masterplan aims to deliver a residential-led, mixed-use development. Phase 2, an existing car park south of the site, is intended to be redeveloped for civic, commercial, and cultural uses. Phase 3 is intended to provide additional residential units.[1]

Notwithstanding the fact that the size of the Proposed Development site, the number of units proposed as part of the Proposed Development, and the size of the overall area of the Corrib Causeway masterplan, are below the respective EIAR thresholds; having regard to the level of inter-connectivity with the Corrib Causeway Development Framework, and having regard to the precautionary principle, a voluntary EIAR has been prepared to accompany this planning application. Based on previous pre-application meetings with Galway City Council, it has been confirmed that it is their position that an EIAR is a requirement for the site.

1.7 Scope of the EIAR

'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is defined in EC Guidance on EIA Scoping 2001 as:

> "*Determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR"*.

[1] The future phases of the Corrib Causeway masterplan have been assessed for potential cumulative effects in each of the respective technical chapters. This is further detailed in Chapter 2 of this EIAR.

The content of this EIAR was informed by a scoping process carried out by the Applicant, design team and EIAR consultants to identify the core issues likely to be most important during the EIA process.

The EIAR prepared for the Proposed Development has endeavoured to be as thorough as possible and therefore all the issues listed in Schedule 6, Sections 1 and 2 of the Planning and Development Regulations have been addressed in the EIAR.

The scope of this EIAR has had regard to the documents listed in Section 1.5 together with:

- The requirements of Part X of the Planning Act and Part 10 of the Planning Regulations.
- The requirements of the Galway City Development Plan 2023-2029.
- Relevant Regional and National Planning Policy Documents.
- The receiving environment and any vulnerable or sensitive local features and current uses.
- Previous relevant planning history and applications that have been submitted on the subject and adjoining lands.
- The likely and significant impacts of the Proposed Development on the environment; and
- Available mitigation measures for reducing or eliminating any potentially significant undesirable impacts.

In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

1.8 Purpose and Objective of the EIAR

The purpose of this EIAR is to assist in the EIA process, by identifying likely significant environmental impacts resulting from the Proposed Development, to describe the means and extent by which they can be reduced or mitigated, to interpret and communicate information about the likely impacts and to provide an input into the decision making and planning process.

The fundamental principles to be followed when preparing an EIAR are:

- Anticipating, avoiding and reducing significant effects.
- Assessing and pursuing preventative action.
- Maintaining objectivity.
- Ensuring clarity and quality.
- Providing relevant information to decision makers; and
- Facilitating public and stakeholder consultation.

EIA is an iterative process. The EIAR captures this assessment process and describes its outcomes. The EIAR documents the consideration of environmental effects and provides transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes. The EIAR provides information on any identified effects arising as a consequence of the Proposed Development and which:

- Are environmentally based.

- Are likely to occur; and
- Have significant and adverse effects on the environment.

The EIAR also documents how the design of the Proposed Development incorporates measures for the purposes of impact avoidance, reduction or amelioration; as well as to explain how significant adverse effects will be avoided.

The key objective of this EIAR is to inform the relevant competent authority on the acceptability of the Proposed Development, in carrying out an EIA, in order to reach a decision in the full knowledge of the Proposed Development's likely significant impacts on the environment, if any.

1.9 Format and Structure of this EIAR

The formation of an EIAR necessitates the co-ordination and collation of associated, yet diverse specialised areas of assessment. The EIA approach involves the examination of each environmental factor, describing the existing baseline environment, the Proposed Development, its likely impacts and direct and indirect significant effects pertaining to that environmental factor and mitigation measures, where appropriate.

Each technical assessment sets out the relevant legislation, policy, and guidance together with the methodology used to carry out the assessment of potential effects, including the criteria that are used to establish which effects are significant. The significance criteria follow that as defined in the EPA 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' 2022[2] as shown in Table 1-1 below.

Table 1-1 Description of Effects

Category	Type and Description
Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral**.**	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment

[2] https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

Category	Type and Description
	(for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance)
Describing the Significance of Effects '*Significance*' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful *(also see Determining Significance).*	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced**.**	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions.

Category	Type and Description
	Likely Effects The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision**.**	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented**.**
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects *'Duration'* is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects

Category	Type and Description
	The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog)

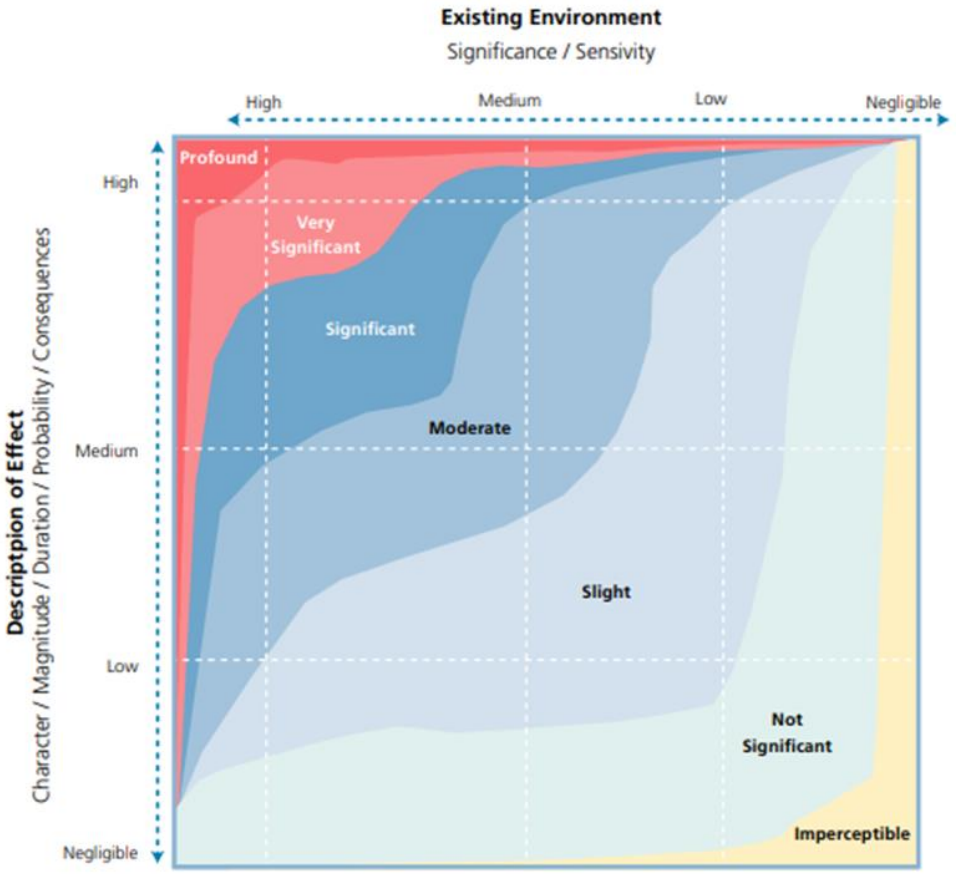


Figure 1-2 :Determining the Significance of the Effect (EPA 2022)

The topics examined in this EIAR are categorised under the environmental factors prescribed under the EIA Directive:

- Population and Human Health.
- Biodiversity.
- Land and Soils.
- Water.
- Air Quality.
- Material Assets.
- Cultural Heritage; and
- Landscape and Visual.

The potential likely significant effects caused by the vulnerability of the Proposed Development to risks of major accidents and/or disasters must also be examined.

The structure of the EIAR is set out in Table 1-2 below.

Table 1-2 Structure of the Environmental Impact Assessment Report (EIAR)

No.	Chapter	Content
1	Introduction	Chapter 1 sets out the purpose, methodology and scope of the document.

No.	Chapter	Content
2	Site Context	As required under Article 5(1)(a) of the EIA Directive, Chapters 2, 3 and 4 provides a description of the site, design, and scale of Proposed Development, and as required under Article 5(d), an evaluation of the reasonable alternative design approaches.
3	Description of the Development	
4	Consideration of Alternatives	
5	Population and Human Health	Chapter 5 covers the requirement for assessment on potentially significant effects to population and human health as required under Article 3(1)(a) of the EIA Directive.
6	Biodiversity	Chapter 6 covers the requirement of Article 3(1)(b) to assess potentially significant effects on biodiversity (which previously referred only to 'fauna and flora'), having particular attention to species and habitats protected under the Habitats Directive and the Birds Directive.
7	Land and Soil	Chapter 7 covers the requirement under Article 3(1)(c) of the EIA Directive on Land and Soil to assess the type of soil and geology in the area of the Proposed Development and identifies any potentially significant effects.
8	Water	Chapter 8 covers the requirement under Article 3(1)(c) of the EIA Directive to assess potentially significant effects to water quality arising from the Proposed Development. This chapter will assess any potential effects from pollution and discharges to surface water.
9	Noise and Vibration	Chapter 9 covers the requirement to assess potentially significant effects from airborne noise and vibration as required under Article 3(1)(a) of the EIA Directive on Human Health.
10	Air Quality	Chapter 10 and 11 covers the requirement under Article 3(1)(c) of the EIA Directive on Air and Climate to assess potentially significant effects to air quality in the surrounding environment.
11	Wind and Microclimate	
12	Landscape and Visual Impact Assessment	Chapter 12 covers the requirement under Article 3(1)(d) of the EIA Directive to assess potentially significant effects on the landscape. This chapter will assess any potential visual impacts to landscape caused by the Proposed Development.
13	Material Assets - Traffic and Transport	Chapter 13 sets out the transport and traffic effects that will be caused on nearby receptors due from increase vehicle movements during the construction phase and operational phase.
14	Material Assets - Waste Management	Chapter 14 and 15 covers the requirement under Article 3(1)(d) of the EIA Directive to assess potentially significant effects on material assets. This chapter will identify impacts to existing utilities and infrastructure from the development of the Proposed Development. Article 5(1), Annex IV, point 1(d) requires estimates of quantities and types of waste produced during construction and operation phase. Chapter 12 will also present an assessment of how resources and waste will be managed for the Proposed Development.
15	Material Assets - Utilities	

No.	Chapter	Content
16	Cultural Heritage	Chapter 16 covers the requirement under Article 3(1)(d) of the EIA Directive to assess potentially significant effects on cultural heritage.
17	Interactions	As required under Article 3(1)(e) of the EIA Directive, Chapter 17 provides an assessment of the interaction between all of the environmental aspects referred to in this EIAR.
18	Risk Assessment	Chapter 18 covers the requirement under Article 3(2) of the EIA Directive, to include the expected effects deriving from the vulnerability of the Proposed Development to risks of major accidents and/or disasters.
19	Summary of Mitigation and Monitoring Measures	Chapter 19 describes mitigation and monitoring as required under Article 5(1) of the EIA Directive in order to avoid, prevent, reduce, or if possible, offset any identified significant adverse effects on the environment and, where appropriate, describes any proposed monitoring arrangements.

This approach employs standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration.

1.10 Methodology Used to Produce this EIAR

The methodology employed to produce this EIAR is detailed in Table 1-3 below. The objective is to evaluate each environmental topic, both individually and collectively, in a systematic and objective manner.

The methodology will outline the methods used to describe the baseline environmental conditions as well as predict the likely impacts on the environment of the Proposed Development. The data and survey requirements for each chapter will vary depending on the environmental topic and will be chosen by the particular specialist based on relevant legislation, best practice guidance, policy requirements, and professional judgement. Similarly, the study area is also defined for each environmental topic based on professional judgement and experience.

All environmental topics require desktop reviews of all relevant data at a minimum. These desktop studies are then supplemented by field studies and consultations with relevant stakeholders, for example interested parties, statutory bodies and local authorities, as required for each environmental topic.

Table 1-3 EIA Chapter Approach

Chapter	Description of Section
Introduction	Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
Study Methodology	This subsection outlines the method by which the relevant impact assessment has been conducted within that chapter.
The Existing Receiving Environment (Baseline Situation)	This section will describe and assess the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the Proposed Development will fit. This analysis also takes account of any other proposed developments that are likely to proceed in the immediate surroundings.
Characteristics of the Proposed Development	Consideration of the '*Characteristics of the Proposed Development'* allows for a projection of the '*level of impact'* on any particular aspect of the environment that could arise. For each chapter those characteristics of the Proposed Development which are relevant to the area of study are described; for example, the chapter on landscape and visual impact addresses issues such as height, design and impact on the surrounding landscape.
Potential Impact of the Proposed Development	This section provides a description of the specific, direct and indirect, effects that the Proposed Development may have. This analysis is provided with reference to both the Existing Receiving Environment and Characteristics of the Proposed Development sections, while also referring to the: (i) magnitude and intensity, (ii) integrity, (iii) duration and (iv) probability of impacts. The assessment addresses whether the impacts are direct, indirect, secondary or cumulative in nature. It also looks at the timescale of such impacts e.g. are they short, medium, long-term, and are they of a temporary, permanent, continuous or intermittent nature, and are they positive or negative impacts. The impact interactions are also addressed.
Residual Impacts of the Proposed Development	This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term, temporary, permanent, continuous, or intermittent, positive and negative effects as well as impact interactions which the Proposed Development may have, assuming all mitigation measures are fully and successfully applied.
Do Nothing Impact	In order to provide a qualitative and equitable assessment of the Proposed Development, this section considers the Proposed Development in the context of the likely impacts upon the receiving environment should the Proposed Development not take place.

Chapter	Description of Section
Avoidance, Remedial and Mitigation Measures	This section of each chapter describes the mitigation measures which are required. The requirement to describe mitigation measures is laid out in the EIA Directive, as implemented by the Planning Act and the Planning Regulations. Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential impacts of the Proposed Development. This includes avoidance, reduction and remedy measures as set out in Section 4.7 of the Development Management Guidelines 2007, to reduce or eliminate any significant adverse impacts identified.
Monitoring	This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring.
Reinstatement	While not applicable to every aspect of the environment considered within the EIAR, certain measures may need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.
Interactions	This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts.
Difficulties Encountered in Compiling Information	The EIA Directive requires that the EIAR includes *'details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved'* (EIA Directive, Annex IV, Part 6). Each chapter that contains an environmental baseline and assessment contains a section outlining any difficulties encountered in compiling that chapter.

1.11 EIAR Project Team

The EIAR authoring team is set out in Table 1-4.

Table 1-4 EIAR Project Team

No.	Chapter	Consultant Name and address	Specialist Area
1	Introduction	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants (specializing in Environmental Impact Assessment)
2	Site Context		
3	Description of the Development		
4	Consideration of Alternatives		
5	Population and Human Health	Brock McClure Planning and Development Consultants, 63 York Road, Dún Laoighaire, Co. Dublin Vitalija Janusonyte	Planning and Development Consultants

No.	Chapter	Consultant Name and address	Specialist Area
		Linda McEllin	
6	Biodiversity	Scott Cawley Ltd., 71-73 Rock Road, College House, Rock Road, Blackrock, Dublin Madeleine Van der Poel	Ecological consultancy
7	Land and Soil	Enviroguide, 3D Core C, The Plaza, Park West, D12F9TN Gareth Carroll	Multidisciplinary Planning and Environmental Consultants (specializing in impact assessment of land and soil and water)
8	Water		
9	Noise and Vibration	AONA Environmental Consulting Ltd., Unit 8A, Northwest Business Park, Sligo F91 E285 Mervyn Keegan Olivia Maguire	Environmental and Occupational Health and Safety consultancy (specialising in Air Quality and Odour Impact Assessments and Noise and Acoustic Assessments)
10	Air Quality		
11	Wind and Microclimate	Integrated Environmental Solutions Ltd, 4th Floor, Castleforbes House, Castleforbes Road, Dublin 1 Harshad Joshi	Software and consultancy company specializing in building performance analysis
12	Landscape and Visual Impact Assessment	Murray & Associates Landscape Architecture, 16 The Seapoint Building, 44-45 Clontarf Road, Dublin 3 Luciana Pinho (Verified View input from: 3D Design Bureau, Unit 1, Adelphi House, George's Street Upper, Dún Laoghaire, Dublin)	Landscape Architecture Company 3D modelling & visualisation company
13	Material Assets - Traffic and Transport	PUNCH Consulting Engineers, Carnegie House, Library Road, Dun Laoghaire, Co. Dublin Julie Tiernan	Consulting Engineers
14	Material Assets - Waste Management	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Planning and Environmental Consultants
15	Material Assets - Utilities	Homan O Brien, 89 Booterstown Ave, Blackrock, Dublin	Consulting Engineers

No.	Chapter	Consultant Name and address	Specialist Area
		Brian Homan	
16	Cultural Heritage	Moore Group, 3 Gort na Rí Athenry, Co. Galway Declan Moore (Consultant Archaeologist)	Multi-disciplinary environmental, planning and heritage resource management consultancy
17	Interactions	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Lakshmi Priya Mohan	Multidisciplinary Planning and Environmental Consultants
18	Risk Assessment	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
19	Summary of Mitigation Measures	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Lakshmi Priya Mohan	Multidisciplinary Planning and Environmental Consultants
20	Competent Persons Table	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
NTS	Non-Technical Summary	Input from all above consultants and compiled by Envioguide	Multidisciplinary Planning and Environmental Consultants
App	Appendices		

1.12 Non-Technical Summary

A Non-Technical Summary of the EIAR has also been prepared. The EIA Directive states that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions. EPA Guidelines note that the non-technical summary of the EIAR should facilitate the dissemination of the information contained in the EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made by An Bord Pleanála. A Non-Technical Summary of the EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document.

1.13 Links between EIAR and Appropriate Assessment

A screening report for Appropriate Assessment (AA) has been carried out for the Proposed Development to determine if there is a risk of effects to any Natura 2000 site. The conclusion of this report states that "*the Proposed Development requires a Stage Two Appropriate Assessment and consequently the preparation of a Natura Impact Statement (NIS)"*. Avoidance, design requirements and mitigation measures have been set out in the NIS and their implementation will ensure that impacts on the conservation objectives of European sites will be avoided during the Construction and Operational Phases of the Proposed Development such that there will be no adverse effects on any European sites

While AA is required by the proposer of any plan or project likely to have an adverse effect on a Natura 2000 site, EIA is required for projects listed in Annex I of the EIA Directive. The requirement for EIA relative to projects listed in Annex II of the EIA Directive is determined on a case by case. While these two different types of assessment are independent and are required by separate legislation, namely the Birds and Habitat Directives (i.e. AA) and the EIA Directive (i.e. EIAR) there is a degree of overlap, particularly in the biodiversity chapter of the EIAR.

1.14 Availability of EIAR Documents

A copy of this EIAR document, it's associated appendices and Non-Technical Summary can be available to view or for purchase from the An Bord Pleanála and Galway City Council planning office at a fee not exceeding the reasonable cost of reproducing the document.

1.15 Statement of Difficulties Encountered

No exceptional difficulties were experienced in compiling the necessary information for the Proposed Development. Where any specific difficulties were encountered these are outlined in the relevant chapter of the EIAR.

1.16 Quotations

The application is also accompanied by a Non-Technical Summary of the EIAR, which is laid out in a similar, but condensed format to the main EIAR. The structure, presentation and the Non-Technical Summary of the EIAR, as well as the arrangements for public access, all facilitate the dissemination of the information contained in the EIAR. The core objective is to ensure that the public and local community are aware of the likely environmental impacts of the Proposed Development prior to the granting of consent.

However, it is important to acknowledge that the EIAR by its nature contains statements about the Proposed Development, some of which are positive and some less than positive. Selective quotation or quotations out of context can give a misleading impression of the findings of the study.

The EIA Regulations require that difficulties such as technical deficiencies, lack of information or knowledge encountered in compiling any specified information for the EIAR be described.

2 SITE CONTEXT

2.1 Introduction

The Proposed Development site is located on the northern edge of Galway City and lies wholly within Galway City Council jurisdiction. The Dyke Road and the River Corrib is located directly west of the site and commercial properties including the Galway Retail Park are located to the east. The University of Galway is located across the River Corrib to the west. The Terryland Forest park is also located north of the site, beyond Phase 3 lands. Please refer to Figure 2-1 below.

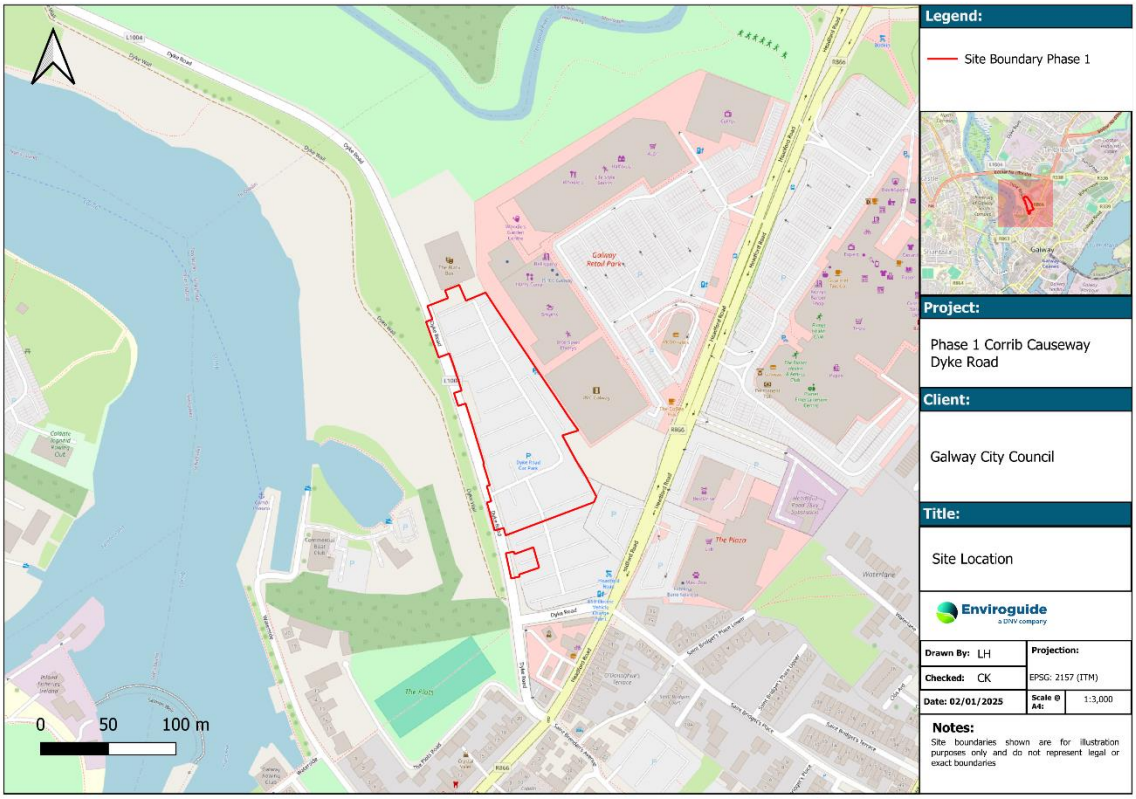


Figure 2-1 Site Location

The site Galway City Development Plan 2023-2029 is the current statutory plan for the local area, against which planning applications will be considered. The site has been identified by Galway City Council Development Plan as a strategic brownfield landbank. The City Development Plan and the Draft 2009 Headford Road Framework Plan identify the site as a regeneration site with a unique opportunity to provide a residential led development with linkages to the established City Centre. Zoning maps for the area demonstrate the site is zoned as 'CI' Enterprise, Light Industry and Commercial.

The Proposed Development, Phase 1 is part of the Corrib Causeway Development Framework - an overall three phased masterplan which will deliver a residential-led, mixed-use development.

This EIAR is assessing the Proposed Development site associated with Phase 1 of the Corrib Causeway Development Framework which has an area of 1.144 hectares and is currently in use as a public carpark. The Proposed Development site is bordered by the Phase 2 lands to the south of the site which are also in use as a public carpark. Phase 2 is intended to be redeveloped for civic, commercial and cultural uses. The Phase 3 lands border the north of the site and contain the Blackbox Theatre. The existing uses of the Phase 2 and 3 lands will remain operational as normal for the duration of the works on the Phase 1 lands.

Based on topographical surveys undertaken by Apex Surveys, the subject site is in a low-lying area, with ground levels ranging from 3.84m at the northern end of the site to 7.12m in the southern portion of the site.

The site is currently accessed via the Dyke Road which facilitates both vehicular and pedestrian acces.

The site is not located within any lands protected under ecological designations, such as Special Areas of Conservation (SAC), or Special Protection Areas (SPA). The closest European designated site to the Proposed Development is the Lough Corrib SAC which is approximately 25m to the west.

The site lies within the Corrib Water Framework Directive (WFD) Catchment (Catchment ID: 30) and the Corrib_SC_010 WFD Subcatchment. The site is located within Flood Zone A with a "*high probability of flooding*". The closest waterbodies to the site are the River Corrib and Terryland Stream which are located approximately 130m east and 210m north respectively. .

The site is not located with an Architectural Conservation Area and there are no buildings listed on the Record of Protected Structures or the National Inventory of Architectural Heritage on site.

The site lies within designated Air Zone C "*Other Cities and Large Towns*" with the closest air monitoring sites located approximately 280m northeast (Bodkin Roundabout: Station Code GY1) and 320m southeast (Galway: Station Code GY2) (EPA, 2024).

According to the Environmental Protection Agency's (EPA) Radon Risk Map of Ireland, the site is located in an area where "*About 1 in 5 homes in this area is likely to have high radon levels*" (EPA, 2024).

2.2 Corrib Causeway Development Framework

The Proposed Development is part of an overall three phased masterplan which will deliver a residential-led, mixed-use development. Phase 2, an existing car park south of the site, is intended to be redeveloped for civic, commercial and cultural uses. If the existing Black Box theatre located north of the site is relocated, there is potential for the site to be developed into an additional residential block which would be Phase 3.

The overall Corrib Causeway vision document has been subject to public consultation through a project website (https://corribcauseway.ie/). The development of a wider Development Framework site has been phased as follows:

- Phase 1 (the Proposed Development);

- Phase 2 (referred to as River Side Residential Neighbourhood);
- Phase 3 (referred to as the Terryland Forest Residential Neighbourhood)

It is anticipated that Phases 2 and 3 will come forward for development following submission of Phase 1 in Q1 of 2025. The total area of the Corrib Causeway Development Framework is 1.78 hectares. Please refer to Figure 2-2 below.

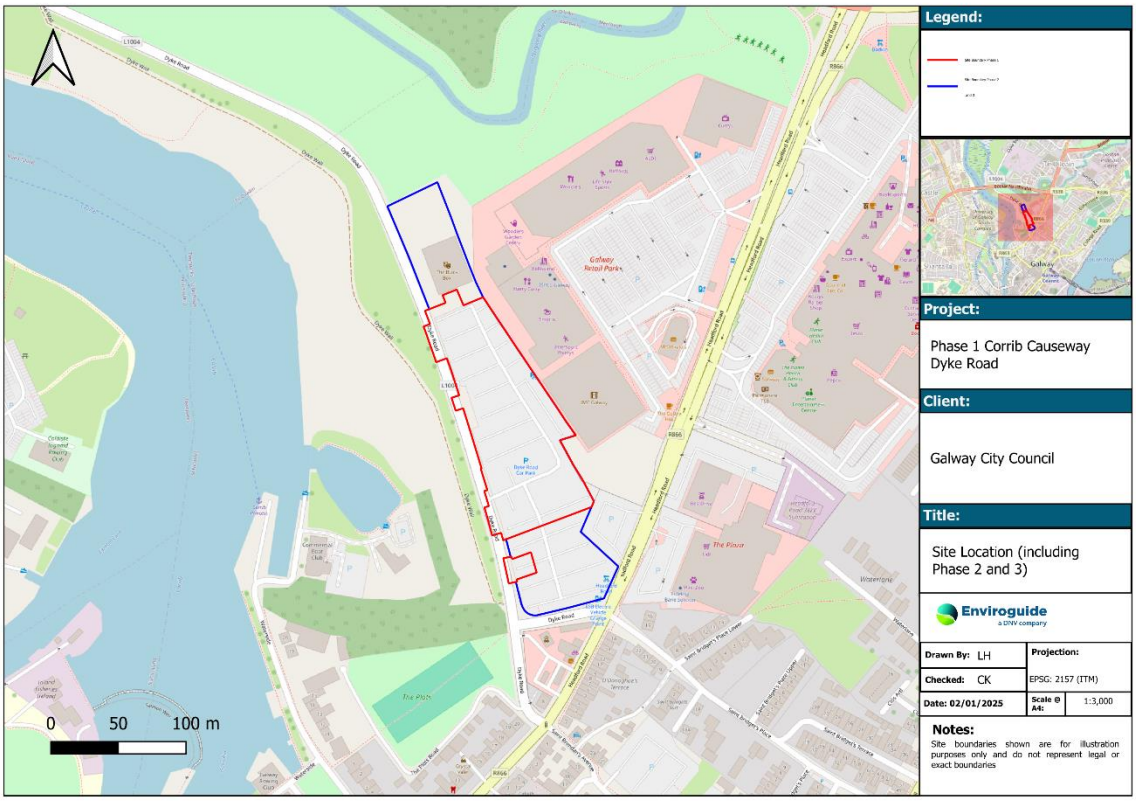


Figure 2-2 Phase 1, 2 and 3 Sites of the Corrib Causeway Development Framework

2.3 Site Background and Site History

The subject site lies within the administrative jurisdiction of Galway City Council. The planning history for the site was reviewed from data sources including:

- Galway City Council planning search: https://www.eplanning.ie/GalwayCity/SearchTypes
- An Bord Pleanála website: http://www.pleanala.ie/
- Myplan: https://www.myplan.ie/
- EIA Portal, as provided by the Department of Housing, Planning and Local Government: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

Considering the current use of the site as a car park and the lack of any recorded planning applications at the sources listed above, no site planning history has been detailed.

2.4 Cumulative Schemes

Cumulative effects are considered in this EIAR in line with Section 3.7.3 of the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022). It is acknowledged that a while a single activity may itself result in a minor effect, it may, when combined with other impacts, minor or significant, result in a cumulative impact that is collectively significant. Similarly, a single activity which may on its own have a significant effect, may be reduced to an insignificant effect when combined with other effects.

> *"The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects. While a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or insignificant), result in a cumulative impact that is collectively significant. For example, effects on traffic due to an individual industrial project may be acceptable; however, it may be necessary to assess the cumulative effects taking account of traffic generated by other permitted or planned projects. It can also be prudent to have regard to the likely future environmental loadings arising from the development of zoned lands in the immediate environs of the proposed project."*

Potential cumulative effects have been assessed through the following assessment scenarios.

1. Baseline scenario
2. Assessment scenario 1 – the Proposed Development (Phase 1)
3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.
4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes (i.e. other existing and approved schemes in the surrounding area).
    - Cumulative effects have been assessed individually in each technical chapter of the EIAR (i.e. chapters 5 to 17).
    - Schemes identified as having potential to cause cumulative effects when considered in conjunction with the Proposed Development are detailed in Table 2-1.

Table 2-1 Existing and Approved Projects for Cumulative Assessment

Application Reg. Ref. and Applicant Name	Address	Development Proposal	Distance from the Proposed Development	Decision
GCC planning ref. 2460108 **Summix BNM Developments Limited** **ABP-PL61.320100**	Corner of Lough Atalia Road and Bóthar na Long, Galway, H91 HY45	The development will include demolition of a vacant industrial structure (115 sq m), the external canopy structure (170 sq m) and the boundary walls along the southern, western and north-western boundaries of the site; and the construction of a 15 No. storey hotel (including part mezzanine at ground floor level) providing 189 No. bedrooms (7,514 sq m), incorporating food and beverage areas and provision of a single storey service building to the northwest of the site on a 0.2217 Ha site.	0.9km southeast	Lodged 15/04/2024 Refused Permission 06/06/2024 (under appeal)
ABP- 314597-22 **Galway City Council**	University Road to Dublin Road, Galway City	BusConnects Galway Cross-City Link Scheme	0.2km south	Grant Permission 27/09/2024
GCC planning ref. 20184 **(Amended by ref. 22259)** **Cleverson Ltd**	Headford Road, Townparks, Galway	Demolition of an ESB enclosure and construction of a seven/eight storey development comprising 4 retail units, a gymnasium and student accommodation 7 storeys in height (272 beds).	Directly adjacent (east)	Grant permission 12/07/2021
GCC planning ref. 1847 **(amended by ref. 20235)** **K. King Construction Claregalway Ltd.**	33-35 Saint Brendan's Avenue, Woodquay, Galway	Construction of 27 no. duplex / apartments including 3 to 6 storey apartment block and all associated site development works and services.	0.3km south	Grant permission 14/12/2020
GCC planning ref. 19107 **Irish Water**	Dyke Road, Terryland, Galway	Permission for development which comprises of a new raw water intake works located on the east bank of the River Corrib, 100m downstream of Quincentenary Bridge to supply the Terryland Water Treatment Plant.	0.5km northwest	Grant permission 24/02/2020

Application Reg. Ref. and Applicant Name	Address	Development Proposal	Distance from the Proposed Development	Decision
GCC planning ref. 2047 **Seagullpoint Limited**	Lands to the rear of Ceannt Train Station, Station Road, Galway City	Large-scale, mixed-use development consisting of 376 no. apartments, retail units, café/restaurant/bar units, hotel, office use, childcare facility, car parking and other services and associated site works.	0.8km southeast	Grant permission 24/05/2021
ABP 320938-24 **Galway City Council with Failte Ireland**	Woodquay Park, Terryland, Galway	Woodquay Park Landscape Upgrade: Included in the plans is the creation of accessible, public, green space, with biodiversity-friendly planting, age and mobility-friendly pathways, sheltered seating niches and spaces for play and for rest. The project will also involve traffic calming upgrades and improved pedestrian facilities to the surrounding streets.	0.3km southwest	A Part X planning application was lodged in spring 2024. Construction works are anticipated to commence in early 2025 subject to grant of permission. Granted 12/03/2025
ABP 320181-24Galway City Council	Across the River Corrib, adjacent to Dyke Road	Clifden Railway Bridge Pedestrian and Cycle Bridge: Construction of a pedestrian and cycle bridge which will span the River Corrib connecting the University of Galway (UG) campus to the City Centre via Riverside and Woodquay.	0.2km southwest	Intended lodgement date unknown

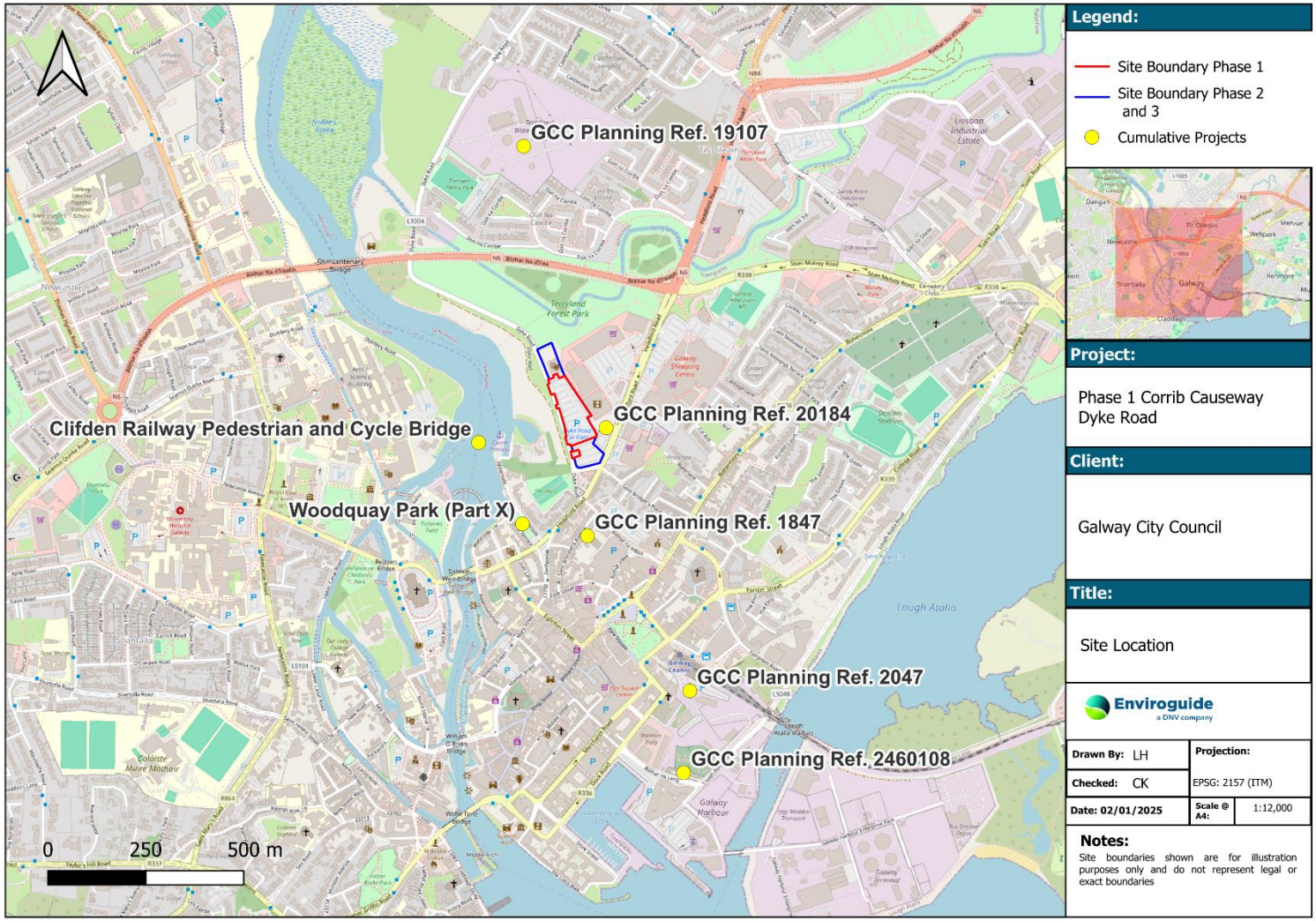


Figure 2-3 Cumulative Projects

The following selection criteria has been applied when identifying schemes with the potential to cause likely cumulative effects.

- Existing or approved projects (by time of planning submission).
    - Existing refers to projects that have been granted planning permission and are being constructed.
    - Approved refers to projects that have been granted planning permission but not yet built.
    - Also included within the 'existing and approved' criteria are projects that have been applied for but are not yet consented (adopting a more precautionary "reasonably foreseeable" approach).
- (A) All projects adjacent or within 100m of the Proposed Development (no matter the size or use)
- (B) Projects that are EIAR developments or projects that exceed the following thresholds:
    - residential projects over 150 residential units
    - non-residential commercial projects over 10,000 square metres of floor space.
    - Infrastructure developments (roads, flood defences) over 1km distance.
- Projects (that meet B criteria) within a 2 km radius from the site.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 Introduction

This chapter provides a description of the Proposed Development together with details of the existing environment. In accordance with Article 5(1)(a) of the EIA Directive, the description of the project should comprise:

'…information on the site, design, size and other relevant features of the project'.

The EIAR must contain information in relation to the environmental impact of both the Proposed Development and all other reasonable alternatives studied. An indication of the main reasons for the option chosen must be given, taking into account the effects of the Proposed Development on the environment.

3.2 Quality Assurance and Competence

This chapter was prepared by Louise Hewitt, Environmental Consultant with Enviroguide Consulting. Louise has worked with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports and a EIAR chapters for developments of a similar scale and nature to the Proposed Development.

This chapter has been reviewed and approved by Catherine Keogan, Technical Director and EIA Lead at Enviroguide. Catherine is an environmental consultant with over 20 years' experience in consultancy, specialising in EIAs for a range of developments, working closely with a range of developers, planning consultants and architects within the public and private sector.

3.3 Project Description

The Proposed Development will consist of the construction of a new residential development of 219 no. apartment units and a childcare facility (approx. 241 sq m) in the form of 1 no. new residential block (5 - 9 storeys over lower ground floor level) with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.144 ha.

The Proposed Development will provide for:

a) 219 no. residential apartment units (109 no. 1-bedroom units, 100 no. 2-bedroom units and 10 no. 3-bedroom units) each with an associated private open space area in the form of a balcony/terrace.

b) A new raised pedestrian boardwalk along the western elevation of the building.

c) Open Space (approx. 2,778 sqm) is proposed in the form of (a) public open space (approx. 1,183 sqm) to the west of the proposed building fronting on to Dyke Road accommodating outdoor seating, planting, a sunken garden and pedestrian pathways and connections; and (b) communal open space (approx. 1,605 sqm) to the east of the proposed building

in the form of a courtyard including outdoor seating, planting, a children's play area and outdoor sports equipment.

d) A childcare facility (approx. 241 sqm) with dedicated external play area (approx. 60 sqm) at ground floor level.

e) A total of 33 no. car parking spaces at surface level to include 2 no. accessible spaces and 2 no. set down / drop off spaces to serve the childcare facility.

f) A total of 465 no. bicycle parking spaces to include 330 no. standard spaces, 100 no. visitor spaces and 25 no. cargo bicycle spaces and 10 no. bicycle parking spaces dedicated for the childcare facility staff all at surface / lower ground floor level.

g) Vehicular access is proposed via Dyke Road at 2 no. locations (to the north west and south west of the site). Pedestrian and Cyclist access is also delivered throughout the site via Dyke Road and includes a pedestrian crossing at Dyke Road. Pedestrian / cyclist connections to adjoining development to the north east and south east are also delivered.

h) The proposal also provides for a further vehicular access point to the south of the main development site to facilitiate new access to the existing southern car park. A total of 12 no. of car parking spaces are removed with 161 no. car parking spaces remaining at this location.

i) 2 no. telecommunications lattice towers (overall height 6.45 m and 7.67 m) affixed to the rooftop supporting 9 no. 2m 2G/3G/4G antennas; 9 no. 0.8m 5G antennas; 6 no. 0.3m microwave transmission links; together with all associated telecommunications equipment and cabinets.

The development will also provide for all associated site development works, infrastructure, excavation and clearance works including decommissioning the existing Black Box Theatre waste water pumping station and providing a new pumping station complete with emergency storage, all boundary treatment, public lighting, internal roads and pathways, ESB substations, switch room, water tank rooms, storage room, meter rooms, sprinkler tank room, parcel stores, comms room, bin storage, bicycle stores, hard and soft landscaping, play equipment, below ground attenuation tanks, nature based SUDs features, green roofs, roof plant, site services and connections for foul drainage, surface water drainage and water supply.

Figure 3-1 details the proposed site layout.

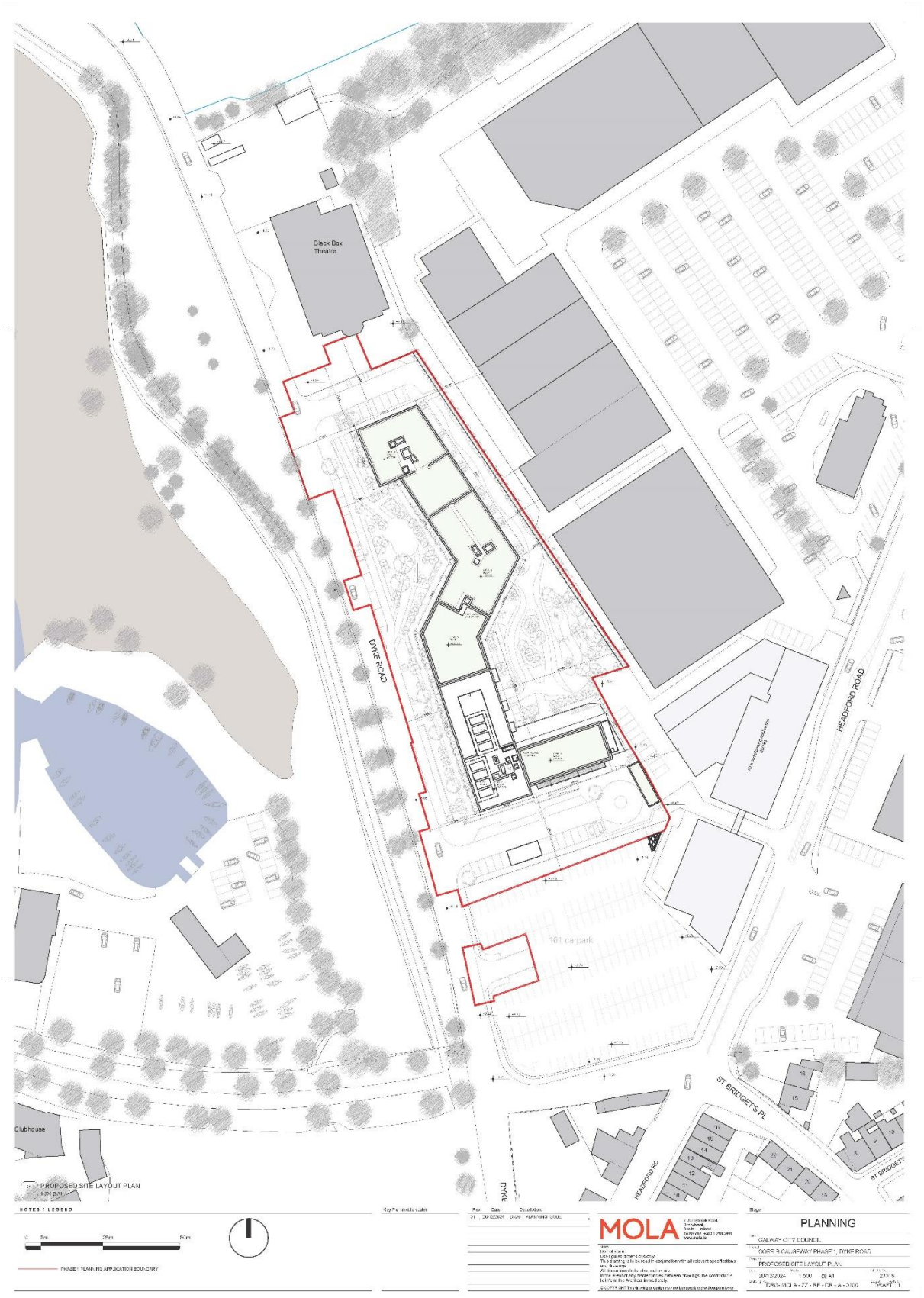


Figure 3-1 Proposed Site Layout (Drawing no. DRG- MOLA - ZZ - RF - DR - A - 0100, MOLA, 2024)

3.3.1 Construction of the Proposed Development

Construction of the Proposed Development will commence in Q1 of 2027, and finish Q1 2029. The construction period will take approximately 2 years.

Site development works will include stripping of existing carpark surface material and excavation of subsoil layers, construction of residential and childcare unit, construction and connection of services (surface water and SuDS, foul water, utilities) and landscaping works.

For the duration of the proposed infrastructure works, the maximum working hours will be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 08:00 to 13:00 Saturdays, subject to the restrictions imposed by the local authority. Works will not be permitted on Sundays and Public Holidays. Subject to the agreement of the local authority, out of hours working may be required for water main connections, foul drainage connections and utility connections. Where this is necessary, prior approval of Galway City Council will be sought. Deliveries will not be permitted at peak times of traffic as follows: 08:00 to 09:00,15:00 to 16:00 and 16:00 to 17:00.

A temporary construction compound will be required for the duration of the construction works. Once appointed, the main contractor will be required to submit a site layout plan which will detail the proposed location of the site compound. The compound will consist of:

- Site office and welfare facilities.
- Car parking.
- Toilets.
- Canteen area; and
- Laydown and contractor storage / stockpile / plant & fuel depot area.

The exact location and layout of the construction compound is to be confirmed in advance of commencement of the works (and agreed with Galway City Council).

3.4 The Existence of the Project

The construction phase will provide both direct and indirect employment for the duration of the works which is estimated to last 2 years. Therefore, for the duration of the construction phase there will be a short-term increase in construction employment in the area, which will have a positive impact, both directly and indirectly, on the local economy (See Chapter 5 Population and Human health for a further assessment).

The operational phase will result in an increase in the population of the area, and it have a positive impact on the long-term supply needs of housing in Galway City. In addition to social and affordable housing, a childcare facility is also proposed. As such, the Operational Phase will have the potential to create employment in the local area, whilst also providing a high standard of living for new and existing local residents. Employment will be created by the maintenance and management of the Proposed Development

The Proposed Development will range in height from 5 no. to 9 no. storeys. The proposed building heights have been designed to take cognisance of both the existing surrounding residential development, the extant permissions for developments on the adjoining sites and

the Urban Development and Building Height Guidelines (2018) and the Galway Urban Density and Building Height Study (2021).

The likely significant environmental impacts of the Proposed Development are fully addressed in the relevant specialist chapters of this EIAR. These impacts relate to Population and Human Health, Biodiversity, Land and Soil, Hydrology and Hydrogeology, Noise and Vibration, Air Quality, Microclimate, Landscape and Visual, Material Assets (Traffic, Waste Management and Utilities) and Archaeology and Cultural Heritage.

The Proposed Development also has the potential for cumulative impacts with neighbouring and surrounding projects which are listed in Chapter 2 of this EIAR. The potential cumulative impacts arising from the construction and operational phases of the Proposed Development with other planned, permitted and existing projects are assessed in detail in each of the technical chapters of this EIAR, and appropriate mitigation measures are proposed for any potential significant effects which have been identified. The zone of influence for assessing cumulative impacts in each technical chapter has been outlined in the relevant chapters.

4 CONSIDERATION OF ALTERNATIVES

4.1 Introduction

Consideration of reasonable alternatives is an important aspect of the EIA process and is necessary to evaluate the likely environmental consequences of a range of development strategies for the site within the constraints imposed by environmental and planning conditions. This section provides a description of the reasonable alternatives that have been considered.

Article 5 of the EIA Directive requires that that the EIAR contain:

> "*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, 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*."

This section of the EIAR provides an explanation of the reasonable alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the Proposed Development, taking into account and providing a comparison of the environmental effects. The alternatives may be described at four levels:

- Alternative locations;
- Alternative designs;
- Alternative layouts; and
- Alternative processes

Pursuant to Section 3.4.1 of the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (*EPA, 2022*), the consideration of alternatives also needs to be cognisant of the fact that "*in some instances some of the alternatives described below will not be applicable - e.g. there may be no relevant 'alternative location'…*"

In accordance with EPA Guidelines (*EPA, 2022*), different types of alternatives may be considered at several key phases during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The EPA Guidelines (EPA, 2022) states:

> "*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 is deciding on the*

> *selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required*."

The following sections of this chapter of the EIAR contains an analysis of the alternative development options for the site, describing design options and changes which were incorporated into the scheme as the proposals progressed. The key considerations and amendments to the design of the scheme, having regard to and comparing the key environmental effects, are set out and discussed.

4.2 Quality Assurance and Competence

This chapter was prepared by Louise Hewitt, Environmental Consultant with Enviroguide Consulting. Louise has worked with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports and EIAR chapters for developments of a similar scale and nature to the Proposed Development.

This chapter has been reviewed and approved by Catherine Keogan, Technical Director and EIA Lead at Enviroguide. Catherine is an environmental consultant with over 20 years' experience in consultancy, specialising in EIAs for a range of developments, working closely with a range of developers, planning consultants and architects within the public and private sector.

4.3 Alternative Locations

The site is located on Dyke Road within the Headford Road area and has been identified in the Galway City Development Plan 2023-2029 as a regeneration and opportunity site. The Headford Road area is a busy commercial area adjacent to the city centre incorporating the three regeneration sites namely the Dyke Road car park site (the Proposed Development site), Galway Retail Park and Galway Shopping Centre (Figure 4-1). The regeneration of these lands has also been identified as a Growth Enabler in the National Planning Framework. At this time, there is no Local Area Plan in place for the Headford Road Area, however, one will be prepared in order to provide a more detailed strategy for these specific areas.

Specific Objective No. 4 of the Galway City Development Plan 2023-2029 states that "*In advance of the adoption of the Headford Road LAP, any proposals to advance development of the **Dyke Road Regeneration site by the GCC/LDA,** having regard to the socio-economic benefits for the city, will be considered, subject to the **preparation of a masterplan**."* (our emphasis) The masterplan prepared and submitted within this application and in response to Specific Objective No. 4 aims to deliver a residential-led, mixed-use development.

Section 10.7 of Chapter 10 Compact Growth and Regeneration of the Galway City Development Plan 2023-2029 states the following in relation to the site:

> *"…the area along the Headford Road adjacent to the city centre presents opportunities for regeneration through redevelopment of underutilised surface car parking and low-density retail park formats to complement its central location, good accessibility and proximity to assets such as the River Corrib and Terryland Forest Park. The regeneration of these specific sites is considered in the NPF to be a key enabler that*

can facilitate Galway to grow to a city of scale" (Chapter 10, Galway City Development Plan 2023-2029)

The Proposed Development will contribute positively to the development of the wider area and will optimise underutilised land at an appropriate location which is well serviced by infrastructure, transport and local facilities. As such, it is not considered appropriate to evaluate alternate locations within the EIAR.

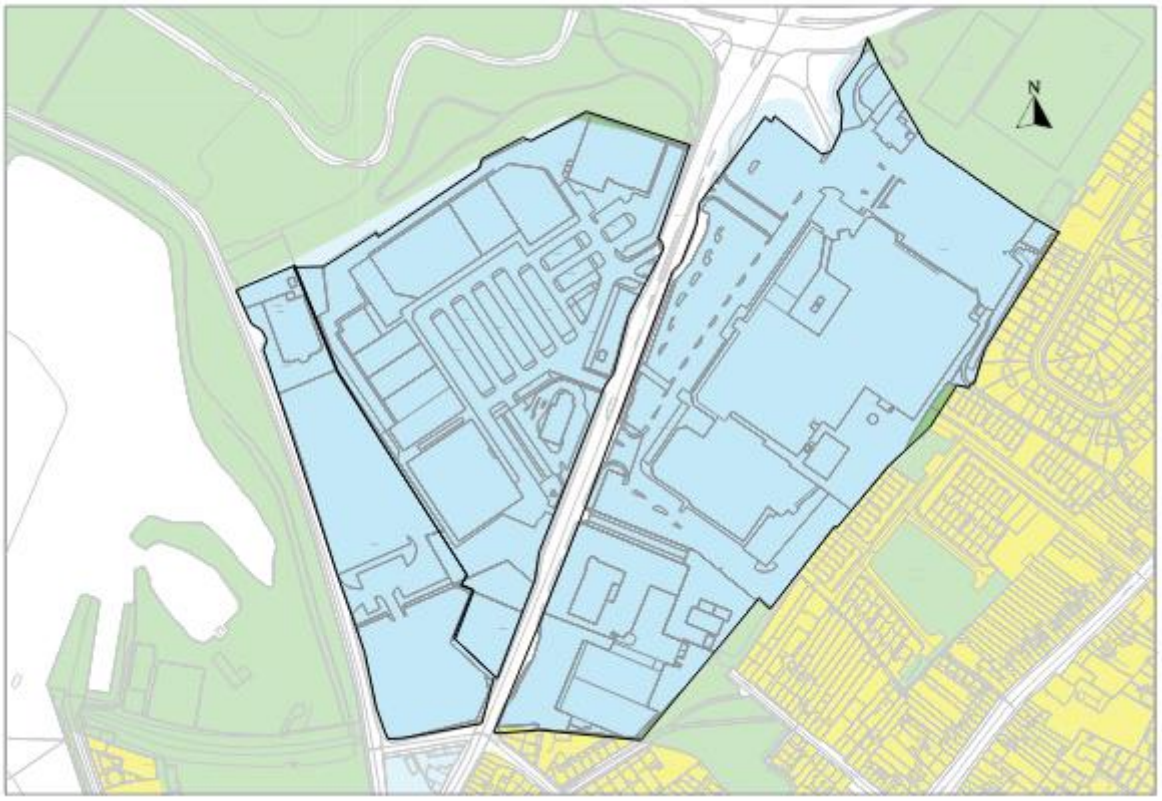


Figure 4-1 Headford Road Regeneration Sites (Galway City Development Plan 2023-2029, Galway City Council)

4.4 Alternative Uses

The Proposed Development has been designed as part of a potential 3 phase masterplan (the Corrib Causeway Masterplan). Phase 1 has been designed to provide residential units along with a childcare facility and public and communal open spaces. The Galway City Development Plan requires the provision of a childcare facility for schemes over 75 units with the exception of where there are adequate facilities in the area to cater for demand generated.

The Draft Headford Road Framework Plan 2009 had a vision for a creche at this site and the provision of a creche facility is also compatible with the 'CI' Zoning under the Galway City Development Plan 2023-2029.

The site has been brought forward for the first phase of development on the basis that the Draft Headford Road Framework Plan (2009) envisioned residential development at this

particular location with the more civic and commercial uses to be located further south on the phase 2 site. The current Development Framework has been prepared to align with this vision. The Draft Headford Road Framework Plan 2009 (non-statutory) proposed the southern portion of the development site (Phase 2) for public, civic, cultural, and office uses, while the Phase 1 area proposed upper area was intended for residential use with some ground-floor retail. Since no revised local area plan exists, this framework serves as the basis for the proposed mix of uses in the Corrib Causeway Development Framework.

According to the Galway City Development Plan 2023-2029, the Dyke Road Car Park Regeneration Site, as an LDA project, will include affordable housing and may feature office/commercial uses, as well as civic, cultural, and arts infrastructure. Opportunities for innovation and research linked to the University of Galway are also considered, with enhanced connectivity via a new pedestrian and cycle bridge. The development will prioritise high-quality architecture, urban design, and a well-integrated public realm connected to the green network.

Both the statutory development plan and non-statutory framework plan, alongside emerging retail trends, have guided the proposed mixed-use development for the Dyke Road Regeneration site. Commercial uses, such as a pharmacy, medical centre, hotel, and community/cultural facilities, were considered appropriate, particularly near the city centre and the proposed Clifden Railway Bridge.

Phasing considerations included the ongoing use of the Blackbox Theatre, which remains in Phase 3, making it unlikely to relocate. Phase 2 was considered for the initial development, as public-facing areas are ideal for civic, cultural, and office buildings to foster community. Consequently, the residential component is planned for Phase 1, as reflected in this application.

The lack of housing supply in Ireland is a well-documented and ongoing issue. The Proposed Development incorporates the construction of 219 no. social and affordable apartments which will service the demand for housing in the area. As such this is considered an appropriate use of the land.

4.5 Alternative Design and Layouts

During the design process, several iterations of the site layout and alternative designs for the Proposed Development were considered following feedback from the Land Development Agency (LDA) and Galway City Council, this included different mixes of the number of residential units as well as alternative layouts for the amenity space. These iterations took account of site constraints such as site width, orientation and the size of proposed courtyards providing communal amenity spaces and public amenity spaces. The design iterations accounted for associated flood risk on the site, noting the needs for the proposed development and when the flood defence is completed. Several different spatial strategies were examined which provided varying number of units. These included c-shape, courtyard, linear north-to-south, linear and perimeter, c-shape and perimeter and hybrid design options (Figure 4-2).

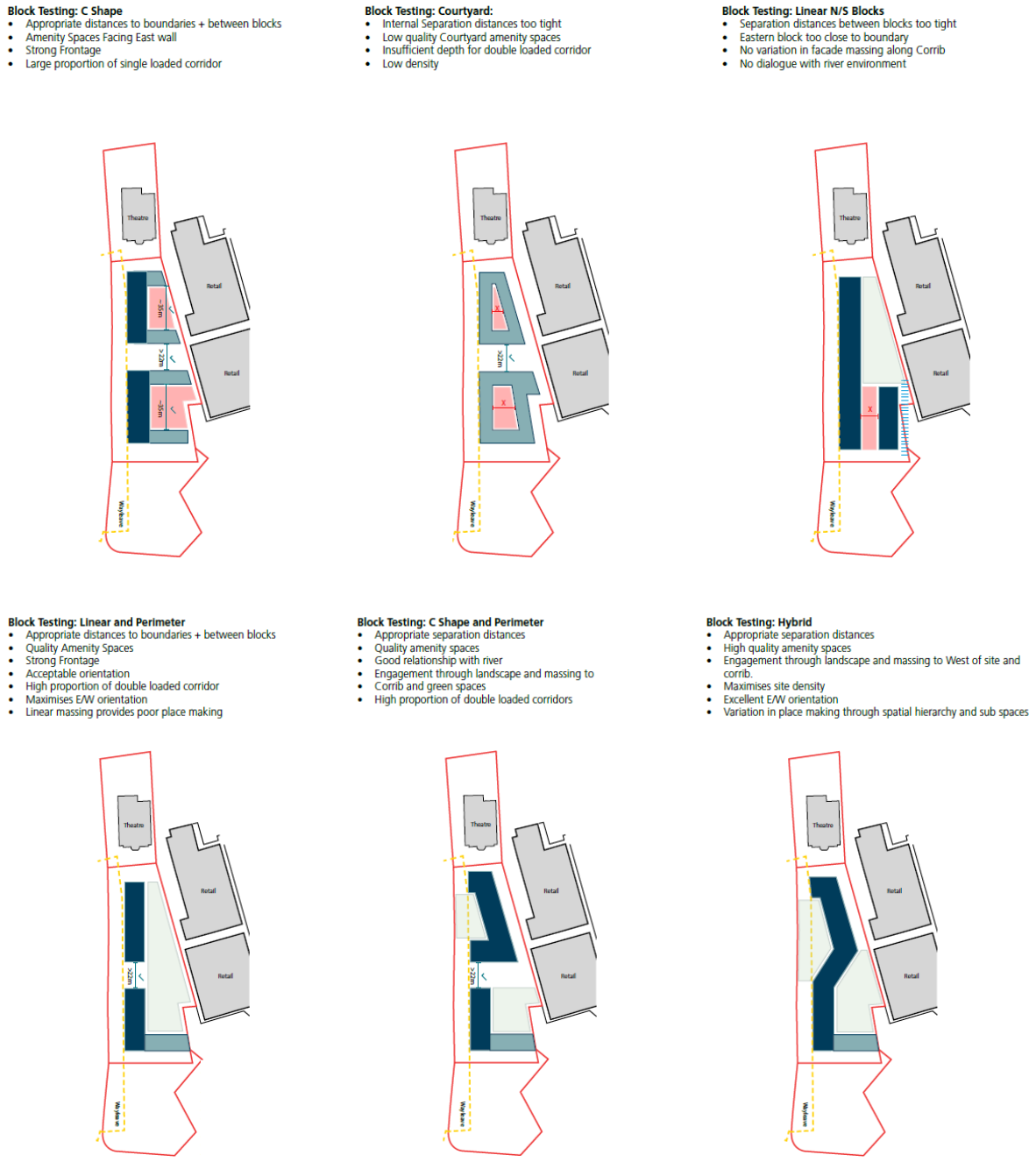


Figure 4-2 Block layout studies (Architectural Design Statement, MOLA 2024)

Following an optioneering exercise which reviewed five different site strategy approaches, option 5 was recognized as the best performing solution from both an urban design context and from a residential amenity perspective and was selected as the design for the Proposed Development. The Architectural Desing Statement prepared by MOLA has assessed the positives and negatives of each option in further however the proposed layouts for options 1 to 4 are detailed below in Figure 4-3.

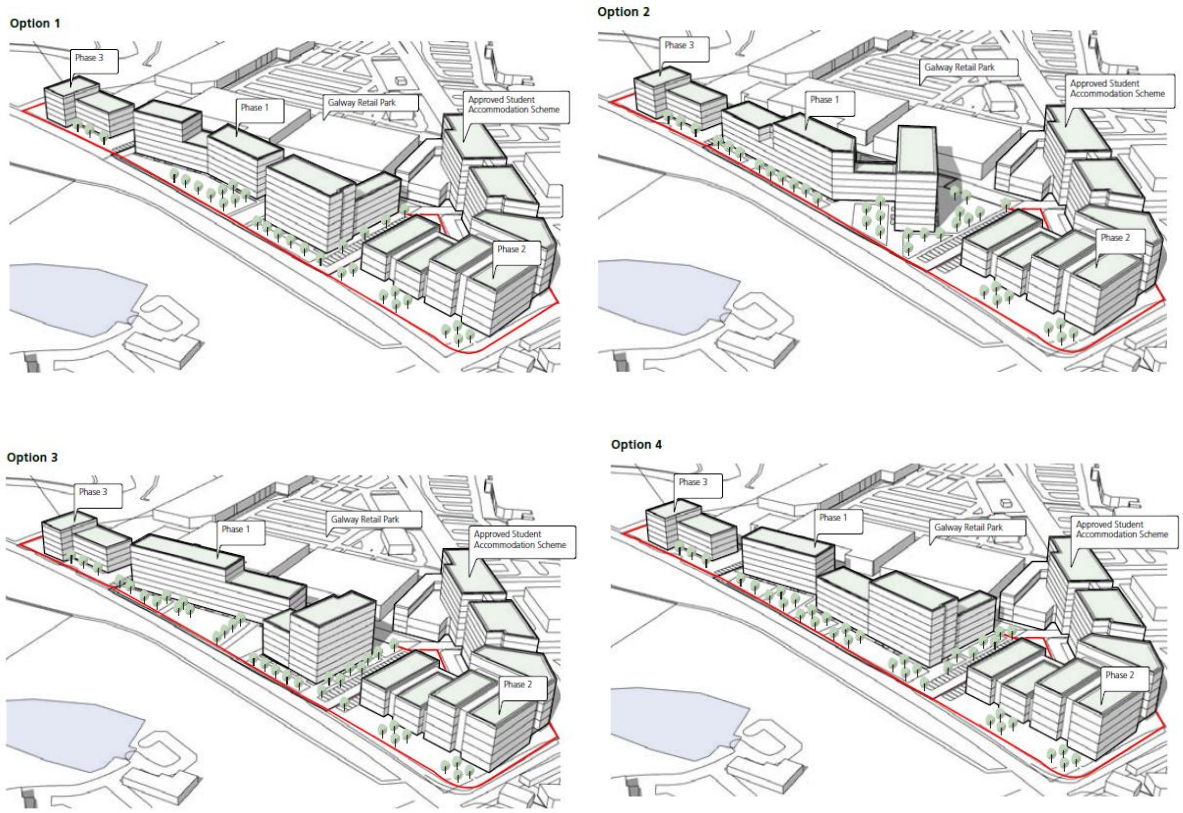


Figure 4-3 Massing Options for Options 1 to 4 (the Proposed Development)

4.6 Alternative Process

Due to the nature of the Proposed Development i.e., residential development with associated amenity space and a childcare facility, where the planning application will be submitted to An Bord Pleanála, it was not considered necessary to consider alternative processes for the Proposed Development.

5 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter assesses any potential impacts the Proposed Development may have on Population and Human Health. The chapter assesses the potential direct and indirect effects of the Proposed Development on the local population and human health.

This chapter of the EIAR focuses on the human environment proximate to the Proposed Development in terms of population profile; employment; land use and social patterns; human health and traffic congestion.

Potential impacts of the Proposed Development on population and human health arise in the context of land and soil, water, air and climate, material assets, cultural heritage and landscape and visual assessment. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics.

In accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022), Draft Advice Notes for Preparing Environmental Impact Statements (EPA 2015) and European Commission Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU 2017), this chapter considers the *"existence, activities and health of people*", with respect to *"topics which are manifested in the environment such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions".*

Human beings and their well-being are a central consideration in assessing the environment. Any likely change in environmental conditions, which will impact the quality of life for human beings, must therefore be comprehensively addressed.

Impacts upon humans may derive from any number of the environmental parameters discussed throughout this EIAR. Ultimately, all development impacts upon the environment to some extent and upon human beings and their quality of life. Direct effects relate to matters such as water and air quality, noise, and landscape change. Indirect effects relate to matters such as flora and fauna.

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

> *"Human Health is a very broad factor that would be highly Project dependant. The notion of human health should be considered in the context of 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 and pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a project in relation to workers on the Project and surrounding population."*

5.1.1 Quality Assurance and Competency of Experts

This chapter has been prepared by Vitalija Janusonyte, Senior Executive Planner at Brock McClure Planning and Development Consultants. Vitalija has a Master's Degree in Regional and Urban Planning from University College Dublin and a Bachelor of Science in City Planning and Environmental Policy from University College Dublin. Vitalija has worked as a Planning Consultant with Brock McClure since 2021 and has experience in preparing Environmental Impact Assessment Reports, specifically Introduction, Population and Human Health and Planning Policy Chapters.

This chapter has been reviewed by Linda McEllin, Associate Director at Brock McClure Planning and Development Consultants. Linda has worked at Brock McClure for 10 years and has over 18 years' experience in the private planning sector and has focused her expertise in the areas of Large Scale Residential Developments and Environmental Impact Assessment Reports. Linda has a Master's Degree in Regional and Urban Planning from University College Dublin.

5.2 Study Methodology

A desk-based study was undertaken in May 2024 and December 2024 to assess information regarding population and human health. Site visits were undertaken on 9th August 2023, 26th September 2023 and 16th October 2024 as part of this assessment. The subject site and surroundings were visited to examine the receiving environment.

This chapter of the EIAR document has been prepared with reference to guidance provided by the EU Commission and recent national publications which provide guidance on the Directive 2011/92/EU, as amended by Directive 2014/52/EU (the "EIA Directive") including the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018) and the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, published by the EPA in 2022.

The 2018 EIA Guidelines published by the DHPLG state that there is a close interrelationship between the SEA Directive and the Directive 2011/92/EU, as amended by Directive 2014/52/EU. The Guidelines state that the term 'Human Health' is contained within both of these directives, and that a common interpretation of this term should therefore be applied.

To establish the existing receiving environment / baseline, several site visits were undertaken to appraise the location and likely significant potential impact upon human receptors. A desk-based study of the following documents was carried out to inform this chapter:

- Central Statistics Office www.cso.ie.
- Central Statistics Office (2022) – Census 2022
- Central Statistics Office (2018) – CSO Statbank
- DoHPLG (2017) Rebuilding Ireland – Action Plan for Housing and Homelessness
- Galway City Development Plan 2023-2029
- ESRI Quarterly Economic Commentary (June 2019)

- Environmental Protection Agency (2022) – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- European Commission (2017) – Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment
- Institute of Public Health (2021) – Health Impact Assessment Guidance: Manual & Technical Guidance

As per Article 3 of the EIA Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU sets out the following:

1. *The environmental impact shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
    a) *Population and Human Health*
    b) *Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC*
    c) *Land, soil, water, air and climate*
    d) *Material assets, cultural heritage, and the landscape*
    e) *The interactions referred to in the factors referred to in points (a) to (d)…"*

The likely significant impacts on Human Health and Population in regards to issues such as soils, geology and hydrogeology, water, air quality, noise and vibration, traffic and landscape are addressed in detail within the following EIAR chapters:

- Chapter 7 – Land and Soil
- Chapter 8 - Water
- Chapter 9 – Noise and Vibration
- Chapter 10 – Air Quality
- Chapter 12 – Landscape and Visual Impact Assessment
- Chapter 13 – Material Assets – Traffic and Transport

Where these topics are dealt with in further detail elsewhere in this EIAR, the relevant chapters have been cross referenced in this chapter to provide An Bord Pleanála with a context for their determination.

The 2014 Directive's title change to assess the impact on 'Population and Human Health' and the 2022 EIA Guidelines published by the EPA have been adhered to in this Chapter, including the requirement that the assessment of impacts on population and human health should refer to the assessment of those factors under which human health effects might occur, as addressed elsewhere in the EIAR, e.g., under the environmental factors of 'air, water, soil, etc.'

This chapter follows these EC guidelines and will examine the health effects relevant to the Proposed Development as they relate to a relevant, defined Study Area. The scope of this evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and EIARs. The effects of the Proposed Development on the population and human health are analysed in compliance with the requirements of the EPA guidelines.

The potential effects of the Proposed Development on the local population is assessed in this EIAR in relation to:

- Population demographics;
- Socio economic impacts;
- Land use and social patterns;
- Visual Impact;
- Water quality;
- Air quality;
- Noise and vibration; and
- Traffic and transport.

5.2.1 Assessment of Significance and Sensitivity

The assessment of significance is a professional appraisal based on the sensitivity of the receptor and the magnitude of impact of any potential effect. The sensitivity of individuals in an area will vary on a case-by-case basis and must be assessed accordingly.

In line with the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022), the following terms are defined when quantifying the quality of effects, the significance of effects and when describing the duration and frequency of effects:

Table 5-1 Definition of Quality of Effects

Quality of Effects	Description
Positive Effects	A change which improves the quality of the environment
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative / Adverse Effects	A change which reduces the quality of the environment

Table 5-2 Definition of Significance of Effects

Significance of Effect	Description
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significance of Effect	Description
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

Table 5-3 Definition of Duration of Effects

Frequency	Description
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.

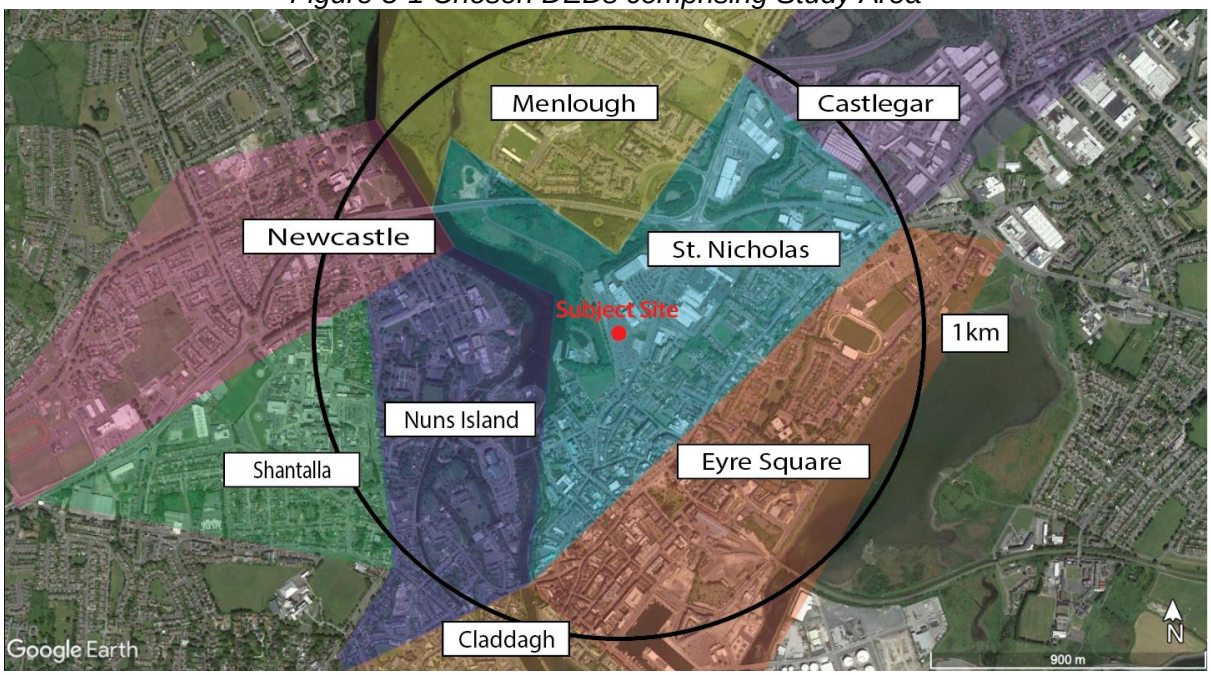
5.2.2 Study Area

There is no formal guidance available on an appropriate study area to focus the assessment of population and health. In determining an appropriate study area, professional judgement has been applied. It is acknowledged that projects such as the Proposed Development can have impacts at different scales. Certain impacts may be experienced at a much smaller radius in close proximity to the Proposed Development (site-specific population) whereas other effects may be experienced at a wider community level (local population). The Proposed Development being considered is not expected to have regional, national, international or transboundary impacts on Population or Human Health. As such, the Study Area has been restricted to the neighbouring community of a 1 km radius from the subject site location.

In order to assess baseline population and human health conditions in the wider area, the chosen Study Area comprises 8 no. District Electoral Divisions (DEDs):

- St. Nicholas
- Menlough
- Castlegar
- Eyre Square
- Nuns Island
- Newcastle
- Shantalla
- Claddagh

Figure 5-1 Chosen DEDs comprising Study Area



From this section forward, the assessment considers the statistical data of the DEDs in closest proximity to the subject site referred to as the Study Area. This ensures an accurate representation of findings.

Figure 5-2 Full Extent of Study Area in accordance with DED boundaries (CSO, 2022)

5.3 The Existing and Receiving Environment (Baseline Situation)

This section describes the receiving environment in terms of existing context, character, significance, and sensitivity which forms the baseline for further assessment.

5.3.1 Population and Demographic Analysis

The Central Statistics Office (CSO) provides data on population and socio-economic aspects of the population at a State, County and local Electoral District level. The subject site falls within the 'St. Nicholas' Electoral District' (ED) and within the administrative area of Galway City Council. The most recent census of population was undertaken by the CSO in 2022 and this data is used to inform this chapter.

CSO population statistics relevant to the Study Area are summarised below.

Table 5-4 Population Evolution in Study Area from 2016 to 2022 (Source: CSO, 2022)

DED	2016	2022	Actual Change	% Change
St. Nicholas	2,394	3,232	+838	+25.9%
Menlough	5,118	5,407	+289	+5.3%
Castlegar	4,053	4,315	+262	+6%

DED	2016	2022	Actual Change	% Change
Eyre Square	4,108	4,456	+348	+7.8%
Nuns Island	1,474	1,716	+242	+14.1%
Newcastle	1,895	2,017	+122	+6%
Shantalla	1,912	2,015	+103	+5.1%
Claddagh	2,593	2,755	+162	+5.8%
Total	**23,547**	**25,913**	**+2,366**	**+9.1%**

A total of 25,913 people were recorded within the Study Area in the 2022 Census. The table above indicates that between 2016 and 2022 there was an overall increase in population of 9.1% across all electoral divisions within the Study Area. We note that St. Nicholas ED (where the subject site is located) saw a 25.9% (838 persons) increase in population between 2016 and 2022. Notably, this is the largest increase in population for an individual ED across the entire Study Area.

To date, population across all regions across the State is increasing along with a consistently rising demand for housing particularly in urban regions. It is worth noting that with a consistently rising demand for housing in Galway City, population figures are envisaged to increase across most DEDs within the Galway City administrative area in the next decade. It is also worth noting that, Galway City's population continues to expand robustly.

The Updated Draft Revised National Planning Framework – Project Ireland 2040 (November, 2024), envisages the population of Galway City and Suburbs to grow by 36,000 people or at least a total population of 122,000 by 2040, an increase of almost 40% from the recorded population in 2022. The RSES also sets a population growth target of at least 120,000 population over the next 20 years for the city. Galway City is expected to become a city of scale and a key driver of growth and prosperity for the Northern and Western Region. The Core Strategy Chapter of the City Development Plan 2023-2029 projects the population to increase to approximately 114,900 people by 2031 for the Galway City and Suburbs area.

5.3.2 Age Profile

A review of the Study Area's age profile confirms that communities in the Study Area have an age profile weighted generally towards a younger adult population group with an above average concentration of individuals under 30 years. This can be assessed following a review of the figure below, which confirms that the area's population profile is dominated by people in the working age group (20 to 64 years accounting for 55% of the entire Study Area population. The largest singular age group (at 4-year increments) within the Study Area is 20-24 years accounting for 16% of the entire Study Area population as shown in Figure 5-3 below. This reflects the Study Area's proximity to the local university and student body present in Galway City.

Figure 5-3 Study Area Population Profile by Sex and Age Group (Source: CSO, 2022)

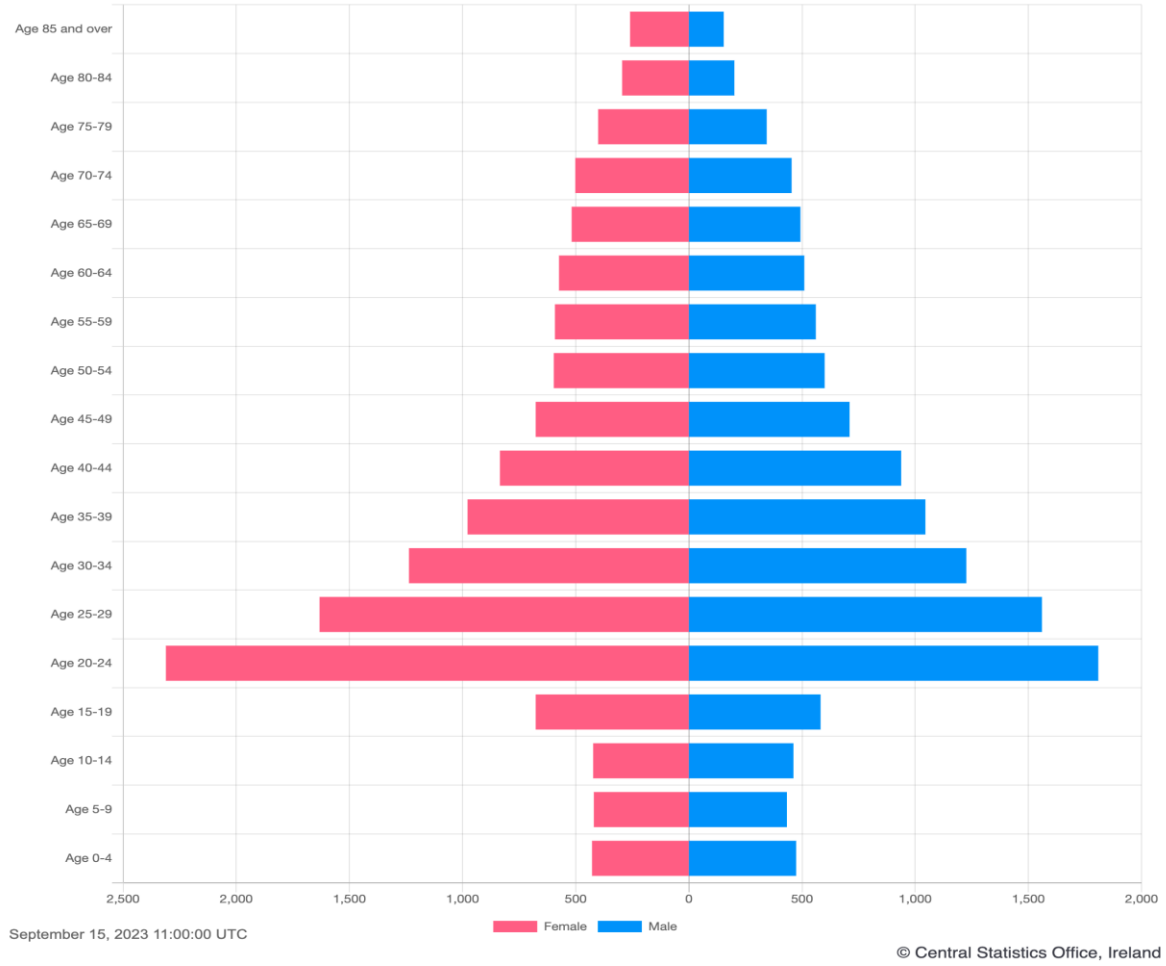


Table 5-5 Age Profile Breakdown within Study Area (Source: CSO, 2022)

Age Cohort	Study Area	% Total
Pre-School (0-4 years)	902	3%
School Age (5-19 Years)	2,997	12%
Young Adults (20-24 years)	4,120	16%
Adults (25-64)	14,272	55%
Older Adults (65+ years)	3,622	14%
Total	**25,913**	**100%**

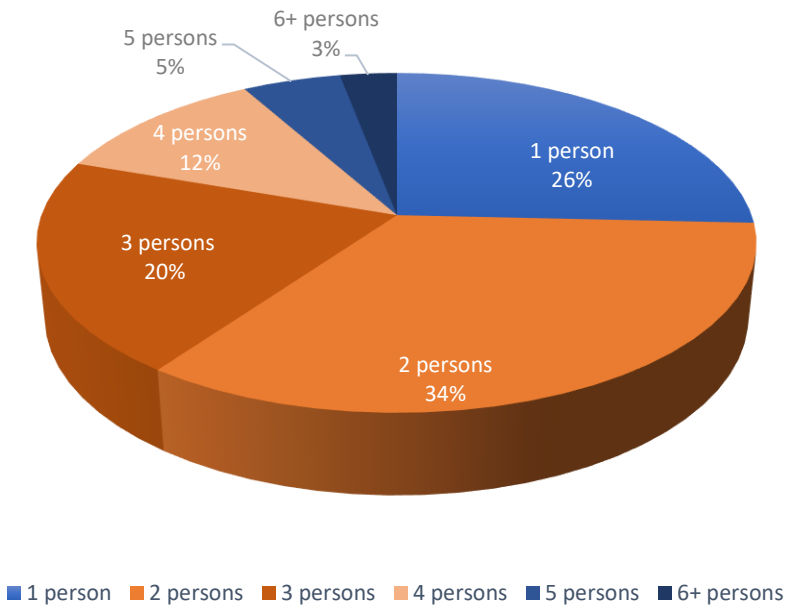
The table above confirms that the relevant percentage of school going aged children between the ages of 5-19 is 12% within the Study Area and the relevant percentage of the total population aged between 0-4 years of age is 3%.

5.3.3 Household Size

Table 5-6 Household Size Breakdown within Study Area (Source: CSO, 2022)

Houshold Size	Study Area	% Total	Galway City	% Total
1 person	2,427	26%	7,505	24.3%
2 person	3,225	34%	9,470	30.6%
3 person	1,923	20%	6,113	19.8%
4 person	1,178	12%	4,662	15%
5 person	488	5%	2,068	6.7%
6 person	184	2%	712	2.4%
7 person	48	0.5%	228	0.7%
8 or more person	50	0.5%	143	0.5%
Total	**9,523**	**100%**	**30,901**	**100%**

Figure 5-4 Study Area Population Profile by Sex and Age Group (Source: CSO, 2022)



There is a total of 9,523 households within the Study Area. Calculating the average household size in the Study Area (CSO 2022 data for Total Household Population = 23,683 / No. of Occupied Households = 9,523) equates to 2.49. The CSO 2022 figures, have shown that the average household size in Galway City is 2.62, an increase from 2.58 in 2016. The household size of the Study Area is evidently lower than that of the wider city area.

The figures above show that the predominant household size in the Study Area is 2-person households. This equates to 34% or 3,225 out of 9,523 households. It is also worth noting that the number of 1-person households is high in the Study Area, equating to 26% (2,427) of the total 9,523 households. Therefore, 60% of the total households are 1-2 person households.

5.3.4 Economic Activity and Employment

The economic profile and labour force of the Study Area is outlined below. The labour force is defined as the number of people above the legal working age that are available to work. The majority of the population within the Study Area is categorised as 'at work'. The Study Area has similar themes to Galway City administrative boundary.

Table 5-7 Population Aged 15+ years by Principle Economic Status within Study Area (Source: CSO, 2022)

Employment Status	Study Area	% Total	Galway City	% Total
At Work	12,527	54%	39,618	55.5%
Looking for first regular job	242	1%	712	1%
Short-term unemployed	521	2%	1,447	2%
Long-term unemployed	609	3%	1,884	2.7%
Student	4,029	17%	11,433	16%
Looking after home / family	969	4%	3,327	4.8%
Retired	3,223	14%	9,486	13.3%
Unable to work due to permanent illness or disability	962	4%	2,978	4%
Other	251	1%	497	0.7%

The Study Area catchment area has a slightly smaller proportion of individuals classed as at work compared to Galway City. The proportion of those classed as 'retired' within the Study Area is slightly higher than the average for Galway City but lower than the State average (16.9%). While levels of unemployment are much the same across the geographical areas,

the share of students is much higher than the State average (11%). This reflects the proximity of the catchment area to the local university.

The nearest social welfare office to the Proposed Development which has figures available for the number of people on the Live Register / Unemployed is the Galway City Intreo Centre which covers the following areas: Galway City and Environs, Corrandulla, Clarenbridge, Inverin, Moycullen (areas nearer Galway), Oughterard, Roscahill, Spiddal, Turloughmore, Aran Islands, Ballinahown, Bealadangen, Carraroe, Cashla, Costello, Cuain Mhuire, Lettermore, Rosmuck, Rossaveal, Maam Cross (areas nearer Galway City).

The monthly unemployment release contains a series of monthly unemployment rates and volumes. These statistics are the definitive measure of monthly unemployment. The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit or Jobseekers Allowance or for various other statutory entitlements at local offices of the Department of Social Protection. At the time of carrying out this assessment, the most recent information available is from November 2024.

Table 5-8 Number of people on the live register in Galway City (CSO, 2024)

Month	No. of People	% Change
November 2023	4,327	-2.5%
December 2023	4,383	+1.3%
January 2024	4,484	+2.3%
February 2024	4,450	-0.8%
March 2024	4,408	-0.9%
April 2024	4,330	-1.8%
May 2024	4,288	-2.4%
June 2024	4,380	+2.1%
July 2024	4,560	+4.1
August 2024	4,500	-1.3%
September 2024	4,231	-6.0%

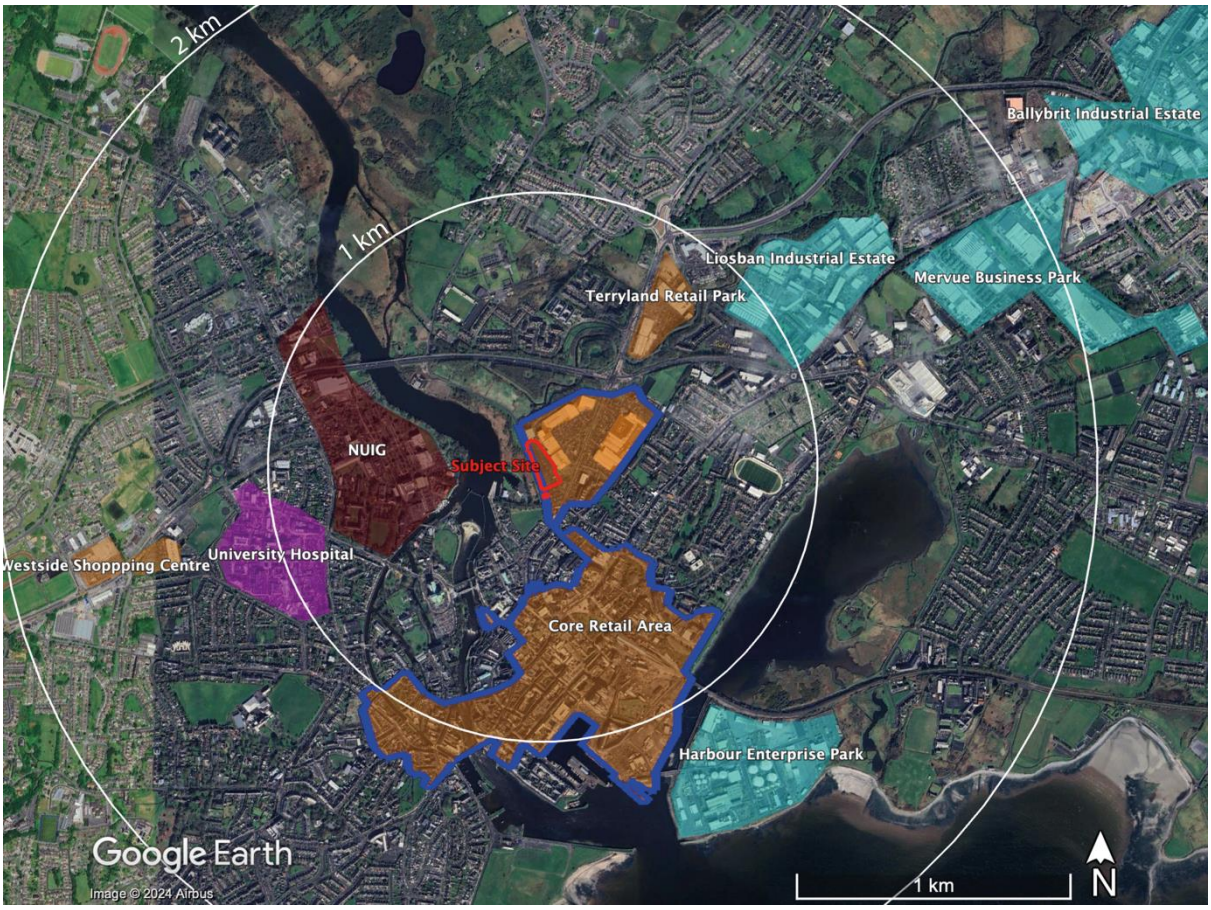
Month	No. of People	% Change
October 2024	4,126	-2.5%
November 2024	4,013	-2.7%
December 2024	4,135	+3.0%
January 2025	4,111	-0.6%
Total Change January 2024 – January 2025	-373	-8.3%

5.3.4.1 Employment Areas

There is a wide range of employment opportunities in various sectors within the Study Area and wider surrounding area including, but not limited to:

- Manufacturing Industries;
- Construction;
- Retail;
- ICT and Professional Services;
- Education; and
- Human Health.

Figure 5-5 Employment Areas in Study Area and wider surrounding area



Retail is Ireland's largest indigenous industry, employing almost 300,000 people and accounting for 23% of the State's tax revenue. It supports many more jobs throughout the supply chain and unlike many other sectors, retail jobs are evenly spread across every city, town and village in the country and are therefore key to contributing to the vibrancy and vitality and prosperity of settlements. Section 8 above, illustrated the large retail sector within Galway City and the immediate surrounding area. The city centre remains the focus of the main commercial activity and this is reflected by the large concentration of major retailers, the hospitality sector, and the strong presence of health, educational and general professional services within the city core area.

There is an emerging concentration of Foreign Direct Investment (FDI) groups and indigenous high tech office uses on regeneration lands in the centre. The city centre is also the recent location of a growing innovation district which hosts startups and incubator type enterprises. The main business and technology sector, including the clustering of the information and communications technology (ICT) and Med Tech and medical device manufacturers are located in the east of the city at the strategic employment sites in Ballybrit, Mervue, Parkmore and immediately outside of the city boundary towards Oranmore. The east side of the city also supports the main bulky goods, wholesale and motor trade activity and also the smaller manufacturing enterprises located at Liosbán and along and off the Tuam Road area. In addition, this side of the city supports significant employment at three strategic hospitals at Merlin Park, the Galway Clinic, and Bon Secours and also at ATU, a third level institution. The west of the city has a less dense employment environment than the east.

Close to the city centre there is a significant concentration of health services at UHG and educational institutions at University of Galway and a cluster of large secondary schools on the periphery of Salthill. In addition there is a concentration of tourist accommodation and hospitality services reflecting the proximity of the attractive seaside location at Salthill.

Galway City is a major centre for education with regional and national influence. The city has three third level institutions, University of Galway, Atlantic Technological University (ATU) and Galway Technology Institute (GTI). These are significant assets to the city in terms of employment, education provision and the contribution they make to research, innovation and the knowledge economy.

The Galway Roscommon Education and Training Board (GRETB) delivers a range of further education and training (FET) initiatives providing opportunities to acquire new skills to support career transition and progression. There is a student population of approximately 26,000 in the city which contributes to the city's vibrancy and innovation. The Regional Skills Forum West is actively progressing greater collaboration between skills development organisations and business groupings in the City so that the skillsets are in place amongst our labour force to meet future skillset needs of employers.

5.3.5 Travel Patterns

As detailed in Table 5-9, the time period that most people within the Study Area leave for work, school or college is 08:01-08:30 (18%) followed by 07:31-08:00 (13.1%) and 08:31-09:00 (12.8%). The busiest time period for commuting is 07:30-09:00 with a total of 44% of people departing home during this time period.

Table 5-9 Number of People Departing Home to Travel to Work, School or College (CSO, 2022)

Departure Time	No. of People	% Total
Before 06:30	740	4.5%
06:30 – 07:00	1,220	7.5%
07:01 – 07:30	1,026	6.3%
07:31 – 08:00	2,126	13.1%
08:01 – 08:30	2,923	18%
08:31 – 09:00	2,065	12.8%
09:01 – 09:30	507	3.1%
After 09:30	2,369	14.7%

Departure Time	No. of People	% Total
Not Stated	3,155	20%

As detailed in Table 5-10, the most utilised means of transport to travel to work, school or college is via sustainable transport modes on foot, bicycle, bus, minibus or coach or train equating to 43.3% of people within the Study Area. This is significantly higher than the State average of 26.64% for the same transport methods. Travelling by car either as a driver or passenger equates to 31.5%. This is significantly lower than the State average of 53.8%.

Table 5-10 Means of Travel to Work, School or College (CSO, 2022)

Means of Travel	No. of People	% Total
On foot	5,379	30%
Bicycle	911	5%
Bus, minibus or coach	1,452	8%
Train, DART or LUAS	59	0.3%
Motorcycle / Scooter	49	0.3%
Car Driver	4,004	22.5%
Car Passenger	1,551	9%
Van	276	1.5%
Other (incl. lorry)	28	0.1%
Work mainly from home	1,295	7.3%
Not Stated	2,822	16%

Table 5-11 shows that the majority of people travel 30 minutes or less to work, school or college (62.4%) or 75% people travel 45 minutes or less, indicating that most people live and go to work, school or college within a 45-minute travel radius.

Table 5-11 Journey Time to Travel to Work, School or College (CSO, 2022)

Journey Time	No. of People	% Total
Under 15 mins	4,409	27.3%
15 mins – 29 mins	5,678	35.1%
30 mins – 44 mins	2,022	12.5%
45 mins – 59 mins	407	2.5%
1 hour – 1 hour 29 mins	345	2.1%
1 hour 30 mins +	131	0.8%
Not Stated	3,195	19.8%

5.3.6 Human Health

Health, as defined by the World Health Organization (WHO), is "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." The Healthy Ireland Framework 2019-2025 builds on this definition, describing health as "everyone achieving his or her potential to enjoy complete physical, mental, and social well-being." This framework emphasises that health goes beyond the mere absence of disease or disability, highlighting that individual health, as well as the health of a State, significantly impacts the quality of life for everyone.

Health is a fundamental resource for everyday life, a public good, and an asset for human development. A healthy population is a critical asset for society, contributing positively to the social, economic, and environmental fabric of the community. Recognising this, the Healthy Ireland Framework 2019-2025 outlines a comprehensive strategy to address the challenges to Ireland's future health and well-being. The framework underscores the importance of collective efforts to enhance the health and quality of life of the population, making it a priority for the government to ensure that policies and initiatives are directed towards achieving this goal.

Table 5-12 shows that 73.3% of people within the Study Area have self-identified themselves as having ‘very good’ or ‘good’ health.

Table 5-12 General Health of Population (CSO, 2022)

General Health	No. of People	% Total
Very Good	11,195	43.3%
Good	7,768	30%
Fair	2,419	9.3%
Bad	405	1.5%
Very Bad	78	0.3%
Not Stated	4,049	15.6%

5.3.7 Social Health

According to the WHO, poor social and economic circumstances affect health throughout life. Good health involves reducing educational failure, insecurity, unemployment, and improving housing standards. Health is influenced by a variety of factors, some of which are genetic or biological and relatively fixed. 'Social determinants of health' arise from the social and economic conditions in which people live. Unlike genetic factors, these determinants, such as housing quality, access to health and education services, income levels, and employment types, can significantly influence a person's health and lifestyle choices.

A range of factors have been identified as social determinants of health. These include the broader socio-economic context, inequality, poverty, social exclusion, socioeconomic status, income, public policies, health services, employment, education, housing, transport, the built environment, health behaviours, social and community support networks, and stress.

Individuals who are less well-off or belong to socially excluded groups tend to experience adverse effects related to these social determinants. Conversely, being employed not only provides income but also access to social networks, a sense of identity, and opportunities for personal development and career progression.

Section 5.3.4 of this chapter states that 61.2% of people in the Study Area are in the labour force. This reflects the high number of people of a working profile living within the area which is expected due to the percent of people of a working age living in the area.

The Proposed Development will allow for the creation of new employment. It is proposed an approximately 80-120 no. jobs will be created during the construction phase and 10-20 no. jobs will be created during the Operational Phase of this development having both a direct and indirect positive impact on the local economy and employment.

5.3.7.1 Social Infrastructure

The Study Area has a wide range of social and community infrastructure facilities.

The categories of social infrastructure were considered for this Chapter take into account the guidance provided in the respective national and regional planning guidance as follows:

- **Further Education** – Colleges, Institutions, Further/Adult Education Centres, Culinary Schools, & Skills Schools.
- **Community Facilities** - Youth Clubs, Libraries & Hobby Clubs.
- **Parks** - Public Parks, River Walks / Canals, Beaches & Urban Squares.
- **Sports Clubs** – Gyms, Outdoor Clubs, Indoor Clubs & Sports Centres.
- **Health Care** – GP Practices, Medical Centres, Hospitals, Mental Health Facilities, Dental Clinics and Veterinary Care.
- **Religion** – Places of Worship.
- **Elderly** – Nursing Homes.
- **Emergency Services** – Garda Stations, Fire Stations & Emergency Health Facilities.

Further Education

Table 5-13 Further Education Facilities in Study Area

Further Education Facilities		Distance from Subject Site
1)	University of Galway	600m
2)	Centre for Adult Learning and Professional Development	750m

Community Facilities

Table 5-14 Community Facilities in Study Area

Community Centres		Distance from Subject Site
1)	Galway City Partnership	100 m
2)	Bohermore Community Centre	500 m
Libraries		**Distance from Subject Site**
3)	James Hardiman Library, University of Galway	650 m
4)	Galway City Library	810 m
Youth Clubs		**Distance from Subject Site**
5)	Youth Work Ireland Galway	350 m
6)	Bohermore Community Centre	500 m
7)	Foroige Office Galway	750 m
8)	Galway Youth Theatre	950 m

Sports Clubs / Leisure Centres / Hobbies

Table 5-15 Sports Clubs / Leisure Centres / Hobby Uses in Study Area

Gyms		Distance from Subject Site
1)	Planet Health & Fitness Club	200 m
2)	POWER Gym Galway	360 m
3)	Snap Fitness Galway	400 m
4)	Black Dragon Kickboxing Gym	650 m
5)	NRG Health & Fitness	730 m
6)	Energize Fitness & Leisure	730 m
7)	Kingfisher Club, University of Galway	800 m
8)	Goals Gym Galway	800 m
Outdoor Clubs		**Distance from Subject Site**
9)	The Galway Rowing Club	260 m
10)	Galway Hibernians Soccer Club	500 m
11)	Galway United Football Club	660 m
12)	Galway Volleyball Club	690 m
13)	Connacht Rugby	760 m
Indoor Clubs / Leisure Activities		**Distance from Subject Site**
14)	Genevieve Ryan Dance Academy	100 m
15)	IMC Cinema Galway	220 m
16)	Salsa Bay Galway	250 m
17)	Galway Latin Dance	300 m
18)	Chen Tai Chi Ireland	300 m
19)	Town Hall Theatre	350 m
20)	Planet Entertainment Centre	350 m
21)	Galway Dance Centre	860 m

22)	Aniar Restaurant & Boutique Cookery School	950 m
23)	Eshu Music	1 km

Public Parks

Table 5-16 Public Parks in Study Area

Parks		Distance from Subject Site
1)	Water's Edge Garden	290 m
2)	Eyre Square	500 m
3)	College Park	630 m
4)	Millennium Park	700 m
5)	Home Town Park	750 m
6)	Lough Atalia Walkway	850 m
7)	Loyola Park	1 km
8)	Terryland Forest Park	1.1 km
9)	The City Green	1.1 km

Healthcare

Table 5-17 Healthcare Facilities in Study Area

Medical Centre		Distance from Subject Site
1)	Prospect Health Centre	300 m
2)	Headford Road Medical Clinic	610 m
3)	Whitehall Medical Centre	690 m
4)	Galway Bay Medical Centre	780 m
5)	Hazel Medical Centre	830 m
6)	Carepoint Medical Centre	830 m
7)	Doctor365 Galway	840 m
8)	Newcastle Medical Centre	870 m
9)	Corrib Medical Centre	880 m

10)	The Heights Medical Centre	960 m
11)	University Hospital Galway	1 km
12)	Shantalla Health Centre	1.1 km
Dental Clinics		**Distance from Subject Site**
1)	Quay Dental	190 m
2)	Forster Court Dental Clinic	400 m
3)	RDent	550 m
4)	Eyre Square Dental Clinic	750 m
5)	Smiles Dental Galway	850 m
6)	Gate Clinic	900 m
7)	Dental Options Galway	1 km
8)	Galway Dental Group	1 km
9)	Cross Street Dental	1 km

Religious Facilities

Table 5-18 Religious Institutions in Study Area

Religious Facilities		Distance from Subject Site
1)	Franciscan Church	430 m
2)	Parish of Saint Patrick	500 m
3)	Living Hope Church	570 m
4)	Galway Cathedral	570 m
5)	Saint Nicholas Collegiate Church	705 m
6)	United Church Galway	710 m
7)	St. Augustine's Catholic Parish	76 0m
8)	Covenant Christian Fellowship	860 m
9)	St. Joseph's Catholic Church	870 m
10)	St. Mary's Catholic Church	1.1 km

Elderly Care

Table 5-19 Elderly Care Facilities in Study Area

Elderly Care		Distance from Subject Site
1)	St. Francis Day Care & Primary Care Centre	1.1 km
2)	St. Mary's Nursing Home	1.3 km

Emergency Services

Table 5-20 Emergency Services in Study Area and immediate surrounding are

Emergency Services		Distance from Subject Site
1)	Mill Street Garda Station	1 km
2)	Emergency Department – University Hospital Galway	1.2 km
3)	Galway City Fire Station	1.3 km

It is clear from the above Tables 5-13 – 5-20 and Figure 5-6 below that the subject site is proximate to a large amount of various facilities, amenities and services. In addition to the above, there are many restaurants, public houses and coffee shops within the town centre and surrounding area that provides a diverse selection of places for residents to eat and drink. Post office, credit unions and banks are all vital aspects of social infrastructure and there are many options for such services in the immediate vicinity of the site.

Figure 5-6 Community Infrastructure Facilities in Study Area

5.3.8 Landscape and Visual

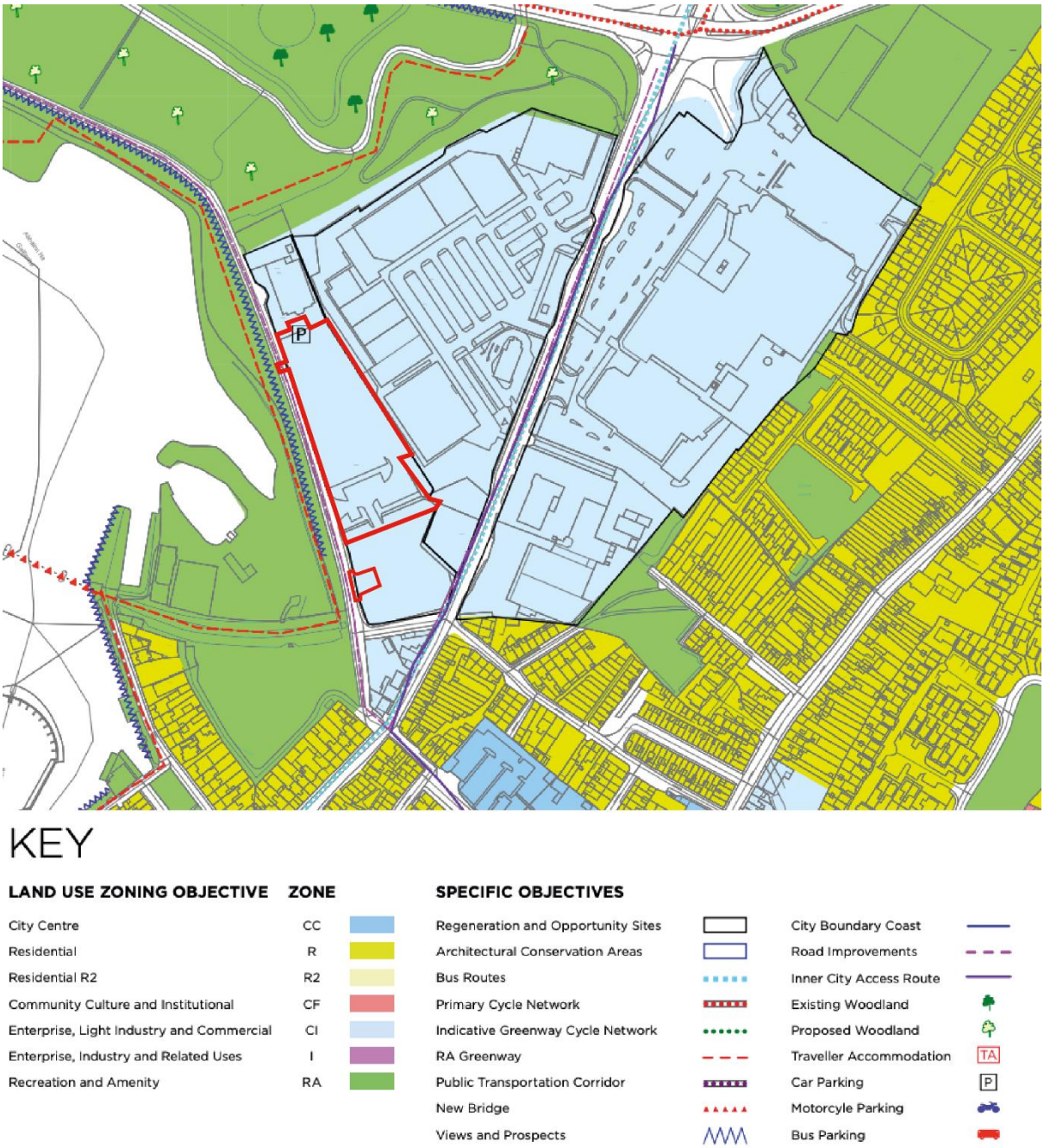
The subject site is located within the Galway City Core Retail Area and is proximate to a variety of land uses, services, amenities and public transport nodes.

The site sits on the eastern bank of the River Corrib and addresses Dyke Road to the west, the existing Dyke Road Car Park to the south and the R866, also known as Headford Road, further southeast. The site borders retail and commercial developments of Galway Retail Park to the east, and the Black Box Theatre to the north. Terryland Forest Park is located further north.

The subject site itself comprises a surface car park of approx. 377 no. car parking spaces. The Dyke Road Car Park (Phase 2 site) to the south of the site contains approx. 177 no. car parking spaces.

5.3.8.1 Zoning

Figure 5-7 Extract Zoning Map (Source: Galway City Development Plan 2023-2029)



The subject site is zoned ***"Enterprise, Light Industry and Commercial"*** **(CI).**

The 'CI' zoning objective sets out the following:

> *"To provide for enterprise, light industry and commercial uses other than those reserved to the CC Zone".*

Uses which are compatible with and contribute to the zoning objective include:

> *'Warehousing / Storage, Retail of a type and of a scale appropriate to the function and character of the area, Specialist offices, Offices of a type and of a scale appropriate to the function and character of the area, Light Industry, Accommodation for the Traveller*

Community, Childcare facilities, Community and cultural facilities, ***Allow for the development of Regeneration and Opportunity Sites in accordance with the provisions of Chapter 10 and Policy 10.2 Strategic Regeneration and Opportunity Sites, particularly where it is identified to provide for mixed use development which includes for residential.'***

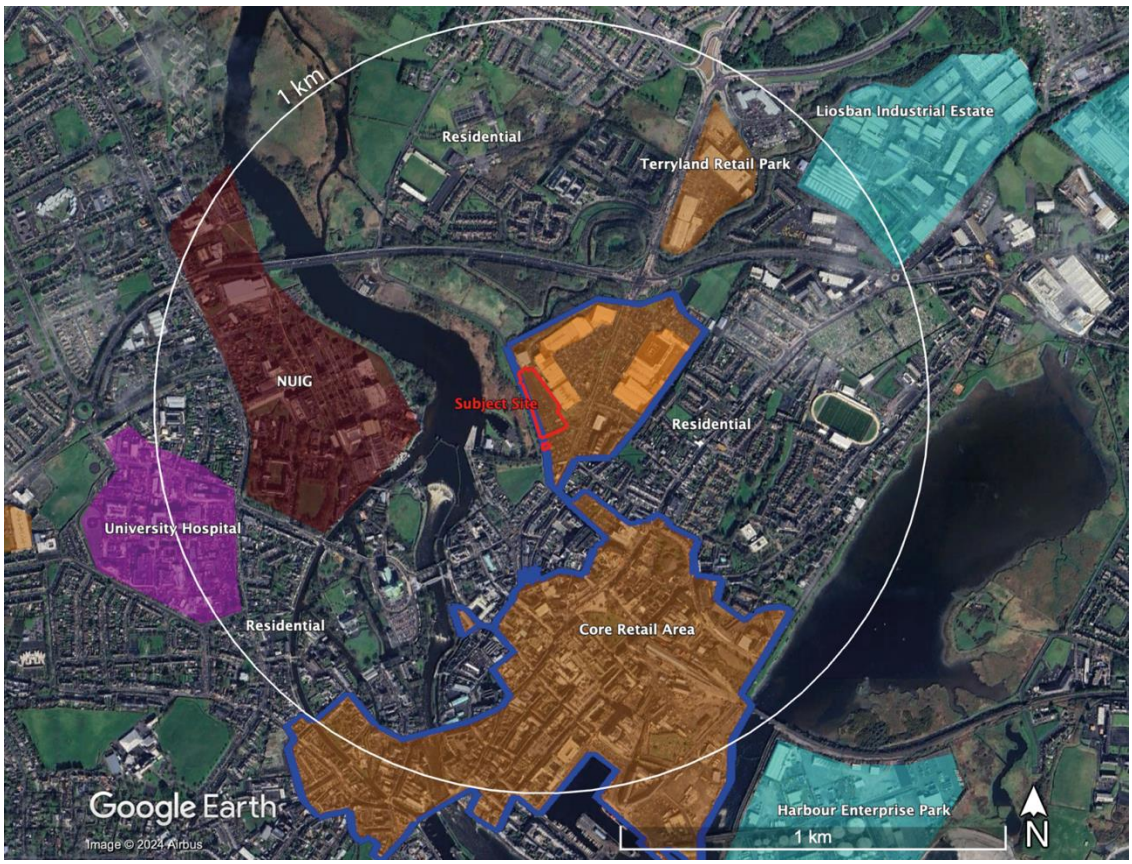
Uses which may contribute to the zoning's objectives, dependent on the CI location and scale of development for example:

'General industry (small scale), Service retailing, ***residential content of a scale that would not unduly interfere with the primary use of the land for CI purposes and would accord with the principles of sustainable neighbourhoods outlined in Chapter 3. Exceptions can be accommodated on publicly owned lands on the Regeneration Sites at Headford Road and Sandy Road which can provided predominantly residential uses in accordance with national housing policy****., Offices, Car Parks (including heavy vehicle parks), Waste management facility, Public transportation facility, Public utilities.'*

5.3.8.2 Surrounding Land Uses

Regarding surrounding land uses in the Study Area, it is clear from the below context map that the Study Area contains a variety of a mix of uses from residential, retail, commercial, recreational, industrial, educational to medical uses.

Figure 5-8 Extract Zoning Map (Source: Galway City Development Plan 2023-2029)



Overall, the Study Area's diverse land use composition creates a dynamic and integrated environment that supports a wide range of activities and services. This diversity not only

enhances the quality of life for residents but also contributes to the economic and social vitality of the area.

5.3.8.3 Sensitive Receptors

Sensitive receptors are elements of the environment that are particularly vulnerable to the impacts of development activities. In the context of the proposed Residential Development, several sensitive receptors have been identified, including residential areas, educational institutions, healthcare facilities, recreational spaces, and natural habitats. A key environmental feature that warrants special attention is the River Corrib.

Residential Areas

The surrounding residential areas are sensitive to changes in the environment that could result from construction and operational activities. Potential impacts include noise pollution, increased traffic, and air quality degradation.

Educational Institutions

Nearby schools and colleges are sensitive to disruptions that could affect students and staff. Construction noise, dust, and traffic can interfere with the learning environment.

Healthcare Facilities

Proximity to healthcare facilities such as hospitals and clinics means that any adverse impacts on air quality, noise levels, and traffic congestion could affect both patients and healthcare workers.

Retail Facilities

Retail areas within the Study Area include shops, supermarkets, restaurants, and other commercial businesses that cater to the daily needs of residents and visitors. These establishments are sensitive to:

- Customer Accessibility: Increased traffic congestion and construction activities can make it difficult for customers to access these businesses, potentially reducing their footfall and revenue.
- Supply Chain Disruptions: Construction activities can interfere with the delivery of goods and services, impacting the operational efficiency of retail businesses.
- Noise and Air Quality: Construction noise and dust can create an unpleasant shopping environment, discouraging customers from visiting and impacting the overall shopping experience.

Industrial Areas

The Study Area includes various industrial uses such as manufacturing plants, warehouses, and distribution centres. These areas are sensitive to:

- Operational Disruptions: Construction activities can interfere with industrial operations, particularly if there are road closures or restricted access to sites.

- Environmental Compliance: Industrial sites often have strict environmental compliance requirements. Increased dust, noise, or water pollution from nearby construction activities could lead to regulatory challenges and potential fines.
- Worker Health and Safety: Industrial workers' health and safety could be compromised by increased pollution levels, construction noise, and traffic hazards.

Recreational Spaces

Parks, sports fields, and other recreational areas are sensitive to environmental changes that could reduce their usability or enjoyment. This includes increased noise and reduced air quality.

Natural Habitats

The River Corrib, a significant natural feature in the vicinity of the Proposed Development, is particularly sensitive. It supports diverse ecosystems and provides critical habitat for various species, including fish, birds, and aquatic plants. The river's health is vital for maintaining biodiversity and ecological balance in the region.

5.3.9 Summary of Receptors and Sensitivity

Table 5-21 below provides a summary of the current sensitivity of each receptor.

Table 5-21 Summary of Receptor Sensitivity

Receptor	Description	Sensitivity
Population demographics of the Study Area and local community	Construction and operational activities will result in an increased number of people travelling to and from the Site. Some of the employees may already reside in the area and some will be required to travel to and from the Site. The baseline population demographics show the Study Area has a balanced population with age categories broadly reflecting those of the county and state.	Low
Housing	The housing stock in the area is diverse, including a mix of single-family homes, apartments, and townhouses, with a generally high occupancy rate.	Medium
Local Economy	The number of people at work in the Study Area is higher than the state average and the number of retired people is lower than the state average indicating a high number of people in the workforce. The number of people who are short term and long term unemployed are in line with those for the county and state. Adults in full-time education is higher than the state average.	Medium
Local road network	An increase in the number of employees travelling to and from the Site can affect the capacity of the local road network to support these additional journeys.	Low

Receptor	Description	Sensitivity
Local population (water quality)	Safe, clean drinking water is essential for population and human health.	Medium
Local population (noise and vibration)	Noise exposure can cause a variety of human health effects including annoyance, sleep disturbance, raised stress levels, work impacts for commercial receptors or individuals who work from home.	Medium
Local population (air quality)	Air quality can significantly impact health, particularly for vulnerable groups such as children, the elderly, and those with pre-existing health conditions.	Medium
Local population (visual impact)	The visual landscape of the area includes a mix of residential, commercial, and natural features, contributing to the overall aesthetic appeal and quality of life.	Medium
Local amenities	Amenities including tourism sites and community infrastructure contribute to a sense of community and the social health of the surrounding population.	Medium

5.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

The Proposed Development consists of the construction of 219 no. residential apartment units (109 no. 1-bedrooms units, 22 no. 2-bedroom (3 person) units, 78 no. 2-bedroom (4 person) units and 10 no. 3-bedroom units) with associated residential and public open spaces. A childcare facility (approx. 241 sqm) with dedicated external play area (approx. 61 sqm) is proposed at ground floor level. The development will also provide for all associated ancillary site development infrastructure and works.

5.5 Potential Impact of the Proposed Development

This section provides a description of the potential direct and indirect impacts that may arise in both the construction and operational phases of the Proposed Development. As stated, guidance documents from the European Commission, EPA and the Department of Health and Department of Housing, Local Government and Heritage outline that the assessment of impacts on population and human health should focus on health issues and environmental hazards arising from the other environmental factors, and does not require a wider consideration of human health effects which do not relate to the factors identified in the EIA Directive.

In relation to the extent of the impact of the Proposed Development during the construction phase, the vast majority of impacts are local and are acceptable in terms of the magnitude of impact and are temporary, as they will last only for the period of construction.

The potential impacts arising during the construction phase will be addressed by the effective implementation measures set out in the application documentation, including in the CEMP.

Due to the size of the Proposed Development, the overall construction phase of the development will last approx. 24 months from the date of commencement.

5.5.1 Construction Phase

5.5.1.1 Population Demographics

During the construction phase of the development, there will be a neutral impact on the population trends and profile for the area. Since no additional persons will be housed on-site during construction, the overall population size and demographic characteristics will remain unchanged. Construction workers will likely commute to the site daily and will not reside within the subject site. As a result, the construction activities will not contribute to any long-term population increase or demographic shift. The sensitivity of the receptor has been identified as low. The magnitude of the impact is low. Based on the mobile nature of construction and the baseline population assessment, the likely effect on population demographics as a result of the Proposed Development will be neutral, short term and imperceptible.

5.5.1.2 Housing

The construction phase of the development is not anticipated to provide any impact on the quantum of or access to housing in the area. The residential amenity of the area will be unavoidably affected during the construction phase due to the works taking place. This impact is not considered to be significant however. The sensitivity of the receptor has been identified as medium. The magnitude of the impact is expected to be low, given the temporary nature of the construction activities (approx. 24 months) and the implementation of mitigation measures to minimize disruption. Therefore, the overall significance of the impact on housing and residential amenity during the construction phase is assessed as direct, short term and slight.

5.5.1.3 Socio-Economic

The construction phase of the Proposed Development, spanning approximately 24 months, will generate substantial employment opportunities across the various construction stages of the project. It is estimated that approximately between 80-120 construction workers will be required, and it is anticipated that many of these construction workers will be recruited from the greater Galway Region. This localised hiring approach will not only provide direct employment but also stimulate the local economy through the multiplier effect.

The multiplier effect arising from these additional construction jobs will also lead to an increase in employment in local businesses providing services to construction workers. As a result, the project will have a positive impact on employment numbers in the area during the construction phase.

The sensitivity of the receptor in the Study Area has been identified as medium. The magnitude of the impact is low. Based on the mobile nature of construction and the baseline assessment of economic activity, the likely effect on the economy on a local scale will be both direct and indirect, slight, short term and positive.

5.5.1.4 Human Health

5.5.1.4.1 Air Quality

Nuisance dust emissions from construction activities, including traffic, are a common and well recognised problem which can negatively impact air quality. Fine particles from these sources are recognised as a potential significant cause of pollution and can be damaging to the health of the surrounding population during the construction phase.

Potential impacts are expected to be short-term and of a temporary nature and last for the duration of the construction phase (approx. 24 months). The greatest potential impact on air quality during this phase is from construction dust emissions and the potential for nuisance dust. Construction vehicles and machinery during the construction phase will also temporarily and intermittently generate exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur oxides, and particulate matter (dust).

Chapter 10 of this EIAR, Air Quality, has identified sensitive receptors in relation to air quality. The are two high sensitive receptors within 20 m of the site boundary identified as the Black Box Theatre and the car park area adjacent to the south. The closest residential receptors are approximately 130 m southeast of the site boundary. There is commercial, retail and offices located east of the site and walking track west of the site approximately 20 m from the site boundary. Therefore, the sensitivity of the area has been established as medium.

Chapter 10 states that the sensitivity of the area to human health impacts is low, in terms of potential demolition, earthworks, constructions and trackout dust impacts.

The likely effect of air quality on human health during the construction stage will be slight, short term and not significant.

5.5.1.4.2 Noise and Vibration

Noise exposure can cause a variety of human health effects including annoyance, sleep disturbance, raised stress levels, work impacts for commercial receptors or individuals who work from home.

Noise generating activities associated with the construction phase have been identified in Chapter 9 Noise and Vibrations of this EIAR and include vehicular traffic as well as noise from the operation of fixed or mobile machinery onsite as well as site clearance works such as demolition, excavations, foundation works and spoil movements.

In terms of noise-generating activities associated with the construction phase, a worst case assessment of construction noise from the Proposed Development indicates that there will be no exceedance of the daytime construction noise limit of 65dB $L_{Aeq,T}$ at the noise sensitive receptors in the area. It will be incumbent on the contractor to ensure that construction works are undertaken with particular sensitivity to ensure no significant construction noise impact. All construction works will take place during daytime hours and so the relative construction noise impact will be slight, not significant and short-term.

During the construction phase all operations will comply with the BS5228:2009+A1:2014 “Noise and Vibration Control on Construction and Open Sites”. Chapter 9 considers that the likely levels of vibration from the Proposed Development is expected to be significantly below the vibration criteria for building damaged based on experience from other similar sites.

5.5.1.4.3 Water

Provision and management of safe and secure drinking water not only supports public health and well-being but promotes socio-economic development (Health Service Executive, 2023). Sources of contamination that could impact on water quality arising from the construction of the Proposed Development have been identified in Chapter 8 of this EIAR, Hydrology.

During the construction phase of the Proposed Development, there is a potential risk of runoff with contaminants migrating offsite via existing surface water drainage within the site. It is considered that this could result in 'negative', 'moderate' and 'medium-term' impact to water quality of the Terryland Stream, the Corrib River and downstream waterbodies. Appropriate controls will be in place to prevent this unlikely scenario.

During a flood event there is the potential for pollutants derived from construction materials to be mobilised by flood waters. Overall, flood events during the construction phase have the potential to have 'negative', 'temporary', 'moderate' – 'significant' effects on hydrological receptors.

Based on the implementation of the mitigation measures outlined in Chapter 8 Hydrology the likely effect on water quality and subsequently human health will be imperceptible and short-term during the construction phase.

5.5.1.4.4 Traffic and Transport

There is potential for construction traffic to impact the surrounding population and human health by causing congestion on the local road network. Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff;
- Excavation plant, dumper trucks involved in site development works and materials delivery vehicles; and
- Mobile crane for lifting of prefabricated units.

Chapter 14, Traffic and Transport of this EIAR has assessed the baseline road network and confirms that the dominant construction traffic route will be via the N6 / Headford Road to Dyke Road. The construction traffic volumes are not considered to be excessive and will be spread out over the duration of the construction phase. Excavated material and imported fill material will be spaced over an approximate 120 day period at the start of the construction phase resulting in a maximum of 10-20 HGV's per day during the busiest construction period. As the construction works are proposed to be carried out off-line and due to the designated access points which allows delivery vehicles to pull off into the site, there will be no significant disruption to the traffic flows on the Dyke Road as a result of the construction of the development. It is not envisaged that any diversions will be required.

There will be a neutral short-term slight impact to local traffic during the construction phase.

5.5.1.4.5 Landscape and Visual

The landscape and visual amenity of an area can affect the emotional and physiological health of those within it. As outlined in Chapter 12 of this EIAR, landscape impacts during construction will be negligible due to the low value of the existing landscape of a car park. The

low character value of the landscape means that there will be no impact to the quality of the landscape due to construction activities.

Townscape and visual effects and their significance during construction works will be short term in duration. They will be highest within the immediate vicinity of the site. The users which are nearest to the development and have direct views will experience profound short term visual impact during construction due to the very high level of change in the environment and their proximity.

The significance on human health is considered temporary, slight-moderate. There will be no likely significant negative effects on human health.

5.5.1.5 Land Use

Removal of the existing car park on site and the replacement with an architecturally designed, high-quality residential building together with open space and enhanced permeability will have a likely significant permanent positive effect on the local townscape.

The Proposed Development complies with the statutory land-use zoning and objective for the site. The development of the subject site is in accordance with the objective to achieve compact growth contained with the National Planning Framework and will realise the efficient use of currently under-utillised brownfield land and higher housing density that is well served by public transport. There will be no severance of land, loss of rights of way or amenities as a result of the Proposed Development.

In light of national, regional and local policy it is likely that that the impact of this development would have a significant, long-term positive effect that will achieve local and wider county, regional and national objectives.

5.5.1.6 Social Infrastructure

Since no additional persons will be housed on-site during construction, the overall population size and demographic characteristics will remain unchanged and it is not envisaged that there will be any requirements for social infrastructure during the construction stage. The likely effect of social infrastructure on population and human health will be indirect, short term and imperceptible.

5.5.2 Operational Phase

5.5.2.1 Population Demographics

The Proposed Development will consist of 219 no. residential units/households. Using the local average household size indicators from Census 2022 for the Study Area (2.49), this is predicted to result in providing accommodation for approximately 545.31 no. persons. Using the average household figures for the Galway City (2.62), this may result in a projected population of approximately 573.78 no persons. Either figure will result in a sizeable addition to the surrounding area. This is considered a significant and positive, long-term effect particularly in the context of current housing demand, while also taking account of the location's access to places of employment.

5.5.2.2 Housing

The Proposed Development will result in the addition of 219 no. units to the supply of housing to the Study Area. These will be a mixture of 1, 2 and 3 bedroom residential units.

This is considered to be a significant and positive, long-term effect. The addition of these proposed units will contribute to the housing unit target outlined in the *Galway City Development Plan 2023-2029*, which states that a minimum requirement of approximately 4,425 no. new housing units are required in the city over the plan period up to the end of 2028 as per the Core Strategy Chapter of the Development Plan. This equates to an average requirement of approximately 738 no. new residential units per annum to 2028.

5.5.2.3 Socio-Economic

The Proposed Development will provide housing for a potential number of approximately 546 no. persons, when using average household figures for the Study Area. Given the multitude of large employment centres within close proximity to the site, the existence of significant transport infrastructure providing access to other centres it is likely that future residents of the scheme would work within close proximity to nearby employment centres. The multiplier effect arising from these additional residents using local services and purchasing goods at local businesses will also lead to an increase in employment in those businesses, which meet this demand.

The Proposed Development itself will employ between 10-20 no. staff for the management of the residential scheme and staff for the childcare facility (approx. 241 sqm).

The overall effect on employment is direct and indirect, moderately positive and medium to long term effects.

5.5.2.4 Human Health

5.5.2.4.1 Air Quality

During the operational phase, the Proposed Development may lead to minor changes in local air quality due to potential traffic and activities associated with the development. Chapter 10 of this EIAR indicates that there will be a negligible impact on air quality in the vicinity of the development due to associated traffic flows of the Proposed Development. Existing residents in the area and future development residents will not experience significant air quality impact. Therefore, the overall effect of the Proposed Development on human health is neutral, imperceptible and long-term.

5.5.2.4.2 Noise and Vibration

As there will be no significant increase in the number of cars on the surrounding road network, entering and exiting the site, there will be a negligible change in traffic noise levels from moving cars and vehicles in comparison to the existing scenario.

Chapter 9 identifies that the occupants of the residential development will not be a significant source of noise in terms of the existing noise climate in the area. It is not envisaged that there will be any impact due to noise break-out from the proposed residential spaces of the development.

The building services plant items required to serve the Proposed Development will be designed and suitably located so that there is no negative impact on sensitive receivers within the development itself or on nearby sensitive receptors.

Therefore, the overall effect of operational noise and vibration on human health is neutral, not significant and long-term.

5.5.2.4.3 Water

During the operational phase of the Proposed Development, there is limited potential for discharge of any contaminated runoff to the receiving water courses. Furthermore, the proposed attenuation design does not allow for infiltration due to poor ground conditions, a high-water table and the potential presence of karst features beneath the site. The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase. It is considered that the likely impact on the water quality from surface water runoff will be 'positive', 'imperceptible' – 'slight' and 'permanent'.

When in operation in a future climate scenario, all proposed structures have been designed to minimise risk from flooding to an appropriate standard and appropriate mitigation measures have been proposed in the design as a result of the accompanying Strategic Flood Risk Assessment. As such, the risk of contamination of surface waters exacerbated during a future climate scenario flood event is considered low. Likely impacts to flood risk as a result of the Proposed Development are 'negative', 'imperceptible' – 'slight 'and 'permanent'.

5.5.2.4.4 Traffic and Transport

The increase in population and commercial activities associated with the Proposed Development will likely result in a minor increase in traffic volumes. The operational phase of the Proposed Development will have 33 no. car parking spaces and will therefore not generate high levels of vehicular traffic in the area. The removal of the existing public car park as part of the Proposed Development will also reduce the number of existing cars accessing the subject site by an estimated 38%. Overall, at operational phase, there is likely to be a long-term positive impact on the surrounding road network as a result of the Proposed Development.

5.5.2.4.5 Landscape and Visual

The character of the impact of changes to the visual environment on human health (positive, negative or neutral) will depend on subjective opinion of members of the public, and on the general contribution of the development to the built environment. The character of a visual effects, and even the duration of a visual effect, is very dependent on the attitude of the viewer. However, objectively, the visual impact of the Proposed Development is predicted to be significant, positive and permanent due to the regeneration of the existing car park into a vibrant, high-quality architectural space. The design includes modern, aesthetically pleasing architecture, complemented by landscaping and public open spaces, which will enhance the visual appeal and functionality of the area. This transformation will not only improve the aesthetic value of the site but also contribute positively to the overall urban environment, providing lasting benefits to the community.

5.5.2.5 Land Use

The Proposed Development will deliver 219 no. residential units of which 22 no. will be for the purposes of Part V, social housing and the remainder will be provided under the cost-rental model.

In light of the existing housing crisis, it is considered that a high-density development at this location would result in a likely significant positive long-term impact as it would realise the objective of compact urban growth through the efficient and effective use of zoned and Council landbank to provide much needed housing for future populations.

5.5.2.6 Social Infrastructure

It has been established in Section 5.3.2 that 12% of the existing population in the Study Area is of the average school going age (5-19 years of age). This equates to c. 66 persons of the c. 546 person population envisioned for the site.

It is submitted that this demand can be absorbed by the current schools capacity of the area and no further educational provision will be required in the context of this proposal. This assessment has been carried out in the accompanying Social, Community and Cultural Infrastructure Audit prepared by Brock McClure Planning & Development Consultants as part of the application documents.

Section 5.3.2 of the Social and Community Infrastructure Audit also established that 3.5% of the Study Areas population are persons aged between 0-4 years that may likely require childcare services. This equates to c. 20 no. persons of the c. 546 person population envisioned for the site. The Proposed Development provides a childcare facility to cater for this potential requirement and therefore is not envisaged to affect the existing facilities in the area in terms of capacity.

It is apparent from a review of community and social facilities, that there is appropriate provision within the surrounding area to serve the development now proposed and the future population.

The Proposed Development will provide a well-designed area of public open space and has the potential to serve a variety of potential end users, be it passers-by along Dyke Road or future inhabitants of the Proposed Development. A total of 1,183 sqm is proposed as Public Open Space located to the west of the site, along the Dyke Road, and envisioned as a linear park. This public open space is designed to serve as an inviting and inclusive space, accessible to both residents and the broader public. The park will be equipped with several seating areas, strategically placed throughout the space to encourage relaxation, socialisation, and enjoyment of the surrounding landscape. In addition to traditional seating, the park will feature natural play. These play spaces will incorporate elements of nature, such as logs, boulders, and other tactile materials, which encourage imaginative, free-form play. This will be a welcome addition in terms of public open space and recreation requirements.

5.5.3 Summary of effects

Table 5-22 Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Increased population in the form of construction phase employees	Study Area and Galway City	Approx. 80-120 no. staff will be employed for the 24-month construction phase. This will not lead to a permanent increase in population for the area.	Neutral	Imperceptible	Short term	Direct	N/A	Imperceptible
Construction Employment	Study area and Galway City	Approx 80-120 no. staff will be employed for the 24-month construction phase.	Positive	Slight	Short term	Direct and Indirect	N/A	Imperceptible
Construction Activities	The closest residential property is located 130 m from the subject site	Air quality impacts	Negative	Slight	Short term	Direct	Mitigation Measures proposed Chapter 10	Not Significant
Construction Activities	Noise sensitive receptors	Noise impacts	Negative	Slight	Short term	Direct	Mitigation Measures proposed Chapter 9	Not Significant
Construction Activities	Local community	Water Quality	Negative	Slight	Temporary	Direct / Worst Case	Mitigation Measures proposed Chapter 8	Imperceptible
Construction Activities	Local community	Flood Risk	Negative	Significant	Medium term	Direct / Worst Case	Mitigation Measures	Imperceptible

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
							proposed Chapter 8	
Construction Activities	Headford Road and Dyke Road	Increased no. of HGV vehicles causing congestion	Neutral	Slight	Short term	Direct	Mitigation Measures proposed Chapter 13	Imperceptible
Construction Activities	Local Community	Visibility of construction vehicles, cranes	Negative	Slight	Short-term	Direct	N/A	Not Significant
Operational Phase								
Increased population from the operational phase	Study Area and Galway City	An increase in population by up to approx. 574 no. people	Positive	Significant	Medium to long-term	Direct	N/A	Not Significant
Operational Phase employment	Study area and Galway City	Approx. 10-20 no. staff will be employed.	Positive	Slight	Medium to long-term	Direct and Indirect	N/A	Slight
Operational phase related air quality	The closest residential property is located 130 m from the subject site	Air quality impacts from operational traffic and activities.	Neutral	Imperceptible	Long term	Direct	Mitigation Measures proposed Chapter 10	Imperceptible
Operational Phase related traffic	Noise sensitive receptors	Noise impacts of operational traffic, residents and plant	Neutral	Not Significant	Long term	Direct	Mitigation Measures proposed Chapter 9	Not Significant
Operational Phase related water quality	Local community	Water Quality	Positive	Slight	Long term	Direct	Mitigation Measures proposed Chapter 8	Imperceptible
Operational Phase related flood risk	Local community	Flood Risk	Negative	Slight	Long term	Direct	Mitigation Measures proposed Chapter 8	Not Significant

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Operational Phase related traffic	Headford Road and Dyke Road	33 no. car parking an overall significant reduction in traffic movements to and from the site	Neutral	Not Significant	Long term	Direct	Mitigation Measures proposed Chapter 13	Not Significant
Operational Phase related visual impact	Local Community	Landscape and visibility of Proposed Development	Positive	Significant	Long term	Direct and Indirect	N/A	Significant

5.5.4 Potential Cumulative Impacts

The EIA Directive requires that the EIAR described the cumulation of effects. Cumulative effects arise from:

- The interaction between the various impacts within a single project i.e. Masterplan;
- The interaction between all of the different existing and / or approved projects in the same area as the proposed project:

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor.

The main cumulative impacts associated with Population and Human Health are potential pollution and nuisance associated with the construction phase (i.e., dust, air quality, construction traffic and noise). During the operational phase, there will be an increase in the population of the surrounding area. This could cumulatively impact the existing local road network in terms of congestion and add pressure to the existing community infrastructure.

5.5.4.1.1 Cumulative Assessment Scenario 1

The Proposed Development forms part of a non-statutory development frameworks (refer to the accompanying Development Framework document) forming part of the application pack. The wider development of the development framework lands will be subject to individual planning applications and associated EIARs where required.

The Cumulative Assessment Scenario 1 includes a review of the potential cumulative impacts of the entire Corrib Causeway Development Framework i.e. the Proposed Development (Phase 1) plus Phase 2 and Phase 3.

The three phased development framework will deliver a residential-led, mixed-use development. Phase 2, an existing car park south of the site, is intended to be redeveloped for civic, commercial and cultural uses. If the existing Black Box theatre located north of the site is relocated, there is potential for the site to be developed into an additional residential block which would be Phase 3. Until redevelopment is confirmed, the current uses of the Black Box theatre and car parking will remain operational.

The maximum parameters for Phase 2 and Phase 3 Corrib Causeway Development Framework options are used for the assumptions as per Table 5-23.

Table 5-23 Cumulative Assessment Scenario 1 – Development Parameters

Phase	Potential Uses	Maximum Height	Maximum Car Parking Spaces
Phase 1 (Residential + Childcare Facility)	219 no. residential units and 241 sqm childcare facility	8 storeys	33 no. spaces
Phase 2 (Mixed-use)	Hotel, theatre, retail, office and civic uses (10,000 sqm maximum GFA)	8 storeys	15 no. spaces

Phase	Potential Uses	Maximum Height	Maximum Car Parking Spaces
Phase 3 (Residential)	Approx. 70 no. residential units	6 storeys	10 no. spaces

Table 5-24 provides a summary of the cumulative effects for Scenario 1.

Table 5-24 Cumulative Assessment Scenario 1 – Summary of Cumulative Effects

Topic	Description
Population Demographics	The cumulative Development Framework schemes will result in a moderate increase in the number of people living in the Study Area at operational phase. A total of approx. 289 no. residential units are proposed as part of the Development Framework. Using the Study Area average household size (2.49), this will result in an approximate population of 719.61 persons. This is considered a significant, positive and long-term impact.
Socio-Economic	While specific employment levels for the cumulative schemes are not quantified, it is anticipated that the combined Development Framework schemes and the Proposed Development will have a direct, medium to long-term, positive impact on the socio-economic status at the city level.
Water, Noise & Vibration, Air Quality, Traffic and Transport	Cumulative effects on hydrology (water quality), noise and vibration, air quality, climate, and traffic and transport have been thoroughly assessed in their respective chapters. The mitigation measures implemented through the Proposed Development, along with those for the cumulative schemes, are expected to prevent any direct or indirect, long-term, adverse, major or significant effects on population and human health.

5.5.4.1.2 Cumulative Assessment Scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes.

A review of other off-site developments and permitted developments was completed as part of this assessment. The list of cumulative schemes has been detailed in Chapter 2 of this EIAR. The projects and plans were reviewed and considered for possible cumulative effects with the Proposed Development and the Development Framework. As predicted impacts on human health can extend beyond the site boundary, the developments below have been selected as the most relevant impacts on population and human health relate to noise, air quality, traffic and landscape and visual. Developments in the immediate vicinity of the Proposed Development are detailed in Table 5-25.

Table 5-25 Cumulative Impacts – List of Permitted and Proposed Developments

Reg. Ref.	Address	Summary of Development	Assessment on Population Demographics	Assessment on Socio-Economics	Assessment on Water, Noise & Vibration, Air Quality & Traffic
2460108 / ABP-320100-24 Summix BNM Developments Limited	Corner of Lough Atalia Road and Bóthar na Long, Galway, H91 HY45 (0.9 km southeast)	The development will include demolition of a vacant industrial structure (115 sq m), the external canopy structure (170 sq m) and the boundary walls along the	This application does not include residential units and as such, will not result in any long-term increase in population demographics in the area.	While specific employment levels are not quantified in this application, it is anticipated that the proposed development would give rise to considerable	Through the implementation of the associated recommendation measures set out in the Construction Management Plan of the application, it is

Reg. Ref.	Address	Summary of Development	Assessment on Population Demographics	Assessment on Socio-Economics	Assessment on Water, Noise & Vibration, Air Quality & Traffic
		southern, western and north-western boundaries of the site; and the construction of a 15 No. storey hotel (including part mezzanine at ground floor level) providing 189 No. bedrooms (7,514 sq m), incorporating food and beverage areas and provision of a single storey service building to the northwest of the site on a 0.2217 Ha site. Permission has been refused on 06/06/2024. Currently under appeal with An Bord Pleanála and no decision available to date.		employment opportunities at both construction and operational phases in combination with Cumulative Scenario 1.	not considered that this application in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.
ABP-314597-22 Galway City Council	University Road to Dublin Road, Galway City (0.2 km south)	BusConnect Galway Cross-City Link Scheme. Permission granted 27/09/2024	This application does not include residential units and as such, will not result in any long-term increase in population demographics in the area.	While specific employment levels are not quantified in this application, it is anticipated that the permitted development would give rise to considerable employment opportunities at both construction and operational phases in combination with Cumulative Scenario 1.	Cumulative effects on water, noise and vibration, air quality, climate, and traffic and transport have been thoroughly assessed in their respective EIAR chapters of the permitted development. The mitigation measures implemented through the Proposed Development, along with the permitted scheme, are expected to prevent any direct

Reg. Ref.	Address	Summary of Development	Assessment on Population Demographics	Assessment on Socio-Economics	Assessment on Water, Noise & Vibration, Air Quality & Traffic
					or indirect, long-term, adverse, major or significant effects on population and human health.
20184 (Amended by ref. 22259) Cleverson Ltd	Headford Road, Townparks, Galway (Directly adjacent site (east))	Demolition of an ESB enclosure and construction of a seven/eight storey development comprising 4 retail units, a gymnasium and student accommodation 7 storeys in height (272 beds). Permission granted 12/07/2021	This application is for student accommodation which will give rise to a transient population of 272 no. students in the local area. In combination with the Cumulative Scenario 1, this is considered a significant, positive and long-term impact.	While specific employment levels are not quantified in this application, it is anticipated that the permitted development would give rise to considerable employment opportunities at both construction and operational phases in combination with Cumulative Scenario 1.	Through the implementation of the associated recommendation measures set out in the Construction Management Plan of the permitted development, it is not considered that this application in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.
1847 (amended by ref. 20235) K. King Construction Claregalway Ltd.	33-35 Saint Brendan's Avenue, Woodquay, Galway (0.3 km south)	Construction of 27 no. duplex / apartments including 3 to 6 storey apartment block and all associated site development works and services. Permission granted 14/12/2020	Using the Study Area average household size (2.49), this permitted scheme will result in an approximate population of 67 no. new residents. In combination with the Cumulative Scenario 1, this is considered a significant, positive and long-term impact.	Although exact employment figures are not provided in this application, it is expected that the permitted development will create significant employment opportunities during both the construction and operational phases, particularly when considered alongside Cumulative Scenario 1.	Through the implementation of the associated recommendation measures set out in the Construction Management Plan of the permitted development, it is not considered that this application in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.

Reg. Ref.	Address	Summary of Development	Assessment on Population Demographics	Assessment on Socio-Economics	Assessment on Water, Noise & Vibration, Air Quality & Traffic
19107 Irish Water	Dyke Road, Terryland, Galway (0.5 km northwest	Permission for development which comprises of a new raw water intake works located on the east bank of the River Corrib, 100m downstream of Quincentenary Bridge to supply the Terryland Water Treatment Plant. Permission granted 24/02/2020	This application does not include residential units and as such, will not result in any long-term increase in population demographics in the area.	Although exact employment figures are not provided in this application, it is expected that the permitted development will create significant employment opportunities during both the construction and operational phases, particularly when considered alongside Cumulative Scenario 1.	This permitted scheme will improve the associated water elements of the surrounding area resulting in a long-term positive impact. It is not considered that this application in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.
2047 Seagullpoint Limited	Lands to the rear of Ceannt Train Station, Station Road, Galway City (0.8 km souteast)	Large-scale, mixed-use development consisting of 376 no. apartments, retail units, café/restaurant/bar units, hotel, office use, childcare facility, car parking and other services and associated site works.	Using the Study Area average household size (2.49), this permitted scheme will result in an approximate population of 936 no. new residents. In combination with the Cumulative Scenario 1, this is considered a significant, positive and long-term impact.	While precise employment figures are not specified in this application, it is anticipated that the permitted development will generate substantial employment opportunities during both the construction and operational phases, especially when considered in conjunction with Cumulative Scenario 1.	Cumulative effects on water, noise and vibration, air quality, climate, and traffic and transport have been thoroughly assessed in their respective EIAR chapters of the permitted development. The mitigation measures implemented through the Proposed Development, along with the permitted scheme, are expected to prevent any direct or indirect, long-term, adverse, major or significant effects on population and human health.
ABP-320938-24	Woodquay Park, Terryland,	Woodquay Park Landscape Upgrade: Included	This application does not include residential units	Although exact employment figures are not	Through the implementation of the associated

Reg. Ref.	Address	Summary of Development	Assessment on Population Demographics	Assessment on Socio-Economics	Assessment on Water, Noise & Vibration, Air Quality & Traffic
Galway City Council	Galway (0.3 km southwest)	in the plans is the creation of accessible, public, green space, with biodiversity-friendly planting, age and mobility-friendly pathways, sheltered seating niches and spaces for play and for rest. The project will also involve traffic calming upgrades and improved pedestrian facilities to the surrounding streets. Permission granted 12/03/2025	and as such, will not result in any long-term increase in population demographics in the area.	provided in this application, it is expected that the permitted development will create significant employment opportunities during both the construction and operational phases, particularly when considered alongside Cumulative Scenario 1.	recommendation measures set out in the Natura Impact Statement of the proposed development, it is not considered that this application in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.
N/A Galway City Council	Across the River Corrib, adjacent to Dyke Road (0.2 km southwest)	Clifden Railway Bridge Pedestrian and Cycle Bridge: Construction of a pedestrian and cycle bridge which will span the River Corrib connecting the University of Galway (UG) campus to the City Centre via Riverside and Woodquay. Intended lodgement date unknown.	The proposed development will not result in any increase in population demographics.	Although exact employment figures are not known at this time, it is expected that the permitted development will create significant employment opportunities during both the construction and operational phases, particularly when considered alongside Cumulative Scenario 1.	Although the exact effects on water, air quality, noise & vibration and traffic are not known at this time, it is considered that through the implementation of appropriate mitigation measures the proposed future development in combination with the Cumulative Scenario 1 would give rise to any direct or indirect, long-term adverse, major or significant effects on population and human health.

Construction Phase

The implementation of mitigation measures within each respective Chapter of this EIAR as well as the compliance of adjacent development with their respective planning permissions,

will ensure there will be minimal cumulative potential impacts on water, air quality, noise and vibration and traffic and transport.

In a worst-case scenario, multiple developments in the area could be development concurrently or overlap in the construction phase and contribute to additional combines 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 measures outlined in this EIAR.

According to the IAQM guidance (2023) should the construction phase of the Proposed Development coincide with the construction phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 7.5.1, are implemented throughout the construction phase of the Proposed Development significant cumulative dust impacts are not predicted. The predicted residual cumulative air quality impacts during the construction phase are short-term, direct, negative, and not significant.

Operational Phase

The potential cumulative impacts of the Proposed Development during the operational phase in terms of water, air quality, noise and vibration and traffic generation in the context of the Proposed Development and cumulative assessments have been considered in Chapter 8, Hydrology and Hydrogeology, Chapter 9 Noise and Vibration, Chapter 10 Air Quality, and Chapter 13 Material Assets Traffic and Transport. The assessments indicate that the Proposed Development is not likely to result in significant adverse impacts on Human Health either alone or in combination with any likely future projects.

The cumulative impact is included within the operational stage impact for the Proposed Development, which has assessed operational road traffic emissions generated by the Proposed Development and committed developments. The significance of the effect on air quality due to the cumulative operational phase impact of the Proposed Development will be direct, long-term, negative and not significant.

During the operational phase any cumulative impacts will be due to an increase in road traffic noise. However, given the insignificant levels of noise increase as a result of the traffic associated with this Proposed Development, it is not expected that cumulative traffic noise will increase by any significant margin as a result of this Proposed Development.

The developments listed in Table 5-25 have been thoroughly evaluated both individually and in combination with each other. This comprehensive assessment has determined that there will be no significant impact on the environment, provided that the mitigation measures outlined in the associated planning documentation are effectively implemented. These mitigation measures are designed to address potential negative effects on various environmental and human health factors, ensuring that any adverse impacts are minimised.

Specifically, this chapter has concluded that there will be no significant negative impact on population and human health resulting from the Proposed Development, as well as from the combined scenarios of Cumulative Scenario 1 and Cumulative Scenario 2. The evaluation has taken into account factors such as air quality, noise, water quality, traffic, and socio-economic

conditions, all of which are crucial for maintaining the health and well-being of the local population.

Moreover, the cumulative impact of these developments, when considered together, has also been determined to be not significant. This means that the combined effects of the Proposed Development and the cumulative scenarios will not result in a substantial negative impact on the overall environment. The effective implementation of mitigation measures across all developments will ensure that the environmental integrity of the area is preserved.

In conclusion, the careful consideration of individual and collective impacts, along with the strategic implementation of mitigation measures, supports the conclusion that the Proposed Development and its associated cumulative scenarios will not significantly harm the environment or public health.

5.5.5 "Do Nothing" Impact

In order to provide a qualitative and equitable assessment of the Proposed Development, this section considers the Proposed Development in the context of the likely impacts upon the receiving environment should the Proposed Development not take place.

A 'Do nothing' impact would result in the subject lands remaining as a public car park and substantially undeveloped. This would be an underutilisation of the site from a sustainable planning and development perspective, particularly considering the location of the lands adjacent to high quality public transport, and within a city centre area which is identified as a key growth area and an 'opportunity site'. The status of the environmental receptors described throughout this EIAR would be likely to remain unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and the operational phase of the Proposed Development would not arise.

In terms of likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be limited change from the baseline scenario in relation to population (human beings) and human health.

However, similarly the potential for any likely and significant positive environmental impacts arising from both the construction and operational phases of the Proposed Development would not arise.

The local economy would not experience the direct and indirect positive effects of the construction phase of development including employment creation. The local construction sector and associated industries and services would be less viable than they might otherwise be. Furthermore, the positive nature of the development in terms of its close proximity to a number of centres of employment, and therefore the associated increase in sustainable commuter trips in the area, would be lost.

Failure to deliver the proposed residential units would result in existing housing need and demand remaining unmet. The new pedestrian and cycle links, childcare facility and public open spaces to be provided in the development and serving the wider area would also not be provided.

5.6 Avoidance, Remedial and Mitigation Measures

5.6.1 Construction Phase

No specific mitigation measures are required during the Construction Phase of the Proposed Development in relation to population and human health, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air quality, noise, traffic, waste etc. are identified in their respective chapters in this EIAR.

5.6.2 Operational Phase

The Proposed Development has been designed to avoid negative impacts on population and human health through;

- The inclusion of a childcare facility within the Proposed Development;
- Landscaping to mitigate against issues arising from microclimate conditions;
- The inclusion of a comprehensive foul and surface water management system;
- Energy efficiency measures; and,
- High quality finishes and materials.

No specific mitigation measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air emissions, noise, traffic etc. are identified in their respective chapters in this EIAR.

5.6.3 "Worst Case" Scenario

No specific mitigation measures have been proposed in relation to Population and Human Health as such a worst-case scenario is not applicable.

5.7 Residual Impacts

Residual Impacts are defined *as 'effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

The Proposed Development will bring a new population into the area. This new population will support existing schools, shops, public transport, and the local community. Additional facilities will be provided in the area including the childcare facility. It is considered that there will be a slight, long-term, positive impact on the population and human health. No specific mitigation measures have been proposed for population and human health so residual impacts will be slight positive.

5.8 Monitoring

5.8.1 Construction Phase

No specific monitoring measures are proposed or required in relation to Population and Human Health for the Construction Phase of the Proposed Development.

Monitoring activities will be implemented for the for the Construction Phase in accordance with the CEMP submitted as part of this planning application.

5.8.2 Operational Phase

No specific monitoring measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, monitoring in relation to air emissions, water, noise and traffic are identified in their respective Chapters in this EIAR.

5.9 Interactions

As noted above, there are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to human health. This chapter of the EIAR has been informed by updated guidance documents reflecting the changes within the 2014 EIA Directive. These documents include the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (2017), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018) and the Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017. Therefore, in line with the guidance documents referred to, this chapter of the EIAR focuses primarily on the potential likely and significant impact on Population and Human Health in relation to health effects/issues and environmental hazards from the other environmental factors and interactions that potentially may occur.

Where there are identified associated and inter-related potential impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to. However, the reader is directed to the relevant environmental topic chapter of this EIAR document for a more detailed assessment.

5.10 Difficulties Encountered When Compiling

No significant difficulties were experienced in compiling this chapter of the EIAR document.

5.11 References

- Central Statistics Office www.cso.ie.
- Central Statistics Office (2022) – Census 2022
- Central Statistics Office (2018) – CSO Statbank
- DoHPLG (2017) Rebuilding Ireland – Action Plan for Housing and Homelessness
- Galway City Development Plan 2023-2029
- ESRI Quarterly Economic Commentary (June 2019)

- Environmental Protection Agency (2022) – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- European Commission (2017) – Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment
- Institute of Public Health (2021) – Health Impact Assessment Guidance: Manual & Technical Guidance

6 BIODIVERSITY

6.1 Introduction

This chapter of the EIAR consists of an impact appraisal of the Proposed Development - i.e. Phase 1 of the Corrib Causeway Development Framework at Dyke Road hereafter referred to as the Proposed Development, under the heading of Biodiversity. The Proposed Development site consists of the construction of 219 residential units and a childcare facility with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works. Further details regarding the Proposed Development are in Chapter 2 of the EIAR.

In accordance with the requirements of *Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014* (i.e. the EIA Directive), this chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (i.e. the Habitats and Birds Directives). In addition, this chapter of the EIAR also identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Development on species protected pursuant to the Wildlife Acts 1976 (as amended).

The EIA Directive does not provide a definition of biodiversity. The Convention on Biological Diversity, however, gives a formal definition of biodiversity in its article 2: "*biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*". Alongside the term “biodiversity” the terms “ecology” and “ecological” are also used throughout this chapter as a broader term to consider the relationships of biodiversity receptors to one another and to their environment.

The aims of this assessment were to:

- Establish and evaluate baseline ecological environment, as relevant to the Proposed Development site and other relevant areas;
- Determine the ecological value of identified ecological features;
- Assess all potentially significant ecological effects associated of the Proposed Development;
- Set out the mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation;
- Provide an assessment of the significance of any residual impacts after mitigation; and,
- Identify any appropriate compensation, enhancement or post-construction monitoring requirements.

A separate stand-alone Appropriate Assessment (AA) Screening Report and follow on Stage Two Natura Impact Statement (NIS) (Scott Cawley Ltd., 2025a, b) have been prepared and submitted as part of the planning application documentation. These reports contain information to inform the competent authority’s assessment of potential impacts on European

sites as a result of the Proposed Development either alone or in combination with other plans/projects.

6.1.1 Quality Assurance and Competency of Experts

This Biodiversity chapter for the EIAR has been prepared by Sorcha Shanley and Síofra Quigley and reviewed by Tim Ryle and Colm Clarke of Scott Cawley Ltd.

Sorcha Shanley is a Senior Consultant Ecologist with Scott Cawley Ltd. She holds an honours degree in Natural Sciences with a specialisation in Zoology from Trinity College Dublin, and a master's degree in Marine Biology from the University of Essex. She has over three years' professional experience in ecological consultancy in Ireland, carrying out a range of habitat and protected species surveys, including bat, otter, badger and breeding and wintering birds. She has undertaken Ecological Clerk of Works roles, overseeing the implementation of mitigation measures, and has prepared and contributed to Appropriate Assessment (AA) Screening reports, Natura Impact Statements (NIS) and Ecological Impact Assessments (EcIA) for a range of development projects across the country.

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Tim Ryle is a Principal Ecologist with Scott Cawley Ltd. He holds an honours degree in Botany from University College Dublin and was later awarded a Ph.D. from the same institution. He is a full Member of the Institute of Environmental Scientists. Tim is an experienced ecological consultant with twenty years' experience in in private consultancy in designing, undertaking and managing a wide range of ecological surveys and in assessing impacts and designing mitigation measures and biodiversity enhancements, in particular for protected species including badgers, otters, bats, birds, amphibians as well as habitats of conservation importance. He is also experienced in undertaking Appropriate Assessment for small-scale development projects and larger infrastructural projects, land plans as well as national/government plans.

Colm Clarke is Associate Director, Terrestrial Ecology at Scott Cawley Ltd., and has over nine year's professional experience in ecological consultancy. He obtained an honours degree in Natural Sciences from Trinity College Dublin, and a Masters in Biodiversity and Conservation

from the same institution. Colm is a full member of CIEEM, a member of Bat Conservation Ireland and Chairperson of the Dublin Bat Group. Colm is Scott Cawley's lead bat ecologist, and regularly prepares derogation licences for bats and their roosts and oversees the discharge of licence obligations. As part of this work, Colm provides advice on protected species to clients and contractors. Colm is on the CIEEM's EcIA Accreditation Working group, which aims to improve the quality of Ecological Impact Assessment (EcIA) Reports through an accreditation process, and he is an assessor on the EcIA Pilot Accreditation Scheme. Colm is experienced in scoping, preparing, and reviewing EcIA (including EIA Biodiversity Chapters) and in the completion of Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS), and has prepared these reports and acted as internal reviewer (as part of Scott Cawley's quality assurance process) on a range of projects from residential to industrial and large-scale infrastructure (e.g. national road and rail projects). Colm also regularly completes technical peer review and has assessed projects for local authority clients and renewable energy developers. As a member of the Irish Environmental Law Association and regular attendee at IELA seminars, Colm stays abreast of developments in environmental law and how these relate to changes to assessment practices.

6.2 Study Methodology

6.2.1 Planning, Policy and Legislation

The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Biodiversity chapter.

The following international legislation is relevant to the Proposed Development:

- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 ('the EIA Directive').
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas (SPAs) are

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special Areas of Conservation are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special Protection Areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.
In Ireland these sites are designed as European sites - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

designated for the protection of endangered species of wild birds listed in Annex I of that directive.

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy hereafter, referred to as the 'Water Framework Directive'. The Water Framework Directive' is the legislation requiring the protection and improvement of water quality in all waters (rivers, lakes, groundwater, and transitional coastal waters) with the aim of achieving good ecological status by 2015 or, at the latest, by 2027.

The following national legislation is relevant to the Proposed Development:

- Wildlife Act 1976 (as amended); hereafter collectively referred to as the 'Wildlife Acts'. The Wildlife Acts are the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species, and 86 species of flora are protected under this legislation.

- Planning and Development Acts 2000 (as amended); hereafter collectively referred to as the 'Planning and Development Acts' and The Planning and Development Regulations 2001 (as amended). These pieces of legislation are the basis for Irish planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and for the conservation of European Sites. It also sets out the requirements in relation to environmental assessment with respect to planning matters, including transposition of the Habitats and Birds Directive into Irish law.

- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (as amended) (S.I. 477 of 2011 (as Amended); hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) (as amended).This legislation transposes the Water Framework Directive into Irish Law.

- Flora (Protection) Order, 2022. This lists species of plant protected under Section 21 of the Wildlife Acts.

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR). (EPA, 2022).

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. August 2018. (Department of Housing, Planning and Local Government, 2018).

The following plans and policies are relevant to the Proposed Development:

- Ireland's 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2023)

- All-Ireland Pollinator Plan 2021-2025 (National Biodiversity Data Centre, 2021)

- National Development Plan Ireland 2021-2030

- National Energy & Climate Plan 2021-2030
- Project Ireland 2040 – National Planning Framework
- Climate Action Plan 2024
- Regional Spatial & Economic Strategy- Northern and Western Region 2020-2032 (RSES)
- River Basin Management Plan for Ireland 2018-2021
- The River Basin Management Plan for Ireland (2022-2027) – draft for public consultation (in review)
- Galway County Development Plan 2022-2028
- Galway County Heritage and Biodiversity Plan 2017-2022
- *Draft Galway County Heritage and Biodiversity Plan 2024- 2030*[2]
- *Draft Galway City Biodiversity Plan 2025 - 2030*[3]
- Galway County Council Climate Action Plan 2024-2029
- Galway City Council Development Plan 2023-2029
- Galway City Biodiversity Action Plan 2014-2024
- Galway City Climate Adaption Strategy 2019 - 2024

6.2.2 Guidance

The process of identifying, quantifying and evaluating potential impacts of the Proposed Development on habitats, species and ecosystems was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2024). In addition, reference to the following recognised guidance defined the scope and evaluation process:

- Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition) The Bat Conservation Trust;
- Collins (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition) The Bat Conservation Trust;
- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report;
- EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports;

[2] Although this plan has not been adopted as of yet, the overarching objectives and policies are likely to be similar in requirement to the existing plan

[3] Although this plan has not been adopted as of yet, the overarching objectives and policies are likely to be similar in requirement to the existing plan

- Institute of Lighting Professionals (2021) Guidance Note 01/21: Guidance notes for the reduction of obtrusive light;
- Marnell, F. Kelleher, C & Mullen, E. (2022). Bat Mitigation Guidelines for Ireland V2. Irish Wildlife manuals, No. 134. National Parks & Wildlife Service, Department of Housing, Local Government and Heritage, Ireland;
- NBDC (2019) Pollinator-friendly management of: Transport Corridors. All-Ireland Pollinator Plan, Guidelines 9. National Biodiversity Data Centre Series No. 20, Waterford. Sept, 2019;
- NBDC (2021) All Ireland Pollinator Plan 2021-2025;
- TII[4] (2005a) Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes;
- TII (2005b) Guidelines for the Treatment of Bats during the Construction of National Road Schemes;
- TII (2006a) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes;
- TII (2006b) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes;
- TII (2006c) Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post Construction of National Road Schemes;
- TII (2008a) Environmental Impact Assessment of National Road Schemes – A Practical Guide (Revision 1);
- TII (2008b) Ecological Survey Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;
- TII (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes;
- TII (2020a) The Management of Invasive Alien Plant Species on National Roads – Standard; and,
- TII (2020b) The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.

6.2.3 Scope of Assessment

6.2.3.1 Study Area

The study area is defined by the Zone of Influence (ZoI) of the Proposed Development with respect to the ecological receptors that could potentially be affected on and beyond the Proposed Development site. The study area was defined by the findings of the desk study (presence/absence of protected habitats, flora or fauna within the ZoI) and best practice methodology referenced above for assessing effects on those ecological features. In general,

[4] Transport Infrastructure Ireland (TII) was established through a merger of the National Roads Authority and the Railway Procurement Agency under the Roads Act 2015, with effect from 1st of August 2015.

the study area includes the site of the Proposed Development and consideration is also given to species and habitats outside this area on a case-by-case basis.

6.2.3.2 Establishing a Zone of Influence

The ZoI, or distance over which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs), depending on 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 within, and in the vicinity of, the Proposed Development site. The ZoI was informed and defined by the sensitivities of each of the likely KERs 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).

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.

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 and species are 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, hydrocarbons, and heavy metals), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the Proposed Development, the ZoI of potential impacts on surface water quality in the receiving environment could potentially extend downstream as far as Galway Bay.

The ZoI in relation to direct impacts to wintering birds could extend up to *c.* 300m from the Proposed Development for general construction activities, as many species (such as waterbirds) are highly susceptible to disturbance from loud and unpredictable noise during construction[5].

However, as many estuarine bird species use inland habitat areas at distances from the coast, the effect of *ex-situ* impacts could extend a considerable distance from the Proposed Development. In the case of the Proposed Development, impacts to wintering birds within this 300m band could affect the use of potential *ex-situ* sites for bird species listed as Special Conservation Interests (SCI) of the nearby European sites, Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and Inner Galway Bay SPA.

[5] Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.* (2009) and Wright *et al.* (2010). In terms of construction noise, levels below 50dB would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect/level of response from birds, i.e. birds becoming alert and some behavioural changes (*e.g.* reduced feeding activity), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At *c.* 300m, typical noise levels associated with construction activity (BS 5228) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

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 road development, and disturbance/displacement during construction and disruption in territorial singing due to noise during operation. Disturbance effects may extend for several hundred metres from the Proposed Development.

The ZoI for impacts to aquatic species, such as Atlantic salmon and lamprey species, is limited to those watercourses crossed by the proposed road development or waterbodies to which runoff from the Proposed Development could drain to during construction. However, impacts could occur at significant distances downstream depending on the magnitude and duration of any pollution event; potentially even affecting species in the receiving estuarine and marine environment.

The ZoI for small mammal species, such as the pygmy shrew, would be expected to be limited to no more than *c.* 100m from the Proposed Development due to their small territory sizes and sedentary lifecycle. The disturbance ZoI in relation to otters, badgers, stoat, and hedgehogs may extend over greater distances[6] than smaller mammal species due to their ability to disperse many kilometres from their natal site; however, the ZoI of significant disturbance impacts to badger and otter breeding/resting places (including impacts associated with elevated noise levels) is likely to be no more than approximately 150m from the Proposed Development boundary[7].

The ZoI of potential impacts to bat roosts are dependent on many factors (such as species, roost type, surrounding habitat and commuting routes), this is assessed on a case-by-case basis and the ZoI may increase/decrease from this distance accordingly. Given the large foraging ranges for some species[8], the effect of potential landscape scale impacts, such as habitat loss and severance, could extend for several kilometres from the Proposed Development but the most significant effects are likely to occur within a 3km core sustenance zone (BCT, 2020) associated with roosts of the following bat species which are known to occur in the area; Leisler's bat, Nathusius' pipistrelle, soprano pipistrelle and brown long-eared bat. As per the Bat Conservation Trusts' Guidelines (Collins *et al.,* 2023), core sustenance zones are defined as the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost.

The ZoI in relation to amphibian species is likely to be limited to direct habitat loss and severance with the Proposed Development and/or indirect impacts to water quality in any wetland habitats hydrologically connected to the Proposed Development.

[6] Otter territory size from Ó Néill L. (2008) Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning. PhD thesis. Trinity College, Dublin; Badger territory size from TII (2005) Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes ; Irish stoat territory size from Sleeman, P.D (2016) Irish Stoat (*Mustela erminea hibernica*) Pp 102-103 In Lysaght, L. and Marnell, F. (Eds) (2016) Atlas of Mammals in Ireland 2010-2015, National Biodiversity Data Centre, Waterford; Pine marten territory size from O'Mahony, D. (2016) Pine marten (*Martes martes*) Pp. 100-101 In Lysaght, L. and Marnell, F. (Eds) (2016) Atlas of Mammals in Ireland 2010-2015, National Biodiversity Data Centre, Waterford and Hedgehog territory size from Haigh, A. (2011). The Ecology of the European hedgehog (*Erinaceus europaeus*) in rural Ireland. PhD Thesis, UCC.

[7] This ZoI (i.e. *c.* 150m from the Proposed Development boundary) for badgers and otters has been defined in accordance with TII guidelines i.e. Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (TII, 2005b), and Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (TII, 2006c), and is considered to be of a precautionary distance. During construction-related disturbance, the screening effect provided by surrounding vegetation and buildings would likely reduce the actual distance of the ZoI for badgers and otters.

[8] Leisler's bats have been recorded foraging up to 13km from maternity roost sites (Shiel *et al.*, 1999)

The ZoI in relation to the common lizard is likely to be limited to direct habitat loss and severance with the Proposed Development and disturbance/displacement effects in the immediate vicinity during construction.

The ZoI of general construction and operational activities (i.e. risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting) is considered unlikely to extend more than several hundred metres from the site of the Proposed Development.

6.2.4 Desk Study

A desktop study was carried out to inform the initial scope of the ecological surveys required to inform the environmental impact assessment. The desktop study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies.

A desk study was carried out to collate the available existing ecological information on the Proposed Development site.

A desk study was undertaken in January 2025, to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

The following sources were consulted during the desktop study to inform the scope of the ecological surveys:

- Data on European sites, Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the National Parks and Wildlife Service (NPWS) from https://www.npws.ie/protected-sites and https://www.npws.ie/maps-and-data - refer to Figure 6- 1 and Figure 6- 2 for locations of protected sites in the vicinity of the Proposed Development[9];
- Records of rare and protected species within 2km of the Proposed Development, as held by the National Biodiversity Data Centre www.biodiversityireland.ie. The use of a 2km radius for desk studies is frequently applied to evaluate potential impacts on protected species, habitats, and the surrounding landscape. A 2km radius allows for the capture of relevant data on species that may use habitats in the area surrounding a Proposed Development site. This distance is useful for species with broader ranges, like certain bird or mammal species, and also helps identify potential corridors or linkages between habitats. It allows for the consideration of species that may be present in the broader landscape while focusing on those that are most likely to be impacted by activities within the development area.
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Data on waterbodies, available for download from the Environmental Protection Agency (EPA) web map service. Available from https://gis.epa.ie/EPAMaps/ -

[9] The following SAC, SPA, NHA and pNHA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2024_12, SPA_ITM_2024_01, NHA_ITM-2019_06 and pNHA_ITM_2015_11.

- Information on soils, geology and hydrogeology in the area available from the Geological Survey Ireland (GSI) online Spatial Resources service. Available from https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx -
- Information on the conservation status of birds in Ireland from Birds of Conservation Concern in Ireland 4 (Gilbert *et al.,* 2021)
- Information on the location, nature and design of the Proposed Development supplied by the Applicant's design team; and
- Information contained within the Appropriate Assessment (AA) Report for this Proposed Development (Scott Cawley Ltd, 2025a).
- Information contained within the Natura Impact Statement (NIS) for this Proposed Development (Scott Cawley Ltd, 2025b).
- Hydrological and Hydrogeological Risk Assessment Report for Proposed Development at Dyke Road, Terryland, Co. Galway (Enviroguide Consulting, 2025)

6.2.5 Field surveys

This section outlines the various ecological survey methodologies used to collate baseline ecological information in the preparation of this chapter. Surveys were initially carried out between July 2023 and May 2024, and additional wintering bird surveys and a site verification survey were carried out between January 2025 and March 2025. The surveys carried out are summarised below in Table 6-1 with the full description of the survey methodologies presented in the sections below.

Table 6-1 Ecological Survey Dates

Survey	Survey Dates
Habitat Surveys	17th July 2023 5th March 2025 – verification survey
Terrestrial Fauna (excluding bats)	17th July 2023
Bat Activity Surveys	8th August 2023 and 22nd August 2023
Breeding Bird Surveys	7th March 2024, 18th April 2024, 29th May 2024
Wintering Bird Surveys	5th March 2024, 13th March 2024 28th January 2025, 18th February 2025, 5th March 2025

6.2.5.1 Habitats and Flora Survey

A habitat survey was undertaken of the Proposed Development site on the 17th of July 2023 by Daniel Connell of Scott Cawley Ltd. following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011). All habitat types were classified

using the *Guide to Habitats in Ireland* (Fossitt, 2000), recording the indicator species and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database* (Weekes & Fitzpatrick, 2010), having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles* (Stace, 2019) and the *British Bryological Society's Mosses and Liverworts of Britain and Ireland: A Field Guide* (Atherton *et al.*, 2010). Annex I habitat types were classified after *the Interpretation manual of European Union Habitats EUR28* (European Commission, 2013) with reference to the corresponding national habitat survey reports and NPWS wildlife manuals, as applicable. The nomenclature for Annex I habitats follows that of the *Interpretation manual of European Union Habitats EUR28* with abbreviated names after those used in *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview* (NPWS, 2019a and 2019b). A site verification walkover was carried out on the 5th March 2025 to ensure there were no changes in habitats and flora within the site.

6.2.5.2 Fauna Surveys

6.2.5.2.1 Terrestrial Fauna (Excluding Bats)

A terrestrial fauna survey was undertaken on the 17th of July 2023 by Daniel Connell of Scott Cawley Ltd. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Surveys included checks for the presence of badger setts and otter holts within the subject lands, and to record any evidence of use.

6.2.5.2.2 Bats

A ground-level assessment of buildings and vegetation within the subject lands, to examine their suitability to support roosting bats and potential to act as important features for commuting/foraging bats, was based on guidelines (see Table 6-2) in Bat Surveys for Professional Ecologists: Good Practice Guidance (Collins ed., 2016) and included inspections of buildings or potential roost features (PRFs), and for signs of bats (staining at roost entrances, droppings, carcasses, insect remains).

Two activity surveys were completed in on the 8th and 22nd of August 2023 and covered the Proposed Development site as well as the surrounding area to capture the adjacent industrial area, part of the Terry-land Forest Park that borders the site, as well as the surrounds of the amenity grassland across the road alongside the walkway of the River Corrib.

Table 6-2 Assessment Criteria for potential suitability of Proposed Development sites for bats, derived from similar criteria in Bat Surveys for Professional Ecologists: Good Practice Guidelines[1011]

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[12] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats in a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to a known roost.

[10] Collins, J. (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd edition. Bat Conservation Trust, London.
[11] The newest edition of the guidelines was released in September 2023 – Collins, J. (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th Edition*. The 2016 edition of guidelines was used at the time of surveys and guidance followed is still relevant.
[12] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

6.2.5.2.3 Breeding Birds

Breeding bird surveys were undertaken on the 27th of March 2024, 18th of April 2024 and the 29th of May 2024 by Sorcha Shanley of Scott Cawley Ltd. using a methodology adapted from the Bird Monitoring Methods - A Manual of Techniques for Key UK Species (Gilbert *et al*., 1998). Three surveys are considered sufficient to determine the potential presence or absence of breeding birds on a site with low habitat quality. In line with the *Bird Survey Guidelines for assessing ecological impacts (*Bird Survey & Assessment Steering Group, 2025)[13], the need for breeding bird surveys is informed by the habitat type and its capacity to support breeding birds. The Proposed Development site is a car park composed entirely of built land with minimal natural habitat features, which limits its ability to support breeding bird populations. While some species may use built urban spaces, it is unlikely that the site would support important populations of species of conservation concern or those dependent on specific habitats (e.g., woodland or wetland species). The verification walkover on the 5th of March 2025 confirmed no change in habitats at the site. The study area covered the Proposed Development site. Lands within the study area were slowly walked in a manner allowing the surveyor toidentify any birds within or directly adjacent to the Proposed Development site . Birds were identified by sight and song, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

6.2.5.2.4 Wintering Birds

A full season of wintering bird surveys was not conducted and was not required given that the site is urban in nature and there are no habitats suitable for wintering birds within the Proposed Development site. The proposed development site is separated from the nearest area of potentially suitable semi-natural habitat along the River Corrib by Dyke Road and by a linear park with pedestrian footpath.

Two wintering bird counts were undertaken on the 5th of March and 13th of March 2024 by Sorcha Shanley to gather information on wintering birds passaging. An additional three wintering bird surveys were conducted on the 28th of January 2025, 18th of February 2025 and 5th of March 2025. The study area covered the lands within the Proposed Development site. Lands were surveyed visually using binoculars from a vantage point(s) at the edge of the study area followed by a walkover of the area to identify birds which may not be visible from a distance and evidence of usage by wildfowl such as swans or geese (e.g. droppings). Birds were identified by sight and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

6.2.5.2.5 Amphibians

A habitat suitability assessment for amphibians was undertaken on the 17th of July 2023 by Daniel Connell. Features such as ponds and wet ditches, were recorded and mapped, as well as any direct observations of individuals.

[13] Bird Survey & Assessment Steering Group. (2025) *Bird Survey Guidelines for assessing ecological impacts*, https://birdsurveyguidelines.org

6.2.5.3 Consultations

As per Guidance (EPA 2022), Consultations, whilst being a key element of the EIA process, are not obligatory during the preparation of an EIAR. Consultations in respect to Biodiversity were not undertaken, due to the low ecological value of the Proposed Development site.

6.2.6 Ecological evaluation and Impact Assessment

6.2.6.1 Ecological Evaluation

Ecological receptors (including identified sites of ecological importance) are valued with regard to the ecological guidance provided in *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2024), refer to Appendix 6-2 for examples of how ecological importance is assigned. In accordance with these guidelines, important ecological features within what is referred to as the Zone of Influence (ZoI) of the proposed road development which are 'both of sufficient value to be material in decision making and likely to be affected significantly' are deemed to be 'Key Ecological Receptors' (KERs). These are the ecological receptors which may be subject to significant effects from the Proposed Development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

Ecological receptors (including identified sites of ecological importance) are valued with regard to the ecological valuation examples set out in *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2* (National Roads Authority, 2009) and the guidance provided in *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2024) – refer to Appendix 6-2 for examples of how ecological importance is assigned. In accordance with these guidelines, important ecological features within what is referred to as the ZoI of the Proposed Development which are "both of sufficient value to be material in decision making and likely to be affected significantly" are deemed to be 'Key Ecological Receptors' (KERs). These are the ecological receptors which may be subject to significant effects from the Proposed Development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

6.2.6.2 Impact Assessment

Ecological impact assessment is conducted following a standard source-pathway-receptor model, where all three elements of this mechanism must be in place in order for an impact to be established. The absence or removal of one of the elements of the mechanism is sufficient to conclude that a potentially significant effect would not occur.

- Source(s) – e.g. pollutant run-off from proposed works;
- Pathway(s) – e.g. groundwater connecting to nearby groundwater dependant wetland habitats; and,
- Receptor(s) – e.g. wetland habitats and the fauna and flora species they support.

6.2.6.3 Characterising and describing impacts

The parameters considered in characterising and describing the potential impacts of the Proposed Development are per the EPA's *Guidelines on the Information to be Contained in*

Environmental Impact Assessment Reports[14] and CIEEM's *Guidelines for Ecological Impact Assessment in the UK and Ireland*: whether the effect is positive, neutral or negative; the significance of the effects; the extent and context of the effect; the probability, duration and frequency of effects; and, cumulative effects.

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. The following development types are included in considering cumulative effects:

- Existing projects (under construction or operational);
- Projects which have been granted consent but not yet started;
- Projects for which consent has been applied for which are awaiting a decision, including those under appeal; and,
- Projects proposed at a plan level, if relevant (e.g. future strategic infrastructure such as roads or greenways).

The likelihood of an impact occurring, and the predicted effects, can also be an important consideration in characterising impacts. In some cases it may not be possible to definitively conclude that an impact will not occur. In these cases, the evaluation of significant effects is based on the best available scientific evidence but where reasonable doubt remains then the precautionary principle is applied and it may need to be assumed that significant effects may occur. Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

6.2.6.4 Significant Effects

In determining whether potential impacts will result in significant effects, the CIEEM guidelines were followed. The approach considers that significant effects will occur when there are impacts on either:

- the structure and function (or integrity) of defined sites, habitats or ecosystems; or
- the conservation status of habitats and species (including extent, abundance and distribution).

Integrity

The term "integrity" may be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (National Roads Authority, 2009).

The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA/NHAs) but can also be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or

[14] Environmental Protection Agency (2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*. May 2022 (refer to Table 3.4)

changing the processes that support the sites' habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

Conservation Status

Similar definitions for conservation status given in the EU Habitats Directive 92/43/EEC, in relation to habitats and species, are also used in the CIEEM (2024) and NRA (2009) guidance which are summarised as follows:

For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its extent, structure and functions as well as its distribution, or the long-term survival of its typical species, at the appropriate geographical scale

For species, conservation status means the sum of influences acting on the species concerned that may affect the abundance of its populations, as well as its distribution, at the appropriate geographical scale

An impact on the conservation status of a habitat or species is significant if it will result in a change in conservation status, having regard to the definitions of favourable conservation status provided in the EU Habitats Directive 92/43/EEC – i.e. into the future, the range, area and quality of habitats are likely to be maintained/increased, and species populations are likely to be maintained/increased.

According to the CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological receptor will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international). In some cases an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an internationally important species is assessed as significant at only a local, rather than an international level.

6.3 The Existing and Receiving Environment (Baseline Situation)

6.3.1 Designated Areas for Nature Conservation

6.3.1.1 European Sites

The Proposed Development is not within any European site, however the nearest European site to the Proposed Development is Lough Corrib SAC; *c.*15m to the west. There is no direct surface water hydrological link between the Proposed Development site and Lough Corrib SAC, however surface water likely drains from the site into the River Corrib.The River Corrib which forms part of the Lough Corrib SAC flows along the western side of the development and the following European sites in Galway Bay lie *c.* 700m downstream: Inner Galway Bay SPA, Galway Bay Complex SAC. Lough Corrib SPA is also located upstream in Lough Corrib, *c*. 2.7km northwest of the Proposed Development. No other European sites are hydrologically connected to the Proposed Development.

All of the European sites present in the vicinity of the Proposed Development are shown on Figure 6- 1 European sites in the vicinity of the Proposed Development

Figure 6- 1 European sites in the vicinity of the Proposed Development

below. The QIs/SCIs of the European sites in the vicinity of the Proposed Development are provided in Appendix 6-1.

It is confirmed that, for the purposes of the EIAR, these European sites are valued as being of International Importance.

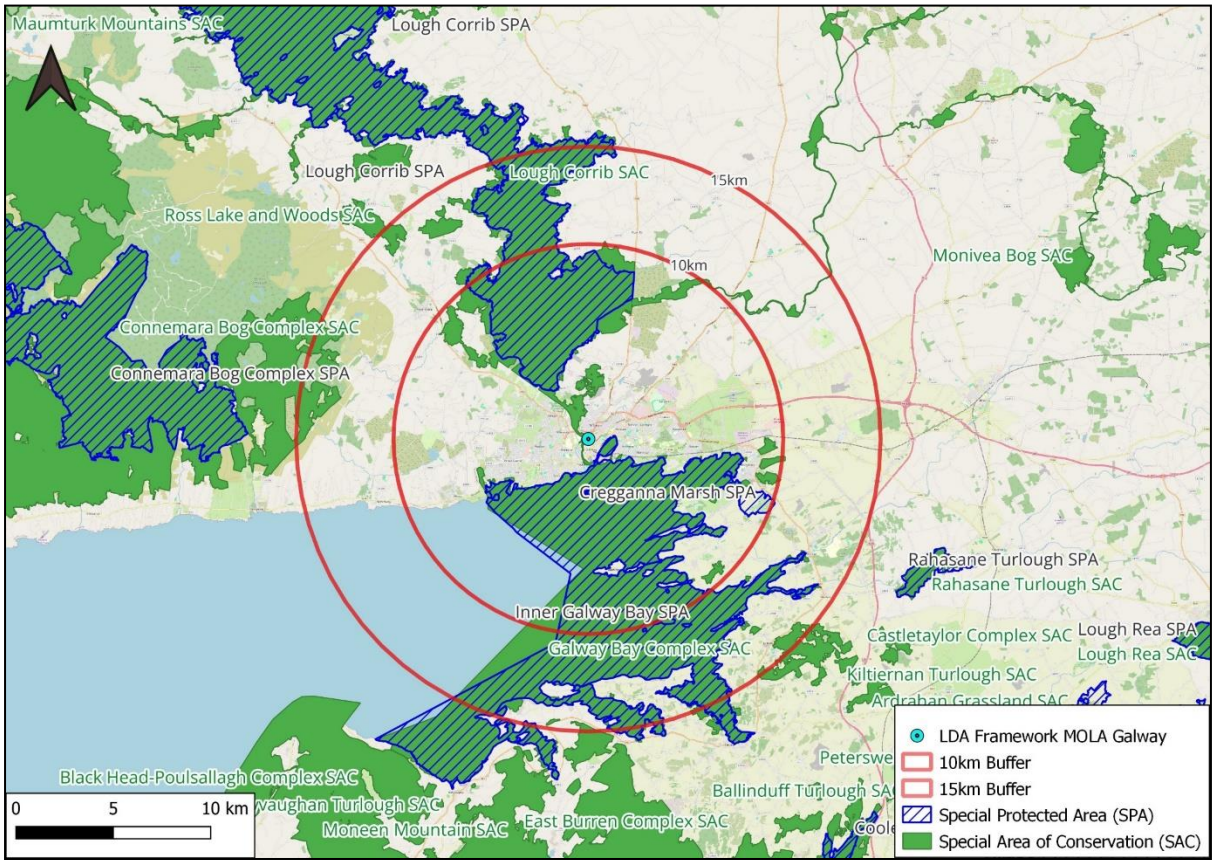

Figure 6- 1 European sites in the vicinity of the Proposed Development

6.3.1.2 Nationally Designated Sites

National Heritage Areas (NHAs) are designations under Section 16 of the Wildlife Acts to protect habitats, species or geology of national importance. In addition to NHAs there are proposed NHAs (referred to as pNHAs), which are also sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Proposed NHAs are offered protection in the interim period under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions[15]. Many of the pNHA sites, and some of the NHAs, in Ireland overlap with the boundaries of European sites.

There are two NHAs and 10 pNHAs located within 15km of the Proposed Development boundary. The closest national site to the Proposed Development is Lough Corrib pNHA, located *c*. 600m north-west of the site. Galway Bay Complex pNHA is the next closest national site, located *c.* 900m south and downstream of the Proposed Development. No other European sites are hydrologically or hydrogeologically connected to the Proposed Development site.

The nationally designated sites in the vicinity of the Proposed Development, their distance from the Proposed Development and their biodiversity features of note[16] are presented in Appendix 6-1. The locations of those sites relative to the Proposed Development are illustrated in Figure 6- 2

It is confirmed that for the purpose of this EIAR, National sites within the ZoI of the Proposed Development are of National Importance.

[16] As noted by NPWS online documentation https://www.npws.ie/protected-sites/nha

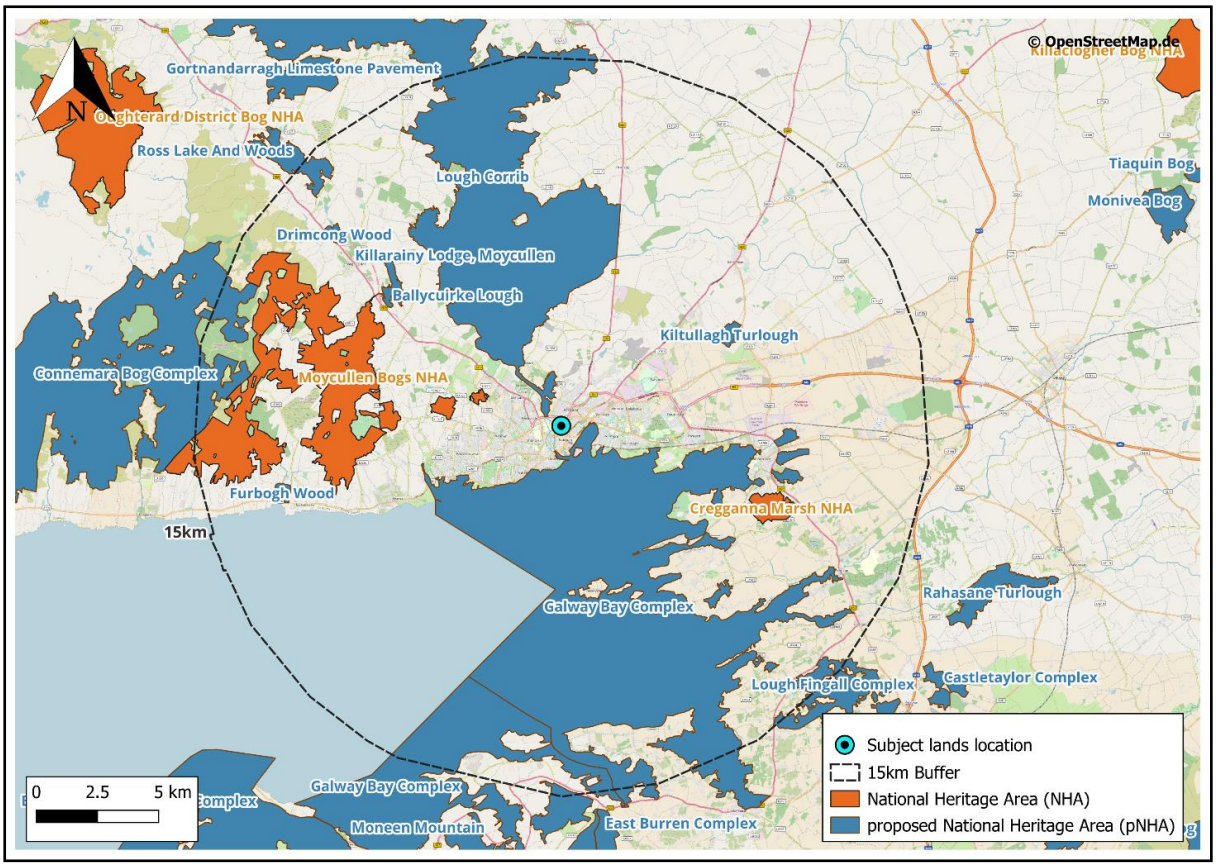

Figure 6- 2 National designated sites in the vicinity of the Proposed Development

6.3.1.3 Other Biodiversity Areas

As per the Galway City Biodiversity Action Plan 2014-2024, the River Corrib is a main wildlife corridor. The River Corrib includes reed swamp and meadows along Dyke Road. Terryland Forest Park is another important local biodiversity area – containing young urban forest of native broadleaf trees and pockets of wetland vegetation located on both sides of Terryland/Sandy River.

Lough Corrib Main Channel is also a designated Salmonid Water under S.I. No 293/1988 European Communities (Quality of Salmonid Waters) Regulations, 1988, which designate 'waters capable of supporting salmon *Salmo salar*, trout *Salmo trutta*, char *Salvelinus* and whitefish *Coregonus* as protected'.

6.3.2 Habitats and Flora

6.3.2.1 Rare and protected plant species

A search of the NBDC database returned no records of rare or protected species as occurring within 2km (refer to Section 6.2.4) of the Proposed Development lands. The surveys undertaken on the 17th July 2023 did not find any protected or rare species within the Proposed Development lands.

There are seven plants listed on the Ireland Red List No. 10: Vascular Plants 2016 (Wyse Jackson *et al.,* 2016) including brackish water-crowfoot *Ranunculus baudotii*, greater knapweed *Centaurea scabiosa*, green field speedwell *Veronica agrestis*, slender tufted-sedge *Carex acuta*, prickly sedge *Carex spicata*, strawberry tree *Arbutus unedo* and tubular water-

dropwort *Oenanthe fistulosa* noted within the vicinity of the Proposed Development lands from the NBDC desktop study. These species were not identified within the Proposed Development and are not likely to occur here due to the urban nature of the site.

6.3.2.2 Non-native invasive plant species

A search of the NBDC database returned records for seven non-native invasive species, listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, (as amended), *Reynoutria japonica x sachalinensis = R. x bohemica*, *Heracleum mantegazzianum*, *Gunnera tinctoria*, *Impatiens glandulifera, Reynoutria japonica*, *Hyacinthoides hispanica* and *Allium triquetrum*; within *c.* 2km (refer to Section 6.2.4) of the Proposed Development site. None of these species were recorded within the vicinity of the subject lands. In addition, it also returned a record for *Elodea canadensis,* which has been delisted as a Third Schedule specie by virtue of SI 355/2015. No non-native invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 were identified within the Proposed Development site.

6.3.2.3 Habitats

The Proposed Development site is characterised by extant buildings and urban development, as well as some Recolonising Bare Ground (ED3) (Figure 6- 3). None of the recorded habitats on site correspond with Annex I habitats as per *the Interpretation manual of European Union Habitats* (European Commission, 2013), and they are of low ecological value. However, the River Corrib which is adjacent to the Proposed Development site supports Wet pedunculate oak-ash woodland (WN4), which on alluvial sites can correspond with the Priority Annex I Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) [91E0].

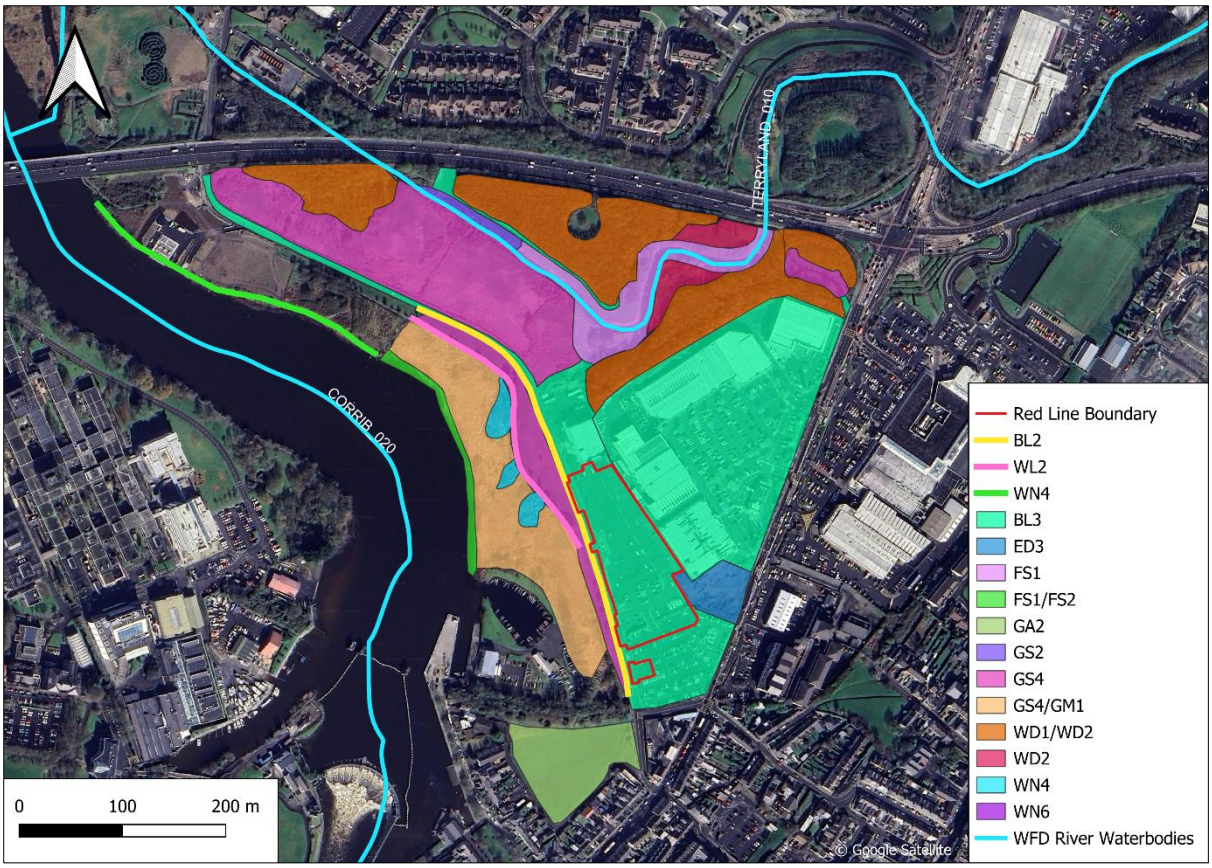

Figure 6- 3 Habitats recorded within and adjacent to the Proposed Development

6.3.2.4 Habitats Recorded Within the Proposed Develpoment Lands boundary

Buildings and articifical surfaces (BL3)

The Proposed Development site is almost entirely comprised of built or disturbed environment. This includes car parking spaces, footpaths and other areas of hardstanding. The same habitats are noted adjacent to the development site to the east, there are retail buildings and commercial buildings. This man-made habitat has no links to any Annex I habitats.

Recolonizing bare ground (ED3)

Within and adjacent to the south-eastern boundary of the Proposed Development site, there is an area of ED3 which features Ruderal pioneers and perennial species. Those recorded included Common Valerian (*Valeriana officinalis*), Common Nettle (*Urtica dioica*), Common Ragwort (*Jacobaea vulgaris*), Docks (*Rumex* spp.), Willow-herbs (*Epilobium* spp.), Greater Plantain (*Plantago major*), Ribwort Plantain (*Plantago lanceolata*), Pineappleweed (*Matricaria discoidea*), and Cat's-ear (*Hypochaeris radicata*) and butterfly bush (*Buddleja davidii*). This habitat has no links to any Annex I habitats.

Buildings and artificial surfaces and recolonising bare ground are considered to be of Local Importance (Lower Value) due to their built structure, low diversity or managed nature.

6.3.2.5 Habitats Recorded outside and adjacent to Proposed Development Site

6.3.2.5.1 Terryland Forest Park

Habitats within Terryland Forest Park (i.e. outside the Proposed Dedvelopment site) include Hedgerow (WL1), Scrub (WS1), Riparian woodland (WN5), Broadleaved woodland (WD1), Broadleaved/Conifer woodland (WD2), Wet willow, alder-ash woodland (WN6), Wet grassland (GS4), Grassy verges (GS2), Sedge Swamp (FS1), Low-land depositing river (FW2) and artifical surfaces/pathways (BL3).No detailed surveys were undertaken of the area by Scott Cawley Ltd., as the Proposed Development does not directly interfere with nor result in the loss of habitat. The potential for surface water discharges and habitat degradation have been taken into account in the assessment and mitigated for in terms of design mitigation and the implementation of tested construction mitigation measures to ensure no change in the adjacent habitats. Flora species previously recorded include Bee Orchid, Bluebell, Lords and Ladies, Meadowsweet, Cowslip, Harts-Tongue Fern, Ivy, Hazel, Oak, Ash, Alder and Hawthorn[17].

6.3.2.5.2 River Corrib (walkway)

Grassy verges (GS2),

The Grassy verges (GS2) along the River Corrib walkway shows signs of previous maintenance, so at times would be classified as GA2 Amenity grassland. At the time of surveying, there were signs of pronounced regrowth. Flora species were largely typical of regularly managed GS2 rather than infrequently managed hay meadow habitat. They included clovers (*Trifolium* spp.), Common Knapweed (*Centaurea nigra*), Selfheal (*Prunella vulgaris*), Bush Vetch (*Vicia sepium*), False Oat-grass (*Arrhenatherum elatius*), Yorkshire-fog (*Holcus lanatus*), Buttercups (*Ranunculus* spp.), Clovers (*Trifolium* spp.), Quaking-grass (*Briza media*), Meadow-grasses (*Poa* spp.), Cow Parsley (*Anthriscus sylvestris*), and Hogweed (*Heracleum sphondylium*). Owing to the impoverished floral list recorded and the presence of Perennial Rye-grass (*Lolium perenne*), a species that is more typical of agricultural and managed grasslands, this habitat has no links with the Annex I *Lowland hay meadows Alopecuris pratensis, Sanguisorba officinalis* [6510] habitat. This habitat is therefore valued as being of Local Importance (Higher Value).

Scattered trees and parkland (WD5)

Scattered trees include Willow (*Salix* spp.), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Alder (*Alnus glutinosa*), Sessile and Pedunculate Oak (*Quercus petraea and Q. robur*), Sycamore (*Acer pesudoplatanus*) , Beech (*Fagus sylvatica*), Horsechestnut (*Aesculus hippocastanum*), along with the parkland understorey of managed grassland. This habitat has no links to any Annex I habitat due to a lack of positive indicator species, and is therefore values as Local Importance (Higher Value).

Reed and large sedge swamps (FS1)

The following species were recorded from this species-poor example of this habitat and included Common Reed (*Phragmites australis*), Bulrush (*Typha latifolia)* and Sedges (*Carex* spp.) and Water Horsetail (*Equisetum fluviatile*). This habitat has no links to any Annex I

[17] Information found here; https://galwaynationalparkcity.com/terryland-forest-park/

habitat due poor species diversity and lack of positive indicator species, and is therefore valued as Local Importance (Higher Value).

Tall-herb swamps (FS2)

This aquatic habitat includes common species such as Yellow Iris (*Iris pseudacorus*), Water Horsetail (*Equisetum fluviatile*), Reeds and a variety of sedges (*Carex* spp).

While a number of common species were identified, links to Annex I habitat *Hydrophilous tall herb fringe communities of plains and of the montane to alpine level* [6340] cannot be confirmed, stands of the Annex variants of this habitat are typically fragmented and poorly developed in Ireland. The species recorded are not key typical species of the Annex I community from a precautionary basis it is assumed this habitat does conform with Annex I habitat 6430, although this habitat is not a QI of Lough Corrib SAC, and is therefore valued as being of National Importance.

Wet pedunculate oak-ash woodland (WN4)

There are three areas of WN4 that are classified as Annex I habitats (EPA Mapviewer), see Figure 6- 3. This is an alluvial site and corresponds with the priority Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]. This Annex I habitat is not a QI habitat for Lough Corrib SAC, with the East Burren Complex SAC the nearest European site designated for this habitat, located c. 15km south of the Proposed Development. As this habitat is a priority Annex I habitat, it is valued as being of National Importance.

Also featuring were Hedgerow (WL1), Treelines (WL2) Earthbanks (BL2), Stone walls (BL1 and BL3 where cemented), Residential areas, Foot paths, Raised walls, and Public road (BL3), Lowland depositing river – River Corrib (FW2), Marsh (GM1) / Wet grassland (GS4), Amenity Grassland (GA2) – a sports pitch to the south of the boat ramp and a compacted aggregate stone track (ED2) runs parallel to the public road to provide access along the river side walk way.

6.3.3 Fauna

6.3.3.1 Terrestrial Mammals (Excluding Bats)

6.3.3.1.1 Badger

Badger *Meles meles*, and their breeding and resting places, are protected under the Wildlife Acts. The NBDC database holds records for badger *Meles meles* within approximately 2km (refer to Section 6.2.4) of the Proposed Development lands. The nearest record for badger is from approximately 450m north of the lands in 2007.

No signs of badger activity were recorded within the Proposed Development site or adjacent areas during field surveys (outlined in Section 6.2.5.2). Given the high volumes of traffic, urban built environment with retail and residential areas (BL3) in immediate area and that the Proposed Development site is tarmac car park (BL3), the site has negligible value for badgers. There is however potential suitable habitat for badger to the north in Terryland Forest Park. Given the suitability of the wider environs for badgers, a precautionary approach has been taken and the local badger population is valued as being of of Local Importance (Higher Value).

6.3.3.1.2 Otter

Otter *Lutra lutra*, and their breeding and resting places, are protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).

The NBDC database holds records for otter within approximately 2km (refer to Section 6.2.4) of the Proposed Development, with the nearest record being from 2015, approximately 200m west of the Proposed Development site along the River Corrib.

No signs of otter were observed during the surveys (outlined in Section 6.2.5.2) and the Proposed Development site provides no suitable habitation nor foraging habitat for otter given the lack of on-site watercourses. There are areas of local amenity grassland (GA2), spoil and bare ground (ED2), treelines (WL2) scattered trees and parkland (WD5), hedgerow (WL1), stone walls (BL1) and a busy public road (BL3) between the western site boundary and the banks of the River Corrib. There is a lack of scrub cover throughout to provide safe passage between the riverbank and open urban areas for any potentially wide-foraging otter. As such, the Proposed Development site does not contain habitat (habitation or feeding grounds) suitable to otter and is therefore considered unsuitable for otter activity. There are suitable habitats for otter adjacent to the Proposed Development site to the west in the River Corrib and to the north in Terryland Forest Park.

Otter is a QI species of Lough Corrib SAC and Galway Bay Complex SAC, which are located *c.*15m west and 700m south of the Proposed Development respectively. The local otter population are therefore valued as being of International Importance.

6.3.3.1.3 Other Small Mammals

Hedgehog *Erinaceus europaeus*, pygmy shrew *Sorex minutus,* pine marten *Martes martes* and red squirrel *Sciurus vulgaris* are protected under the Wildlife Acts, and pine marten are also listed on Annex V of the EU Habitats Directive. The NBDC database holds records for hedgehog (approximately 400m east), pygmy shrew (approximately 50m north), pine marten (approximately 300m northwest), and red squirrel (*c.* 500m northwest) in the vicinity of the Proposed Development site.

No signs of these species were recorded during the surveys (outlined in Section 6.2.5.2) and there is no suitable habitat within the Proposed Development site. However, the adjacent lands offer suitable habitat for hedgehog and pygmy shrew, which typically commute and forage within habitats such as dry meadows and grassy verges (GS2) and scrub (WS1) and there are records of other mammal species in the wider environment. As such, the local small mammal populations are assessed as being of a Local Importance (Higher Value).

6.3.3.2 Bats

Bats, and their breeding and resting places, are protected under the Wildlife Acts. All bat species are also listed on Annex IV of the EU Habitats Directive (with the Lesser Horseshoe bat also listed on Annex II) and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).

The NBDC database holds records for four bat species, Daubenton's bat *Myotis daubentonii*, lesser horseshoe bat *Rhinolophus hipposideros*, Leisler's bat *Nyctalus leisleri* and soprano

pipistrelle *Pipistrellus pygmaeus* within approximately 2km (refer to Section 6.2.4) of the subject lands. Common pipistrelle and Leisler's bat are common throughout Ireland and are found in similar habitats as those found adjacent to the Proposed Development site, while Daubenton's bat is typically associated with watercourses and is also widespread. However, the distribution of lesser horseshoe bat is restricted to six western counties including Cork, Kerry, Limerick, Clare, Galway and Mayo and is confined to discrete clusters within these counties (NPWS & VWT, 2022)[18].

The lesser horseshoe bat is also listed in Annex II of the Habitat Directive, necessitating the establishment of SACs for their protection. Lough Corrib SAC is the closest European site designated for the protection of the lesser horseshoe bat. All bats in Ireland are listed as being of "least concern" (Nelson *et al*., 2019).

Three species were recorded during activity surveys (outlined in Section 6.2.5.2), common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle and Leisler's bat, all recorded on both survey dates. A small number of pipistrelle species *Pipistrellus* spp. calls were also recorded that cannot be differentiated by analytical software as belonging to either soprano pipistrelle or common pipistrelle as the frequency of the call falls between the thresholds for the two species. These species are closely related members of the same genus (*Pipistrellus*) and known to be common and widespread in Ireland. This does not limit the assessment as the results provide sufficient insight into whether the site supports important bat populations and whether there are any potential impacts from the Proposed Development. The locations of the bat calls recorded during the activity surveys are illustrated in Figure 6- 4, with soprano pipistrelle being the most recorded species.

[18] NPWS & VWT (2022) Lesser Horseshoe Bat Species Action Plan 2022- 2026. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Figure 6- 4 Bat species recorded during bat activity surveys

An assessment of trees on adjacent lands identified areas of mature trees with low potential roost features (PRFs), mature treeline (WL2) to north/north-east of site and situated along the site boundary, broadleaf mixed species which include Horse-chestnut (*Aesculus hippocastanum*), Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), and Beech (*Fagus sylvatica*). Some of the mature trees had dense ivy cover but no other potential roost features.

Suitable mature trees for PRFs also exist to the north of the Proposed Development site, in Terryland Forest Park, which comprises broadleaved/conifer woodland (WD1 & WD2), and areas of Wet pedunculate oak-ash woodland (WN4) along the banks of the Terryland/Sandy River (FW2) (CORRIB_020) which flows through the park land. Developing riparian woodland (WN5) is present along the course of the Terryland/Sandy river, but the majority of the trees there are maturing and do not present with potential for PRFs. There are no buildings or trees within the Proposed Development site, and therefore the site has no potential for roosting bats.

The Proposed Development site has little foraging or commuting habitat (i.e. treelines, hedgerows and waterways) for bats, however it is adjacent to a number of important foraging habitats; along the River Corrib to the west, Terryland Forest Park to the north, and the Pitch in Woodquay to the south west. The Proposed Development site is well lit with streetlights along the western and eastern boundary, which restricts the site to more light tolerent species, i.e. Leislers bat and pipistrelle species (ILP, 2023, which was echoed in the survey results of the Proposed Development site and surroundings.

Although there are Lesser horseshoe bat records from the locality, the local Lesser horseshoe bat population (associated with a network of roost sites around Galway City, including a known

maternity roost site at Menlo Castle[19]) is not part of, and does not support, the Qualifying Interest lesser horseshoe bat population of any SAC sites. While, Lough Corrib SAC is the closest European site selected for the Lesser horseshoe bat *Rhinolophus hipposideros*, the roost that forms the QI population for this European site (buildings at Ebor Hall, Clonbur, Co. Galway) is *c.* 35km away from the Project, on the northern shores of Lough Corrib. Ross Lake and Woods SAC is the next closest European site selected for the Lesser horseshoe bat. The roost that forms the QI population for this European site (buildings at Ross House) is more than 17km from the Propsoed Development. The local lesser horseshoe bat populations are therefore valued as National Importance due to their restricted range in Ireland, and have the smallest predicted core area of any other species (Roche *et al.*, 2014). However; as lesser horseshoe bats are one of the most light sensitive species in Ireland, and are generally found in unlit areas such as woodlands, field margins and scrub, none of which are within the Proposed Development, therefore, lesser horseshoe bats are not considered further.

Bats as an Ecological Receptor have been assigned Local Importance (Higher Value) on the basis that the habitats adjacent to the Proposed Development are utilised by a regularly occurring bat population of Local Importance.

6.3.3.3 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 EU Birds Directive, and / or as SCIs within designated European sites.

The full results of the desk study, including records of breeding bird species of conservation concern, are presented in Appendix 6.4 of this EIAR. These species are considered to be KERs of the Proposed Development and include the following:

- SCIs for a breeding population of SPAs (as discussed under Section 6.3.1.1);
- Species listed under Annex I of the Birds Directive; and
- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) species listed for their breeding populations (Gilbert, Stanbury and Lewis, 2021).

The results of the breeding bird desk study carried out to inform this assessment are summarised below.

The NBDC desk study returned records of a total of 76 breeding bird species within *c.*2km (refer to Section 6.2.4) of the Proposed Development site. Records included 3 species listed under Annex I of the Birds Directive, 18 Amber-listed and 11 Red-listed species. This includes 64 species with breeding and wintering populations. The three Annex I species include black-throated diver *Gavia artica*, little egret *Egretta garzetta*, and Mediterranean gull *Larus melanocephalus*, all of which are birds typically found in coastal and estuarine habitats. Bird species are grouped into habitat preferences and are discussed below in relation to their presence within the Proposed Development boundary.

Several bird species for which records were returned in the desk study are those typically found in coastal, estuarine and intertidal habitats, such as Galway Bay. Gulls favour nesting along coasts on shingle and cliffs but may utilise inland public areas for scavenging and

[19] Galway City Ring Road Project, Arup 2014

buildings for roof nesting as per habitat preferences associated with the species as listed on BirdWatch Ireland (BirdWatch Ireland 2023). As such, some gull species may utilise the buildings adjacent to the Proposed Development for nesting. However, other species associated with estuarine and coastal habitats are not deemed likely to breed within the Proposed Development but could utilise the habitats adjacent to the Proposed Development site along the River Corrib. The majority of records along the Proposed Development comprise bird species common to suburban habitats (including residential and parkland areas), such as gull and garden bird species. These species are therefore likely to use lands adjacent to the Proposed Development for breeding.

Breeding species which are associated with buildings were returned from the desk study including house martins, barn swallow, and swifts (BirdWatch Ireland, 2023). As there are currently no buildings within the Proposed Development, these species likely utilise buildings outside the Proposed Development. Several species of warblers and raptors which favour woodlands, agricultural lands and upland heathland areas were identified during the desk study. Agricultural lands and open areas are located north and west of the Proposed Development beyond Galway City. As such, these areas are suitable for use by breeding raptors and warblers such as kestrel, buzzard, and sedge warbler.

Species that are known to utilise freshwater lakes, ponds, canals, and rivers in urban habitats include wagtails, swans, water rail, ducks. Suitable habitats located within close proximity to the Proposed Development include along the River Corrib and associated habitats.

Site Surveys

A number of common bird species were observed in the Proposed Development site and surrounding areas during surveys, namely blackbird, blue tit, dunnock, goldcrest, goldfinch, house sparrow, willow warbler and wren (Figure 6- 5).

While the Proposed Development site does not provide breeding or foraging habitat for most species, the lands surrounding it including the River Corrib and Terryland Forest Park are considered high value for birds as they are commonly used and support a range of species. The Proposed Development site has therefore been valued as Local Importance (Higher Value) for breeding birds. Despite the Proposed Development not containing any suitable habitat for SCI breeding bird populations (as discussed in the NIS as part of this planning application (Scott Cawley Ltd. 2025b)), SCI breeding bird populations are valued as being of International Importance due to the hydrological connection between the Proposed Development and Lough Corrib SPA, and Galway Bay SPA.

Figure 6- 5 Breeding bird species recorded during surveys at the Proposed Development site

6.3.3.4 Wintering 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.

The full results of the desk study, including records of wintering bird species of conservation concern, are presented in Appendix 6.4 of this EIAR. These species are considered to be KERs of the Proposed Development and include the following:

- SCIs for a wintering population of SPAs (as discussed under respective SPAs in Section 6.3.1.1);
- Species listed under Annex I of the Birds Directive; and,
- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) species listed for their wintering populations.

The results of the wintering bird desk study carried out to inform this assessment are summarised below

The desk study returned records of a total of 29 wintering bird species within *c.* 2km (refer to Section 6.2.4) of the Proposed Development site. Records included 4 species listed under Annex I of the Birds Directive, 12 SCI species, 7 Amber-listed, and 11 red-listed species.

The majority of wintering bird species identified in the desk study are typically found in coastal, estuarine, and wetland habitats, including Galway Bay, and wetland/marsh habitat in the River

Corrib and Lough Corrib, e.g. bar-tailed godwit *Limosa lapponica*, goldeneye *Bucephala clangula*, greenshank *Tringa nebularia,* wigeon *Anas Penelope*, great northern diver *Gavia immer,* grey plover *Pluvialis* squatarola, Jack snipe *Lymnocryptes minimus*, northern pintail *Anas acuta*, purple sandpiper *Calidrus maritima*, red knot *Calidrus canutus*, and whimbrel *Numenius phaeopus*. There is no suitable habitat for these species within the Proposed Development, as it is comprised of man-made urban habitats. Suitable habitat for these species is located in close proximity to the site however, along the River Corrib, and in Terryland Forest Park.

No wintering bird species were observed foraging within the site during wintering bird surveys. Five species were observed flying over the site: black-headed gull *Chroicocephalus ridibundus*, herring gull *Larus argentatus,* common gull *Larus canus*, lesser black-backed gull *Larus fuscus* and oystercatcher *Haematopus ostralegus* (Figure 6- 6). Mallard *Anas platyrhynchos* were observed flying over the River Corrib, adjacent to the Proposed Development site (Figure 6- 6).

The nearest site designated for black-headed gull is Inner Galway Bay SPA, approximately 700m south of the Proposed Development site. The nearest site designated for herring gull, is Inishkea Islands SPA, located *c*.120km northwest of the Proposed Development site. The nearest designated site for common gull is Inner Galway Bay SPA, approximately 700m south of the Proposed Development site. The nearest designated site for lesser black-backed gull is Lough Mask SPA, located *c*. 36.5km north-west of the Proposed Development site. The nearest designated site for oystercatcher is Cumeen Strand SPA, located *c.* 115km north-east of the Proposed Development site. The nearest site designated for mallard is Lough Ree SPA, located *c*. 74km east of the Proposed Development site.

The Proposed Development site has therefore been valued as Local Importance (Higher Value) for wintering birds. Despite the Proposed Development not containing any suitable habitat for SCI wintering bird populations (as discussed in the NIS as part of this planning application), SCI wintering bird populations are valued as being of International Importance due to the hydrological connection between the Proposed Development site and Lough Corrib SPA and Galway Bay SPA.

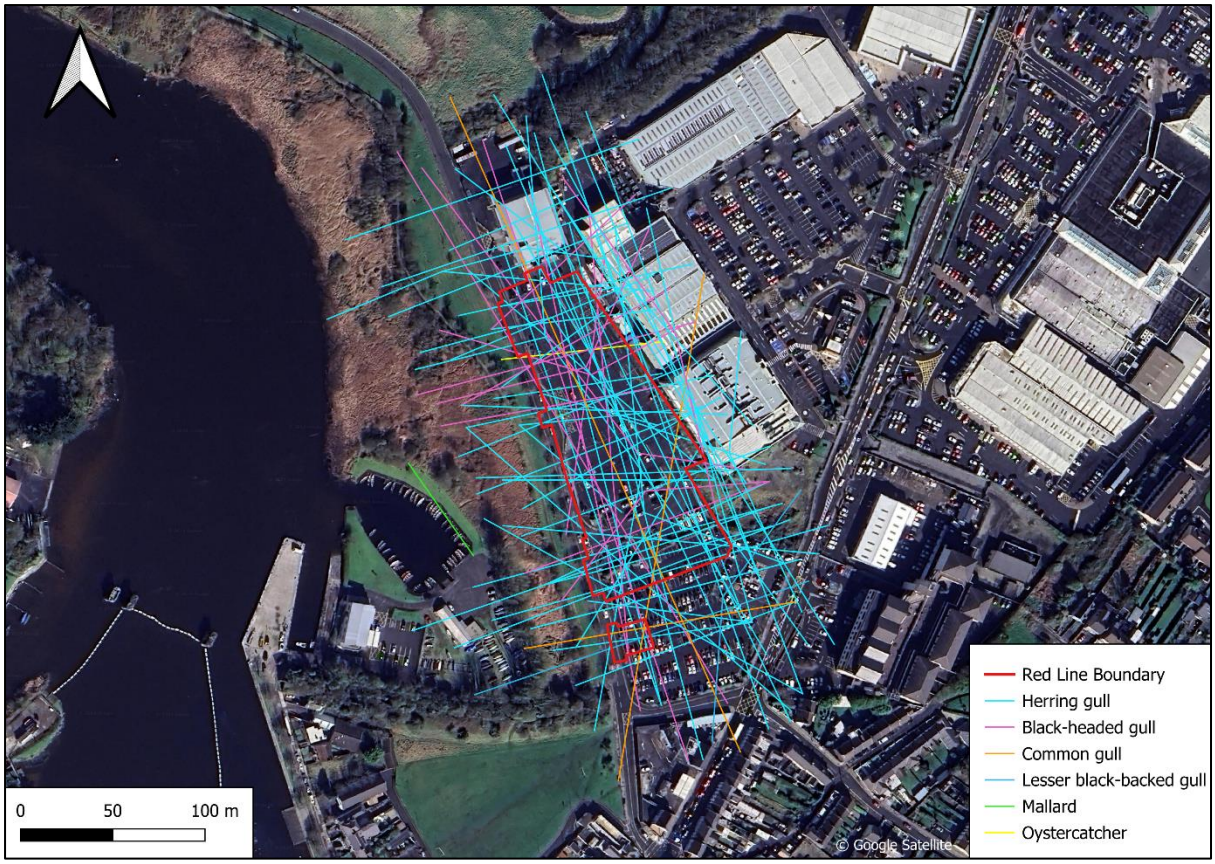

Figure 6- 6 Species recorded flying over the site during wintering bird surveys

6.3.3.5 Amphibians

Common frog *Rana temporaria* and the smooth newt *Lissotriton vulgaris* are protected under the Wildlife Acts. Common frog is also listed under Annex V of the Habitats Directive.

The NBDC database returned records for smooth newt *Lissotriton vulgaris* (approximately 100m east of the Proposed Development) and common frog *Rana temporaria* (approximately 400m west) of the Proposed Development lands.

No evidence of common frog or smooth newt were identified within the Proposed Development site during the surveys (outlined in Section 6.2.5.2). Amphibians require access to aquatic habitats (including ephemeral ponds) to breed. Suitable habitats for amphibians exist adjacent to the Proposed Development site but the Proposed Development site does not contain any aquatic habitat features and therefore does not contain suitable habitat for amphibians. Local common frog and smooth newt populations are of Local Importance (Higher Value) due to the close proximity of wet grassland and marsh habitat between the River Corrib and the Proposed Development site, and other suitable habitats within Terryland Forest Park.

6.3.3.6 Common lizard

Common lizard *Zootoca vivipara* were not recorded during any surveys (outlined in Section 6.2.5.2) and have not been recorded within the vicinity of the Proposed Development site, based on a review of the NBDC database.

This species is strongly associated with heathland and coastal dune habitats (Marnell, 2002; Farren *et al.*, 2010); neither habitat types were identified within the Proposed Development

site. Therefore, common lizard is not considered likely to be present within the Proposed Development site. As such, common lizard populations are considered to be of Local Importance (Lower Value).

6.3.3.7 Aquatic Species

6.3.3.7.1 Fish

Fish species are protected under the Fisheries Acts and by fishing by-laws. Atlantic salmon *Salmo salar*, sea lamprey *Petromyzon marinus* and the brook lamprey *Lampetra planeri*, are listed on Annex II of the Habitats Directive. Electro-fishing surveys and aquatic surveys were not carried out as part of the application for the Proposed Development, as the Proposed Development is not located within any watercourses and will not involve any works in or near water.

There are NBDC records of sea lamprey, brook lamprey and salmon in the vicinity of the Proposed Development in the River Corrib. These species are QIs for Lough Corrib SAC, approximately 15m from the site. They are therefore considered to be of International Importance. The desk study also returned records of brown/sea trout *Salmo trutto*. As Lough Corrib is designated a Salmonid Water under S.I. No 293/1988 European Communities (Quality of Salmonid Waters Regulations 1988), brown/sea trout are also valued as being of International Importance.

The desk study also returned records of European eel *Anguilla anguilla,* with a number of records downstream of the Proposed Development in the River Corrib. This species is the most threatened fish in Irish freshwaters (King *et al*., 2011) and the alarming decline of the species in recent decades has resulted in a classification of 'Critically Endangered' (Jacoby and Gollock 2014). European eel populations are valued as being of National Importance (Kelly *et al*., 2010).

No other records of fish species were returned from the desk study. All other fish species are of Local Importance (Higher Value).

6.3.3.7.2 White-Clawed Crayfish *Austropotamobius pallipes*

White-clawed crayfish are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. Ireland remains the only part of the EU with no introduced species of crayfish, as such it is of key conservation concern (NPWS 2021). White-clawed crayfish are a QI species of Lough Corrib SAC, 15m from the Proposed Development.

The NBDC desk study did not return any records of white-clawed crayfish within *c.* 2km of the Proposed Development. The closest record for this species was recorded as part of the NPWS and Marine Institute National Crayfish Plague Surveillance Programme and is located in Curraghmore on the River Clare (a tributary of Lough Corrib), *c.* 10km upstream of the Proposed Development. Surveys completed for the N6 Galway City Ring Road Project (GCRR) (Bord Pleanála Case reference: MA07.302885) for white-clawed crayfish did not identify any crayfish in the lower River Corrib. White-clawed crayfish are freshwater species and do not occur in brackish estuarine habitats and they have not be recorded downstream of the Proposed Development. Therefore white-clawed crayfish are not considered further.

6.3.3.7.3 Freshwater Pearl Mussel *Margaritifera margaritifera*

Freshwater pearl mussel are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. They are also a QI species of Lough Corrib SAC, 15m from the Proposed Development. The NBDC desk study did not return any records of freshwater pearl mussel within *c.* 2km of the Proposed Development. The closest record for this species is located in the Owenriff River (a tributary of Lough Corrib), over 3km upstream of the Proposed Development. The Lough Corrib SAC Conservation Objectives document (NPWS, 2017) which shows the extent of this species population within the SAC, is restricted to the BallycuirkeLoughStream_SC_010 sub catchment, upstream of the Proposed Development. However, salmonid species passing through the lower River Corrib, form a key supporting role to the QI freshwater pearl mussel population and are at risk of water quality impacts in the lower River Corrib, i.e. where the Proposed Development is located. The local freshwater pearl mussel is therefore considered to be of International Importance.

6.3.3.7.4 Marine Mammals

Harbour seal *Phoca vitulina,* grey seal *Halichoerus grypus*, harbour porpoise *Phocoena phocoena,* and bottlenose dolphin *Tursiops truncates* are known to be present in Galway Bay, and along the west coast. These species are all protected under the Wildlife Acts, and also listed on Annex II of the Habitats Directive, whilst all cetaceans are also listed on annex IV of the Habitats Directive.

There are NBDC records of harbour seal, grey seal, harbour porpoise and bottlenose dolphin within the vicinity of the Proposed Development. Harbour seal is a QI for Galway Bay Complex SAC, approximately 700m south of the site. Harbour porpoise is a QI for Inishmore Island SAC, located *c*. 38km southwest of the Proposed Development in Galway Bay. The nearest European site designated for grey seal and bottlenose dolphin is Slyne Head SAC, located *c.* 76km west of the Proposed Development. Whilst these SACs are located a significant distance way (with the exception of Galway Bay Complex SAC), marine mammal species have wide foraging ranges, and they are therefore considered to be of International Importance.

A number of additional protected marine mammals are known to occur within Galway Bay and off the Westcoast downstream of the Proposed Development, including:

- Common Dolphin *Delphinus delphis*;
- Minke Whale *Balaenoptera acutorostrata*;
- Fin whale *Balaenoptera physalus;*
- White-beaked Dolphin *Lagenorhynchus albirostris*;
- Humpback Whale *Megaptera novaeangliae*;
- Striped Dolphin *Stenella coeruleoalba*; and
- Risso's Dolphin *Grampus griseus*.

These cetacean species are all protected under the Wildlife Acts and Habitats Directive. Common dolphin and Risso's dolphin, found both in inshore and offshore coastal waters are occasionally sighted in Galway Bay and off the western coastline. Minke whales, and humpback whale species are migratory and frequent Irish coastlines each year. White-beaked dolphin and striped dolphin are pelagic species and are rarely sighted on Irish coastlines, favouring the offshore waters of the continental shelf. These species are protected under Annex IV of the Habitats Directive and the Wildlife Acts and as such are valued as being of National Importance.

6.3.3.8 Invertebrates

6.3.3.8.1 Marsh Fritillary *Euphydryas aurinia*

The Marsh fritillary butterfly *Euphydryas aurinia* is listed in Annex II of the Habitat Directive, necessitating the establishment of SACs for their protection. It is listed as vulnerable on the Irish Red List for butterflies (Regan *et al*., 2010).

There are historic desktop records for Marsh fritillary within 2km of the Proposed Development boundary from the NBDC desktop search.

There are no European sites designated for Marsh fritillary within the ZOI of the Proposed Development. The nearest designated sites for Marsh fritillary are the Connemara Bog Complex SAC, located approximately 12.7km west of the Proposed Development, and the East Burren Complex SAC, located approximately 14.5km south of the Proposed Development.

Marsh fritillary are restricted to habitats containing a low, open sward with abundant devil's-bit scabious *Succisa pratensis* including sand dunes, calcareous grassland, fens, raised and blanket bogs, upland heaths and grasslands. There is no suitable habitat for marsh fritillary within the Proposed Development, as it consists of man-made, urban environment. Therefore, this species is not considered further.

6.3.4 Summary of Ecological Evaluation

Table 6-3 summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features: CIEEM and National Roads Authority guidelines (CIEEM, 2024 and National Roads Authority, 2009).

Table 6-3 Ecological evaluation of all receptors, considering legal protection, conservation status and local abundance, and identification of the Key Ecological Receptors (KERs).

Ecological Receptor	Ecological Valuation	KER
Designated Sites		
Lough Corrib SAC	International Importance	Yes
Lough Corrib SPA	International Importance	Yes
Galway Bay Complex SAC	International Importance	Yes
Inner Galway Bay SPA	International Importance	Yes
All other SAC or SPA sites	International Importance	No
Galway Bay Complex pNHA	National Importance	Yes
Lough Corrib pNHA	National Importance	Yes

Ecological Receptor	Ecological Valuation	KER
All other NHA or pNHA sites	National Importance	No
Habitats		
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	No
Recolonising bare ground (ED2)	Local Importance (Lower Value)	No
Grassy verges (GS2)	Local Importance (Higher Value)	Yes
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Yes
Reed and large sedge swamps (FS1)	Local Importance (Higher Value)	Yes
Tall-herb swamps (FS2)	National Importance	Yes
Wet pedunculate oak-ash woodland (WN4)	National Importance	Yes
Fauna Species		
Badgers	Local Importance (Higher Value)	Yes
Otter	International Importance	Yes
Bats	Local Importance (Higher Value)	Yes
Other small mammals	Local Importance (Higher Value)	Yes
Breeding birds (outside of SPA populations)	Local Importance (Higher Value)	Yes
Breeding birds (SPA populations)	International Importance	Yes
Wintering birds (outside of SPA populations)	Local Importance (Higher Value)	Yes
Wintering birds (SPA populations)	International Importance	Yes
Common Lizard	Local Importance (Lower Value)	No
Amphibians	Local Importance (Higher Value)	Yes
Atlantic salmon	International Importance	Yes
Brown/sea trout	International Importance	Yes
Lamprey species	International Importance	Yes
European eel	National Importance	Yes
All other fish species	Local Importance (Higher Value)	Yes
White-Clawed Crayfish	International Importance	No
Freshwater pearl mussel	International Importance	Yes

Ecological Receptor	Ecological Valuation	KER
Marine Mammals (SAC populations)	International Importance	Yes
Marine Mammals (outside of SAC populations)	National Importance	Yes

6.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development.

The LDA, in partnership with GCC, propose to bring forward regeneration plans for a residential led mixed use development which will enhance the existing and adjacent blue and green infrastructure. The residential element of the development will include for affordable housing options. The mixed-use element is expected to include office/commercial uses as well as provision for civic and cultural arts infrastructure. The overall Development Framework aims to deliver a three-phase development as outlined in Chapter 2 of this EIAR. LDA propose to apply for permission for development of the first phase of development. It is not currently known when the second and third phases, which aim to deliver mixed use development and additional residential use, will be brought forward for planning.

The proposal will consist of the construction of a new residential development of 219 no. apartment units and a childcare facility (approximately 241 sq m) in the form of 1 no. new residential block (5 - 9 storeys over lower ground floor level) with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.144 ha.

The development will provide for:

- 219 no. residential apartment units (109 no. 1-bedroom units, 100 no. 2-bedroom units and 10 no. 3-bedroom units) each with an associated private open space area in the form of a balcony/terrace.
- A new raised pedestrian boardwalk along the western elevation of the building.
- Open Space (approx. 2778 sqm) is proposed in the form of (a) public open space (approx. 1,183 sqm) to the west of the proposed building fronting on to Dyke Road accommodating outdoor seating, planting, a sunken garden and pedestrian pathways and connections; and (b) communal open space (approx. 1,065 sqm) to the east of the proposed building in the form of a courtyard including outdoor seating, planting, a children's play area and outdoor sports equipment.
- A childcare facility (approx. 241 sqm) with dedicated external play area (approx. 60 sqm) at ground floor level.
- A total of 33 no. car parking spaces at surface level to include 2 no. accessible spaces and 2 no. set down / drop off spaces to serve the childcare facility.
- A total of 455 no. bicycle parking spaces to include 330 no. standard spaces, 100 no. visitor spaces and 25 no. cargo bicycle spaces all at surface / lower ground floor level.
- Vehicular access is proposed via Dyke Road at 2 no. locations (to the north-west and south-west of the site). Pedestrian and Cyclist access is also delivered throughout the

site via Dyke Road and includes a pedestrian crossing at Dyke Road. Pedestrian / cyclist connections to adjoining development to the north-east and south-east are also delivered.

- The proposal also provides for a further vehicular access point to the south of the main development site to facilitate new access to the existing southern car park. A total of 12 no. of car parking spaces are removed with 158 no. car parking spaces remaining at this location.
- 2 no. telecommunications lattice towers (overall height 6.45 m and 7.67 m) affixed to the rooftop supporting 9 no. 2m 2G/3G/4G antennas; 9 no. 0.8m 5G antennas; 6 no. 0.3m microwave transmission links; together with all associated telecommunications equipment and cabinets

The Proposed Development will also provide for all associated site development works, infrastructure, excavation and clearance works including decommissioning the existing Black Box Theatre waste water pumping station and providing a new pumping station complete with emergency storage, all boundary treatment, public lighting, internal roads and pathways, ESB substations, switch room, water tank rooms, storage room, meter rooms, sprinkler tank room, parcel stores, comms room, bin storage, bicycle stores, hard and soft landscaping, play equipment, below ground attenuation tanks, nature based SuDs features, green roofs, roof plant, site services and connections for foul drainage, surface water drainage and water supply.

6.5 Potential Impact of the Proposed Development

6.5.1 Construction Phase

6.5.1.1 Construction Phase Impacts on Designated Sites

This section describes and assesses the potential for the Proposed Development to result in likely significant effects on designated sites that lie within the ZoI of the Proposed Development.

6.5.1.1.1 European Sites

This section describes and assesses the potential for the Proposed Development to result in likely significant effects on European sites that lie within the ZoI of the Proposed Development. In the context of European sites this is focused on the habitats and species for which the sites are selected (QIs for SACs and SCIs for SPAs) and the conservation objectives supporting their conservation status in each site. This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented separately in the AA Screening Report and NIS (Scott Cawley Ltd., 2025a & b) for the Proposed Development that accompanies this application.

Section 3.3 of the AA Screening report identified the potential impacts of the Proposed Development in relation to European sites, which are summarised below:

- Habitat loss and fragmentation: The Proposed Development site does not lie within or overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts. As the Proposed Development site does not

traverse any European sites there is no potential for habitat fragmentation to occur. The habitats within the proposed development site do not support significant populations of any fauna species linked with the QI/SCI populations of any European site(s) in Appendix 6-1.

- Habitat degradation as a result of hydrological impacts: The potential release of contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water drainage during construction, or operation, has the potential to affect water quality in the receiving environment. Such a pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and the accidental spillage and/or leaks of contaminants into receiving waters. A pollution event, of a sufficient magnitude, has the potential to affect the receiving aquatic and marine environments (either alone or in combination with other pressures on water quality) to an extent that undermines the conservation objectives of Lough Corrib SAC, Lough Corrib SPA, Galway Bay SAC and Inner Galway Bay SPA.
- Habitat degradation as a result of hydrogeological impacts: The proposed development lies within the Clare-Corrib GWB. Based on the findings of the Hydrological and Hydrogeological Risk Assessment Report (Enviroguide Consulting, 2024), in an unmitigated scenario, there is a potential risk associated with the discharge of contaminants to ground affecting both the underlying aquifer and downstream waterbodies including the Corrib River, the Corrib Estuary and associated downstream European sites. The Clare-Corrib GWB beneath the site is considered to have high levels of interconnection between groundwater and surface water with limited potential for attenuation of dissolved phase contaminants which have the potential to rapidly migrate towards receiving watercourses and European sites. Therefore, there is the possibility of the Proposed Development undermining the conservation objectives of all of the qualifying interests or special conservation interests of Lough Corrib SAC, Lough Corrib SPA, Galway Bay SAC and Inner Galway Bay SPA, either alone or in combination with any other plans or projects, as a result of hydrogeological effects.
- Habitat degradation as a result of introducing/spreading non-native invasive species: No Third Schedule non-native invasive species were recorded within the Proposed Development site, and therefore there is no risk of their accidental spread or introduction to habitats within European sites.
- Disturbance and displacement impacts: Disturbance or displacement of fauna species could potentially occur within the vicinity of the Proposed Development. The potential ZoI for mammals could extend to 150m (Cutts *et al.*, 2009)[20] and 300m for birds. Lough Corrib SAC is within the disturbance ZoI and there is the potential for Qualifying Interest mobile species to be disturbed and displaced from foraging habitat within the site for the duration of construction and/or operation. Whilst Galway Bay Complex SAC

[20] This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of otters prior to the Construction of National Road Schemes (TII 2006) and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) (TII 2005) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

is not within the disturbance ZoI of the Proposed Development, it is possible that the QI otter population from this SAC, overlap with the Lough Corrib population. Research carried out by Ó Néill *et al.,* (2009) on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged *c*. 7.5km while male otter home ranges varied between *c*. 7-19km. Increased human presence and/or noise and vibration associated with construction works may temporarily displace commuting or foraging otter, particularly during noisy activities. Otter are known to tolerate human disturbance under certain circumstances[21,22]. Construction works will typically be undertaken during normal daylight working hours. Whilst otters are generally nocturnal in habit and can (in many circumstances) tolerate high levels of human presence and disturbance, temporary displacement in the vicinity of the Proposed Development noise and vibration associated with construction works could temporarily displace commuting or foraging otter during the construction phase of the development. Therefore, there is potential for the Proposed Development to result in significant effects (albeit short-term) which could have implications for the conservation objectives of Lough Corrib SAC and Galway Bay Complex SAC as a result of disturbance/displacement impacts on otter during construction.

- Air quality impacts: The Proposed Development has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Development. Dust generation and deposition during construction has the potential to degrade habitats within several hundred metres of the Project. The majority of dust deposition, however, occurs within approximately 50m of the proposed construction works or construction traffic routes, and will be temporary in nature. Lough Corrib SAC is located approximately 15m west of the site boundary. Construction works will take place <20m from Lough Corrib SAC which in accordance with IAQM Guidance (IAQM, 2024) is considered a high sensitivity receiver. Therefore, the sensitivity of the Area to Ecological Impacts is High; in terms of construction and track out dust impacts, and low risk for earthworks. The results from the air quality assessment deem the potential impacts of the Proposed Development on habitats to be significant from a local to international geographic scale.
- Collision risk: The presence of new multi-storey structures within the Proposed Development site could potentially result in direct mortality of bird species that utilise the site for commuting, due to collisions. Bird collisions with man-made structures are common and well documented[23] with migratory passerine species the most prevalent

[21] Bailey, M. and Rochford J. (2006) *Otter Survey of Ireland 2004/2005*. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

[22] The Environment Agency (2010). *Fifth otter survey of England 2009-2010*. Environment Agency, Almondsbury, Bristol, England

[23] Banks, R.C (1979). *Human related mortality of birds in the United States*. U.S. Fish Wildl. Serv. Spec. Sci. Rep. Wildl. 215. 16 pp.

Jenkins, A., Smallie, J.J. and Diamond, M. (2010). Avian collisions with power lines: A global review of causes and mitigation with a South African perspective. *Bird Conservation International*, 20(03), 263 – 278.

Klem, D. (1990). Collisions between birds and windows: mortality and prevention. *Journal of Field Ornithology*, 61, 120–128.

collision victims[24]. Bird collision with buildings is generally associated with reflective material such as windows or large surfaces of glass which create a mirror and appear to show the continuation of the sky or surrounding landscape, an effect that can be exacerbated by lighting [25]. Whilst the design of the facades of the Proposed Development do include windows, no large surfaces of glass are proposed. Considering the low collision risk associated with the species in question, in combination with the building location, design and materials used, the potential for mortality due to building collisions is low. It is acknowledged that there could be a low level of mortality attributable to bird collision with glazing on the proposed buildings. However, due to the low numbers of species and individuals recorded over the Proposed Development site and their avoidance capabilities, this impact would not result in any population level effect or change in distribution of any species, including any SCI species for SPAs within the ZoI of the proposed development.

The assessment presented in the AA Screening Report and NIS concluded that the potential impacts associated with the Proposed Development have the potential to affect the receiving environment and, consequently, and therefore affect the conservation objectives supporting the QIs or SCIs of Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and Inner Galway Bay SPA.

6.5.1.1.2 Nationally Designated Sites

In the case of NHAs and pNHAs the assessment considers whether the integrity[26] of any such site would be affected by the Proposed Development with reference to the ecological features for which the site is designated or is proposed.

The Proposed Development does not overlap with any NHA/pNHA sites, and it is not located in the immediate vicinity of any NHA/pNHA sites.

However, the following nationally designated sites have potential impact pathways with the Proposed Development:

- Galway Bay Complex pNHA (via the proposed surface and foul water drainage networks)

Erickson, W.P., Johnson, G.D. and Young, P.D. (2005). *A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions*. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191. 2005.

Erickson, W. P., G. D. Johnson, M. D. Strickland, D. P. Young, Jr., K. J. Sernka, and R. E. Good. (2001). *Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States*. National Wind Coordinating Committee, c/o RESOLVE, Inc., Washington, D.C.

[24] Bing G.-C., Choi C.-Y., Nam H.-Y., Park J.-G., Hong G.-P., Sung J.-K., Chae H.-Y & Choi Y.-B. (2012). Causes of mortality in birds at stopover islands. *Korean J. Ornithol*., 19, 23–31.

Longcore, T. Rich, C., Mineau, P., MacDonald, B., Bert, D.G., Sullivan, L.M., Mutrie, E., et al. (2013). Avian mortality at communication towers in the United States and Canada: which species, how many, and where? *Biological Conservation,* 158, 410-419.

[25] Sheppard, C. & Phillips, G. (2015). *Bird-Friendly Building Design*, 2nd Ed. The Plains, VA: American Bird Conservancy, 2015.

[26] Refer to Section 6.2.6 for definition and impact assessment methodology.

- Lough Corrib pNHA (as birds from the pNHA site may utilise lands within the ZoI of the Proposed Development)

In the case of Galway Bay Complex pNHA and Lough Corrib pNHA, which are remote from the Proposed Development site, the potential hydrogeological impact pathways connecting the Proposed Development to these sites are the same as those of Galway Bay SAC, Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and Inner Galway Bay SPA via association with the Clare-Corrib GWB.

NHAs and pNHAs within the ZOI of the Proposed Development are presented and in Table 2 in Appendix 6.1.

6.5.1.1.2.1 Habitat Degradation – Surface Water Quality

During construction, contaminated surface water runoff and / or an accidental spillage or pollution event directly into the River Corrib, or any surface water feature, including existing drainage infrastructure that drain to the Terryland River, has the potential to have a significant negative effect on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, large extents of the Galway Bay Complex pNHA downstream could also be affected. It is considered unlikely that a pollution event of such a magnitude would occur during construction, or if it did occur, it would be temporary in nature. Nevertheless, a precautionary approach has been adopted in the assessment of potential risk of impacts on water quality. Consequently, detailed mitigation measures are required to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or pollution events having any perceptible effect on water quality during construction of the Proposed Development.

6.5.1.2 Construction Phase Impacts on Habitats

6.5.1.2.1 Habitat Loss

The ZoI of habitat loss impacts will be confined to within the Proposed Development boundary as there will be no habitat loss outside of this area. None of the habitats identified within the Proposed Development were rated greater than of Local Importance (Lower Value). The habitat loss will include buildings and artificial surfaces and recolonising bare ground. As these habitats are of Local Importance (Lower Value), their removal or modification will not result in a likely significant effect on biodiversity at any geographic scale.

Habitat loss may also lead to habitat fragmentation, i.e., creating new divisions of existing habitat blocks and/or contributing to an existing trend of fragmenting semi-natural habitat blocks; however, considering the habitat types to be lost, their extents and the surrounding habitats beyond the Proposed Development boundary, this potential impact will not result in a significant effect at any geographic scale.

6.5.1.2.2 Introducing or spreading non-native invasive plant species

Planting, dispersing, or allowing/causing the dispersal, spread or growth of certain non-native plant species is controlled under Article 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011, and refers to plant or animal species listed on the Third Schedule of those regulations. The accidental spread of non-native invasive plant species as a result of

construction works has the potential to impact terrestrial habitats within and immediately adjacent to the Proposed Development boundary, potentially affecting plant species composition, diversity and abundance over the long-term. The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g. designated area for nature conservation or areas of Annex I habitat) have the potential to result in a likely significant negative effect, at geographic scales ranging from local to international.

No non-native invasive species of the Third Schedule were recorded within the Proposed Development site and therefore there is no risk of them being spread beyond the boundaries of the Proposed Development site.

6.5.1.2.3 Habitat degradation – Surface Water Quality

During construction, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have significant negative effects on water quality and consequently affect aquatic and wetland habitats in the baseline environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, estuarine and coastal habitats downstream could also be affected. It is unlikely that a pollution event of such a magnitude would occur during construction, or if it did occur, it would be temporary/short-term in nature. Nevertheless, a precautionary approach has been adopted in the assessment of the potential risk of impacts on water quality. Consequently, detailed mitigation measures are required to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or a pollution event as a result of the Proposed Development having any perceptible effect on water quality during construction.

During construction, suspended solids, silt and other harmful materials generated as a result of the Proposed Development could be released into the local drainage infrastructure and travel downstream, including, potentially, into the River Corrib and the wider habitats downstream of the Proposed Development (i.e. Galway Bay). Cement-based products used in the Construction Phase of the Proposed Development (e.g. concrete and/or bentonite which are highly corrosive and alkaline materials), if released into any watercourse may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, the potential to be negatively impacted from a wide range of pollutants contained within surface water runoff remains. Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of downstream estuarine and coastal habitats in the previously mentioned estuaries within, and therefore, has the potential to result in a significant negative impact from a local to an international scale. Habitat degradation as a consequence of construction effects on surface water quality also has the potential to affect the conservation status of tidal rivers (CW2) / Annex I habitat Estuaries [1130], and therefore, has the potential to result in a likely significant effect at a National and International scale in the case of the aquatic / coastal / wetland Annex I habitats located within the Zol of the Proposed Development.

6.5.1.2.4 Habitat Degradation – Groundwater

Any effects on the existing hydrogeological baseline supporting wetland habitats have the potential to negatively affect habitat extent and distribution, and vegetation structure and composition. The potential effects upon the existing hydrogeological regime are not necessarily limited to habitats within the Proposed Development boundary but can be far-reaching, with significant negative long-term effects.

Groundwater dependent habitats were not identified within the Proposed Development, however, pockets of priority Annex I Alluvial woodland [91E0] were identified adjacent to the boundary along the banks of the River Corrib. This habitat is sensitive to changes to the underlying hydrogeological regime. According to the Conceptual Site Model (CSM) (Enviroguide Consulting, 2024) for the Proposed Development, the underlying aquifer has been identified as “Regionally Important Aquifer – Karstified (conduit) (RKc)” which has inherent pathways for potential pollutants pathways within the GWB and to migration to receiving waterbodies including the Corrib River and Corrib Estuary. In a worst-case scenario during either the Construction Phase (e.g., accidental release of fuels, chemicals or oils through the failure of secondary containment or a materials handling accident) in the absence of any mitigation measures there is potential for discharge of contaminants to groundwater. The groundwater within the Clare-Corrib GWB will be impacted and taking account of the limited attenuation within the aquifer, it is considered that there is an indirect risk to the downstream receiving waterbodies (i.e., Corrib River, the Corrib Estuary, Galway Bay).

Piling during the construction phase of the Proposed Development, may potentially create pathways for contaminants to enter underlying groundwater. Pilling also has the potential to alter karstic flow paths linking downstream waterbodies with pollutants. In the worst-case scenario drilling fluids used during piling could potentially be introduced to the subsurface and groundwater and rapidly migrate to the receiving waterbodies including the Terryland Stream, the Corrib River, the Corrib Estuary and downstream receiving waterbodies. Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology (informed by the piling risk assessment) will minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater.

Therefore, habitat degradation as a result in changes to the hydrogeological regime has the potential to result in a significant effect, at the International Scale.

6.5.1.2.5 Habitat Degradation – Air Quality

As discussed in Section 6.5.1.1.1, the Proposed Development has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Development. Dust generation and deposition during construction has the potential to degrade vegetated habitats within several hundred metres of the Proposed Development. The majority of dust deposition, however, occurs within approximately 50m of the proposed construction works or construction traffic routes, and will be temporary in nature.

Dust deposition due to demolition, earthworks, construction and trackout has the potential to affect sensitive habitats and plant communities. Dust can have two types of effect on

vegetation: physical and chemical. Direct physical effects include reduced photosynthesis, respiration and transpiration through smothering. Chemical changes to soils or watercourses may lead to a loss of plants or animals for example via changes in acidity. Indirect effects can include increased susceptibility to stresses such as pathogens and air pollution. These changes are likely to occur only as a result of long-term demolition and construction works adjacent to a sensitive habitat. Often impacts will be reversible once the works are completed, and dust emissions cease.

Lough Corrib SAC is located approximately 15m west of the site boundary. Construction works will take place <20m from Lough Corrib SAC boundary which in accordance with IAQM Guidance (IAQM, 2024) is considered a high sensitivity receiver. Therefore, the sensitivity of the Area to Ecological Impacts is High; in terms of construction and track out dust impacts, and low risk for earthworks. The results from the air quality assessment deem the potential impacts of the Proposed Development on habitats, to be significant from a local to international geographic scale.

6.5.1.3 Construction Phase Impacts on Badger

6.5.1.3.1 Habitat loss

No signs of badger, including setts or feeding signs, were observed across the Proposed Development site. There is no suitable habitat for badger within the Proposed Development site and it is predicted that habitat loss associated with the Proposed Development will not impact the local badger population and will not result in a likely significant negative effect, at any geographic scale.

6.5.1.3.2 Disturbance/displacement

Increased human presence and/or noise and vibration during construction or operation, has the potential to displace badgers from adjacent foraging habitat. However, considering the lack of evidence of any badger activity recorded within the Proposed Development site and that the majority of human disturbance/noise will typically be undertaken during normal daylight hours and badgers are nocturnal in habit, significant displacement of badgers from foraging areas is unlikely to affect the local badger population.

It is predicted that displacement/disturbance effects associated with increased human presence and/or noise and vibration and artificial light spill is unlikely to affect the conservation status of the local badger population and will not result in significant negative effect, at any geographic scale.

6.5.1.3.3 Mortality Risk

Site clearance and construction works have the potential to result in the mortality of badger species, were they to commute across the Proposed Development. The potential for this impact to occur would be expected to be greater during the breeding season when juveniles venture out of the maternal sett or indeed when males leave the sett earlier on.

Furthermore, the potential for direct mortality to badger would be greater in more vegetated areas, as opposed to disturbed ground / urban habitats, as these areas would offer more in terms of breeding / resting / foraging habitat for badger. Although the Proposed Development is urban in nature and contains no badger habitat, suitable habitat exists adjacent to the Proposed Development in Terryland Forest Park and along the banks of the River Corrib. Badgers

are also frequently observed in urban habitats, thus, there remains the risk that commuting / foraging badger might become entrapped in deep excavations, particularly in areas adjacent to open parkland.

Given the relatively low numbers that might be expected to be affected, and that these species are highly mobile, the risk of mortality due to site clearance and/or excavation is unlikely to result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale. However, on a precautionary basis, mitigation measures have been designed to protect badger from such impacts.

6.5.1.4 Construction Phase Impacts on Otter

The otter population in Galway Bay, the River Corrib, and Lough Corrib, and all associated and contributing watercourses and waterbodies, form part of the Qualifying Interest population of Galway Bay Complex SAC.

6.5.1.4.1 Habitat loss

There are no aquatic habitats within the Proposed Development site there will be no loss of aquatic or suitable riparian/terrestrial foraging habitat due to the Proposed Development. No signs of otter were identified within the Proposed Development site during the multidisciplinary survey. Therefore, the Proposed Development will not result in a significant negative effect with regard to habitat loss for otter, at any geographic scale.

6.5.1.4.2 Disturbance/displacement

Increased human presence and/or noise and vibration during construction has the potential to displace otter from foraging habitat. Despite the lack of aquatic habitats within the Proposed Development site, due to the close proximity to the River Corrib disturbance of otter from foraging areas is could potentially affect the local otter population. There is therefore potential for the Proposed Development to result in significant negative effects on otter, at an International scale.

6.5.1.4.3 Effects of water quality impacts

During construction, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently an impact on otter; either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats). The effects of frequent and/or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality during construction.

The ZoI of potential impacts on surface water quality in the receiving freshwater environment could extend downstream as far as Galway Bay. Surface water run-off generated during construction could potentially carry silt, oils or other contaminants into the local surface water network which discharges to the River Corrib.

The Hydrological and Hydrogeological Risk Assessment Report (Enviroguide Consulting, 2024) concluded that there is a potential risk from surface run-off from the Proposed Development. Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at an International geographic scale, as otter is a QI species of Lough Corrib SAC, *c.*15m from the Proposed Development. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for otter in the wider vicinity and the abundance of otter across the study area, as revealed in the results of the desk study.

6.5.1.5 Construction Phase Impacts on Small Mammals

6.5.1.5.1 Habitat loss

There is no suitable habitat for small mammals within the Proposed Development site and it is predicted that habitat loss associated with the Proposed Development will not impact the local small mammal population and will not result in a likely significant negative effect, at any geographic scale.

6.5.1.5.2 Disturbance/displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and/or noise and vibration associated with construction works, has the potential to displace mammal species from both breeding/resting places and from foraging habitat in areas adjacent to the Proposed Development site. However, considering that disturbance will be short-term, it is unlikely to result in any long-term effects on the local mammal population or their conservation status. Therefore, disturbance/displacement is unlikely to result in a significant negative effect, at any geographic scale.

6.5.1.6 Construction Phase Impacts on Bats

All bat species in Ireland are protected under the Wildlife Acts and are listed in Annex IV of the EU Habitats Directive 92/43/EEC. It is an offence under Section 23 of the Wildlife Acts 1976-2012 and under Section 51 of *the European Communities (Birds and Natural Habitats) Regulations 2011* (as amended) to kill or damage or destroy the breeding or resting place of any bat species. Under the Birds and Natural Habitats Regulations it is not necessary that the action should be deliberate for on offence to occur. This places an onus of due diligence on anyone proposing to carry out works that might result in such damage or destruction. There are no bat roosting features (nor potential) present within the Proposed Development boundary, however suitable foraging and commuting habitat is present adjacent to the site, in Terryland Forest Park, and along the River Corrib and its associated habitats.

6.5.1.6.1 Disturbance/Displacement

Light levels are not anticipated to increase significantly during the construction phase of the proposal, as works will be largely confined to daylight hours, and therefore there will not be a requirement for long-term lighting of the Proposed Development site which could affect suitable bat foraging habitat in the vicinity. However, it is possible that temporary lighting required during the construction stage of the Proposed Development may illuminate previously unlit feeding and/or commuting areas, e.g. areas away from the Proposed Development site, making them unsuitable for bats. However, any effects associated with artificial lighting during construction of the Proposed Development, are likely to be temporary and confined to specific

areas within the site. Additionally, the site is already very well lit, and the most common species recorded within the Proposed Development site i.e. Leisler's bat, soprano pipistrelle and common pipistrelle bat are some of the least sensitive to artificial light spill and are recorded in towns and cities across Ireland. For these reasons, significant effects arising from disturbance or displacement of bats during construction are not anticipated to be significant at any geographic scale.

6.5.1.7 Construction Phase Impacts on Breeding Birds

6.5.1.7.1 Habitat loss

While there is suitable foraging/breeding habitat, including hedgerows, woodlands and treelines located in the vicinity of the Proposed Development site, the site itself does not contain habitat suitable for breeding or nesting birds. Additionally, the majority of birds recorded within the Proposed Development site include a range of common bird species, which occur in urban settings throughout the Galway area. It is likely that they will continue to utilise areas of the Proposed Development site following completion of construction. It is therefore predicted that the effects of habitat loss on breeding birds are not significant at any geographic scale.

6.5.1.7.2 Direct mortality

All birds, their nests, eggs and unfledged young are protected in Ireland through the Wildlife Acts. In the absence of any mitigation, there is potential for clearance of any vegetation to result in mortality of birds or their young, or the destruction of a nest. Whilst there is very little vegetation within the site, this could occur if site preparation works were to be undertaken during the breeding bird season, i.e. between 1st of March and 31st of August. The effects of mortality or loss of a nest for all breeding birds would have a significant negative effect at the local geographic scale only.

6.5.1.7.3 Disturbance/displacement

There will likely to be an increase in noise and human presence within the Proposed Development site during construction (and operation) which has the potential to displace breeding birds from habitat areas adjacent to the Proposed Development boundary. Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) it could potentially extend for several hundred metres from the Proposed Development. Given that the majority of bird species recorded in the Proposed Development site are common urban species already exposed to existing noise and disturbance in the immediate vicinity of the proposed works, they are anticipated to continue breeding and utilising lands adjacent to the Proposed Development site. For these reasons, significant negative effects arising from disturbance or displacement are not predicted.

6.5.1.8 Construction Phase Impacts on Wintering Birds

This section of the impact assessment deals with wintering bird species (i.e. those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations). The assessment carried out in the NIS (Scott Cawley Ltd., 2025b) for the Proposed Development considered the potential for the Proposed Development to affect the bird species listed as SCIs of Lough Corrib SPA, Inner Galway Bay SPA, and their wintering populations. That assessment presented in the NIS concluded that the Proposed Development could affect their wintering bird colonies and have long-term

effects on the local wintering populations. Therefore, for these species, the Proposed Development has the potential to affect the conservation status of the wintering bird populations and result in a significant adverse effect on the integrity of the European sites.

6.5.1.8.1 Habitat Loss

The Proposed Development will not result in any habitat loss for wintering bird species, and therefore significant negative effects arising from habitat loss are not predicted.

6.5.1.8.2 Disturbance/displacement

A temporary and / or permanent increase in noise, vibration and / or human activity levels during the construction of the Proposed Development could result in disturbance to and / or displacement of wintering bird species present within the vicinity of the Proposed Development.

Assessment of construction related noise disturbance to wintering waterbirds is based on the research presented in C*onstruction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance* (Cutts *et al.,* 2009) and "*Exploring Behavioural Responses of Shorebirds to Impulsive Noise"* (Wright *et al.*, 2010). In terms of construction noise, levels below 50dB would not be expected to result in any response from foraging birds or roosting birds during both day and nighttime hours. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e. birds becoming alert and some behavioural changes (i.e. reduced feeding activity)), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity are generally below 60dB or, in most cases, are approaching the 50dB threshold (BSI 2008). As such, disturbance effects for general construction activities across the majority of the Proposed Development would not be expected to extend beyond a distance of approximately 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond. Whilst there is no suitable habitat within the Proposed Development for wintering bird species, and there are no SPAs within 300m of the Proposed Development, the habitats adjacent to the site along the banks of the River Corrib, the River Corrib itself, and in Terryland Forest Park, are within 300m of the Proposed Development boundary, all of which may also be *ex-situ* sites for SCI species from nearby SPAs (as discussed in the NIS, and Section 6.5.1.1). Chapter 9 (Noise and Vibration) of this EIAR, details the noise levels across the Proposed Development throughout the Construction Phase. The measured ambient noise level (rounded to the nearest 5 dB) in proximity to the site is in the range of 60 - 65 dB $L_{Aeq,12\ Hour}$ during daytime. Therefore, all noise sensitive receptors fall into Category A of the 'ABC' assessment methodology. Hence, daytime construction noise will be subject to a limit of 65 dB $L_{Aeq,12\ Hour}$. No night-time or evening construction works is expected to take place. There will be instances where the noise levels exceed this, i.e. a dump truck within the site at 82dB, however these instances are very short term and not expected to cause a population effect on local wintering bird species, particularly as suitable habitats are present in the wider landscape within the River Corrib, Lough Corrib and Galway Bay.

Therefore, there is no potential for the Proposed Development to impact upon and thus affect the conservation status of wintering bird populations and result in a likely significant negative effect, at any geographic scale.

6.5.1.8.3 Habitat Degradation – Surface Water Quality

During construction, contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water feature has the potential to have a negative impact on water quality and consequently an impact on wintering birds; either directly (e.g. bird species coming into direct contact with pollutants) or indirectly (e.g. acute or sub-lethal toxicity from pollutants affecting their food supply or supporting habitats). The effects of frequent and/or prolonged pollution events in a waterbody have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

However, it is unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk (albeit low due to the distance between surface water features and the main construction activities) of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality during construction.

During construction suspended solids, silt and other harmful materials generated as a result of Proposed Development could be released into the local drainage infrastructure and travel downstream via watercourses, and potentially, into waterbodies such as the River Corrib and ultimately Galway Bay. Cement-based products used in the construction phase of the Proposed Development (e.g. concrete and/or bentonite which are highly corrosive and alkaline materials), if released into any watercourse may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality and could consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, estuarine/ coastal foraging habitats downstream could also be affected.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a range of local to international geographic scale.

6.5.1.9 Construction Phase Impacts on Fish

There are no watercourses within the Proposed Development site. This section only describes fish species in the local waterbodies adjacent to the Proposed Development site and that surface water drains to from the site, outside of European sites. Impacts on QI species within downstream European sites are described above in Section 6.5.1.1.1 and in Section 6 of the NIS (Scott Cawley Ltd., 2025b).

6.5.1.9.1 Effects of water quality impacts

During construction, contaminated or heavily silted surface water runoff, pump discharges and/or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently on aquatic habitats and fish species, and potentially also in the marine environment downstream. This could be either directly (e.g. acute or sub-lethal toxicity from pollutants or siltation events damaging spawning habitat downstream) or indirectly (e.g. affecting their food supply or supporting habitats).

The effects of frequent and/or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. It is unlikely that a pollution event of such magnitude would occur during construction or if such an

event did occur, it would be temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk (albeit low due to the distance between surface water features and the main construction activities) of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the conservation status of affected fish species and result in a likely significant negative effect, at a local geographic scale given the fact that the other fish species in question are common in Irish waters and not of conservation concern. For species such as European eel and brown/sea trout, effects on surface water quality during construction has the potential to affect the conservation status of these species and result in a likely significant negative effect, at a national geographic scale for European eel, and at an International geographic scale for brown/sea trout.

6.5.1.10 Construction Stage Impacts on Freshwater pearl mussel

Impacts on freshwater pearl mussel within downstream European sites are described above in Section 6.5.1.1.1 and in Section 6 of the NIS (Scott Cawley Ltd., 2025b).

6.5.1.11 Construction Phase Impacts on Marine Mammals

6.5.1.11.1 Effects of water quality impacts

As discussed in Section 6.5.1.1.1, the construction phase of the Proposed Development could result in contamination of receiving water bodies. This could result in negative impacts on marine mammals either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats). During construction at the estuaries, sediment may be released into the estuaries and be transported downstream to Galway Bay. Cement based products used in the Construction Phase of the Proposed Development (i.e. concrete which is a highly corrosive and alkaline material), released into connecting water bodies, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in negative and significant effects on the local food supply. Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely negative and significant effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed effect and the availability of suitable habitat in Galway Bay and the wider western coastline.

6.5.2 Operational Phase

6.5.2.1 Operational Phase Impacts on Designated Sites

6.5.2.1.1 European Sites

Given the minor contribution of the Proposed Development to the outstanding capacity of the Mutton Island WwTP, the fact that the WwTP's discharge is compliant with its licensed limits and the fact that the discharge is not having an observable negative impact on water quality in Galway Bay, the Proposed Development will not have any perceptible impact on water quality of Galway Bay (Enviroguide Consulting, 2024).

Therefore, there is no possibility of the Proposed Development undermining the conservation objectives of any of the QIs or SCIs of the European sites in, or associated with, Galway Bay as a result of foul water discharges.

Therefore, the Proposed Development will not adversely affect (either directly or indirectly) the integrity of any European site.

6.5.2.1.2 Nationally Designated Sites

Given the minor contribution of the Proposed Development to the outstanding capacity of the Mutton Island WwTP, the fact that the WwTP's discharge is compliant with its licensed limits and the fact that the discharge is not having an observable negative impact on water quality in Galway Bay, the Proposed Development will not have any perceptible impact on water quality of Galway Bay (Enviroguide Consulting, 2025).

Therefore, there is no possibility of the Proposed Development affecting national sites in, or associated with, Galway Bay or Lough Corrib as a result of foul water discharges.

Therefore, the Proposed Development will not adversely affect (either directly or indirectly) the integrity of any National site.

6.5.2.2 Operational Phase Impacts on Habitats

6.5.2.2.1 Habitat Degradation – Surface Water

As discussed in Section 6.5.2.1.1, without the design mitigation incorporated into the design of the Proposed Development, the Operational Phase of the Proposed Development could result in contamination of receiving water bodies. This could result in significant negative impacts on habitats in the receiving environment, and potentially downstream in sensitive habitats such as the alluvial woodland along the River Corrib.

Surface water runoff from the Proposed Development, which will be managed in accordance with the principles and objectives of SuDS, will be treated and attenuated prior to discharge from the site.

Foul water from the Proposed Development will be treated in the Galway WwTP before ultimately discharging to the Corrib Estuary transitional waterbody and the Inner Galway Bay North coastal waterbody. The increase discharge to the Galway WwTP as a result of the Proposed Development will reduce the overall available capacity of the facility. Foul water from the Proposed Development will only be discharged to Uisce Eireann (UE) foul sewer under agreement from UÉ and other applicable statutory consents verifying capacity at the Galway WwTP for the Proposed Development. The UÉ Confirmation of Feasibility (CoF) dated the 26th June 2024 (Enviroguide Consulting, 2025) notes that the foul water connection is feasible subject to infrastructure upgrades by UÉ. These upgrades will be completed by UÉ prior to any connections from the Proposed Development. There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the operational phase as the main operating system for heating will be natural gas.

The Site is located within Flood Zone A where the probability of flooding is high. As documented in the Site-Specific Flood Risk Assessment (SSFRA) (AECOM, 2025b) when in operation in a future climate scenario, all proposed structures will be defended from flooding to an appropriate standard. As such, the risk of contamination of surface waters exacerbated during a future climate scenario flood event is considered low.

As documented in the SSFRA (AECOM, 2025b),the most plausible, albeit worst case, source scenarios are outlined below:

- Fuels or other potentially hazardous materials released in the event of an accidental spill or leak from a vehicle (assumed 500 litres) is considered a worst-case source at the Site. This potential source is considered to be a short-term event in a worst-case scenario and while unlikely to occur, this scenario will be considered in the assessment.
- Suspended sediment entrained in runoff is considered a low-risk source of contamination at the Site for the Operational Phase of the Proposed Development.

The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase.

Therefore habitat degradation as a result of effects on surface water quality during the Operational Phase does not have the potential to affect downstream habitats and will not result in a significant negative effect, at any local geographic scale.

6.5.2.2.2 Habitat Degradation – Groundwater

During the operational phase there will be no discharges to groundwater at the Proposed Development. Based on the design of the Proposed Development there is limited potential sources of contamination during the Operational Phase and there will be limited potential for discharge of contaminants associated with surface water runoff to ground via unpaved, permeable areas due to the low infiltration potential at the Proposed Development. Furthermore, the proposed attenuation design does not allow for infiltration due to poor ground conditions, a high-water table and the potential presence of karst features beneath the site.

Habitat degradation as a result of effects on groundwater quality during the Operational Phase does not have the potential to affect downstream habitats and will not result in a significant negative effect, at any local geographic scale.

6.5.2.2.3 Habitat Degradation – Air Quality

The potential for air quality impact on an ecologically sensitive site is highest within 200m of a Proposed Development and within 200m of roads where significant changes in AADT (>5% AADT increase) occur. While the TII Guidelines were developed for road schemes they are relevant and regularly used for developments which have impacts on road traffic or alignment. The following assessment criteria is used to determine whether an assessment for nitrogen deposition should be conducted:

- There is a designated area of conservation within 200m of the Proposed Development; and
- There is a significant change i.e. a >5% increase in AADT flows.

Lough Corrib SAC is located approximately 15m west of the Proposed Development redline site boundary. The TII guidelines state that as the potential impact of a development is limited to a local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>5%) and the designated / ecologically sensitive site is located within 200m of the road centre line.

As evident from Section 10.5.2 of the Chapter 10 Air Quality, the predicted AADT traffic flows on Dyke Road and the Headford Road with the Proposed Development do not increase by more than 5%. Therefore, an assessment of traffic emissions on the designated / ecologically sensitive site is not required.

6.5.2.3 Operational Phase Impacts on Badger

The Proposed Development theoretically has the potential to impact badgers from adjacent foraging habitat during operation given the increased number of people likely to be using the Proposed Development site during operation. However, considering that the majority of human disturbance/noise will typically be undertaken during normal daylight hours and badgers are nocturnal in habit, and as the Proposed Development is already within an urban environment, significant displacement of badgers from adjacent foraging areas is considered unlikely to significantly affect the local badger population, at any geographic scale.

6.5.2.4 Operational Phase Impacts on Otter

6.5.2.4.1 Habitat Degradation – Surface Water

As discussed in Section 6.5.2.1.1, with the implementation of design mitigation incorporated into the construction of the Proposed Development, the Operational Phase of the Proposed Development is unlikely to result in contamination of receiving water bodies.

The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase.

Habitat degradation as a result of effects on surface water quality during the Operational Phase does not have the potential to affect the conservation status of otter and will not result in a significant negative effect, at any local geographic scale.

6.5.2.5 Operational Phase Impacts on Other Small Mammals

There are no operational phase impacts to small mammal species predicted to arise from the Proposed Development at any geographic scale.

6.5.2.6 Operational Phase Impacts on Bats

An increase in the existing light levels during operation, within the Proposed Development site could potentially indirectly affect bat species that utilise the site for foraging and/or commuting.

Given the presence of lighting in the immediate surrounding environment and street lighting along the surrounding roads, the local bat population is expected to be habituated to artificial light spill, especially as the most common species recorded within the Proposed Development site, i.e. Leisler's bat, soprano pipistrelle and common pipistrelle bat, are some of the least sensitive to artificial light spill, and are recorded in towns and cities across Ireland.

Additionally, in the operational lighting plan prepared for the Proposed Development, artificial light has been minimised and where possible will be avoided for areas of high bat activity e.g. in the direction of existing treelines adjacent to the site, and planted treelines. Significant effects arising from disturbance or displacement of bats are therefore not anticipated to be significant at any geographic scale.

The presence of new multi-storey structures within the Proposed Development site could potentially result in direct mortality of bat species that utilise the site for foraging and/or commuting, through collisions. Recent studies, investigating the cause of bat collisions with buildings found that building material is an important factor to be considered (Greif *et al.,* 2017) Whilst the design of the facades of the buildings do include windows, no large surfaces of glass are proposed. The use of brickwork will help to minimise the effect of the glazing, making the buildings more detectable to bats and therefore reduce the potential for collisions to occur.

Irish bat species navigate largely by echolocation calls, and fixed structures such as those proposed as part of the Proposed Development present a low risk in terms of collision. Therefore, the Proposed Development will not have a significant negative effect on the bat populations at any geographic scale with regard to direct mortality from building collisions.

6.5.2.7 Operational Phase Impacts on Breeding Birds

The landscape planting proposed as part of the landscape design for the Proposed Development will, as it becomes established and matures, serve to potentially provide additional nesting and foraging opportunities for the local bird population. Although there will be an increase in noise and human presence within the Proposed Development site during operation, the majority of bird species previously recorded within the Proposed Development environs, and likely to breed in the vicinity, are common urban species that are likely to adapt to human presence within the Proposed Development site.

The presence of new multi-storey structures within the Proposed Development site could potentially result in direct mortality of bird species that utilise the site for foraging and/or commuting, due to collisions.

From a review of available literature on the subject, bird collisions with man-made structures are common and well documented (Banks, R.C., 1979), (Jenkins, *et al.*, 2010), (Klem, D., 1990), (Erickson, *et al.*, 2005), (Erickson, *et al.*, 2001) with migratory passerine species the most prevalent collision victims (Bing *et al.*, 2012) (Longcore *et al.*, 2013). Bird collision with buildings is generally associated with reflective material such as windows or large surfaces of glass which create a mirror and appear to show the continuation of the sky or surrounding landscape, an effect that can be exacerbated by lighting (Sheppard, C. & Phillips, G., 2015). Whilst the design of the facades of the buildings do include windows, no large surfaces of glass are proposed. The external surfaces of the buildings will be a combination of brickwork and pressed metal cladding.

The use of different materials and design in the facades and elevations will minimise the effect of glazing, making the building more detectable to birds and therefore reduce the potential for collisions to occur. In the absence of mitigation there could be a low level of mortality attributable to bird collision with glazing on the proposed buildings, however this impact will not cause any significant effect at a local scale or any other geographic scale.

6.5.2.8 Operational Phase Impacts on Wintering Birds

6.5.2.8.1 Direct Mortality/Injury

The presence of new multi-storey structures within the Proposed Development site could potentially result in direct mortality of wintering bird species that utilise the habitat adjacent to the Proposed Development site for foraging and/or commuting, due to collisions.

From a review of available literature on the subject, bird collisions with man-made structures are common and well documented (Banks, R.C., 1979), (Jenkins, et al., 2010), (Klem, D., 1990), (Erickson *et al*., 2005), (Erickson *et al*., 2001) with migratory passerine species the most prevalent collision victims (Bing *et al*., 2012) (Longcore *et al*., 2013). Bird collision with buildings is generally associated with reflective material such as windows or large surfaces of glass which create a mirror and appear to show the continuation of the sky or surrounding landscape, an effect that can be exacerbated by lighting (Sheppard, C. & Phillips, G., 2015). Whilst the design of the facades of the buildings do include windows, no large surfaces of glass are proposed. The external surfaces of the buildings will be a combination of brickwork and pressed metal cladding.

The use of different materials and design in the facades and elevations will minimise the use or large expanses of glazing, making the building more detectable to birds and therefore reduce the potential for collisions to occur. In the absence of mitigation there could be a low level of mortality attributable to bird collision with glazing on the proposed buildings, however this impact will not cause any significant effect at a local scale or any other geographic scale.

6.5.2.9 Operational Phase Impacts on Fish

6.5.2.9.1 Habitat Degradation – Surface Water

As discussed in Section 6.5.2.1.1, without the design mitigation incorporated into the construction of the Proposed Development, the Operational Phase of the Proposed Development could result in contamination of receiving water bodies. This could result in significant negative impacts on Atlantic salmon, lampreys, European eel sea/brown trout and other fish species either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase.

Habitat degradation as a result of effects on surface water quality during the Operational Phase does not have the potential to affect the conservation status of fish and will not result in a significant negative effect, at any local geographic scale.

6.5.2.10 Operational Phase Impacts on Freshwater Pearl Mussel

6.5.2.10.1 Habitat Degradation – Surface Water

As discussed in Section 6.5.2.1.1, without the design mitigation incorporated into the design of the Proposed Development, the Operational Phase of the Proposed Development could result in contamination of receiving water bodies. This could result in significant negative impacts on freshwater pearl mussel indirectly, (e.g. affecting their food supply or supporting habitats).

The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase.

Habitat degradation as a result of effects on surface water quality during the Operational Phase does not have the potential to affect the conservation status of freshwater pearl mussel and will not result in a significant negative effect, at any local geographic scale.

6.5.2.11 Operational Phase Impacts on Marine Mammals

6.5.2.11.1 Habitat Degradation – Surface Water

As discussed in Section 6.5.2.1.1, without the design mitigation incorporated into the design of the Proposed Development, the Operational Phase of the Proposed Development could result in contamination of receiving water bodies. This could result in significant negative impacts on marine mammals either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

The Proposed Development will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, and the design of the development incorporates pollution control measures, to ensure the risks are minimised during the Operational Phase.

Habitat degradation as a result of effects on surface water quality during the Operational Phase does not have the potential to affect the conservation status of marine mammals and will not result in a significant negative effect, at any local geographic scale.

6.5.3 Potential Cumulative Impacts

1. Baseline Scenario

The biodiversity in the site will continue to exist as a carpark and provide little – no benefits to biodiversity. The surrounding habitats along the River Corrib and Terryland Forest Park, will continue to provide suitable habitats for local flora and fauna species.

2. Assessment Scenario 1 (the Proposed Development)

Potential cumulative impacts may arise during construction and operation, as a consequence of the Proposed Development acting in-combination with other plans and projects, on water quality in the downstream surface water environment, and disturbance to birds, bats and badger.

There are granted planning permissions for residential or other small-scale developments such as extensions to existing dwellings, construction of new car parking spaces, etc. in the immediate vicinity of the Proposed Development site as well as larger scale developments in close proximity to the Proposed Development site, some of which may be in construction at the same time as the Proposed Development. A list of the projects considered in the cumulative impacts assessment has been included in Appendix 6-3.

As demonstrated in Section 6.7 it is considered there are no residual significant ecological effects on designated sites, habitats, badger, bats or breeding birds. As there are no measurable residual effects from the proposal on its own, there is no potential for cumulative effects to arise.

In addition, the potential for cumulative effects to arise from any existing or proposed land use plans or developments is regulated and controlled by the environmental protective policies and objectives of the Galway City Development Plan 2023–2029 and Galway County Development Plan 2022-2028. Any existing/proposed plan or project that could potentially act

in combination with the Proposed Development, must adhere to these overarching environmental protective policies and objectives. These policies and objectives will ensure the protection of local biodiversity within the ZoI of the Proposed Development. These policies and objectives also include the requirement for any future plans or projects to undergo Screening for Appropriate Assessment and/or Appropriate Assessment to examine and assess their effects on European sites, alone and in combination with other plans and projects.

Other proposed schemes which have not yet been submitted to the Planning Authority must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant development plan and its policies and objectives, which would ensure the protection of the natural environment.

In light of the above no cumulative effects are predicted with regard to biodiversity, in conjunction with the Proposed Development.

3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

Similar to Assessment scenario 1, it is anticipated that the likely significant cumulative impact is the potential for the construction phase to overlap with other developments in the area. Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate mitigations are put in place during construction, construction impacts on biodiversity will not be significant.

4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

Similar to Assessment scenario 1, it is anticipated that the llikely significant cumulative impact is the potential for the construction phase to overlap with other developments in the area. Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate mitigations are put in place during construction, impacts on biodiversity will not be significant.

Future projects of a large scale would need to conduct an EIAR to ensure that no significant construction and/or operational impacts on biodiversity will occur as a result of those developments.

6.5.4 “Do Nothing” Impact

Under the do-nothing scenario, it is expected that the Proposed Development site would remain largely unchanged in terms of its current use, but that the existing recolonising bare ground would continue to develop. The site is mainly comprised of built land and artificial surfaces and characteristics of the site would, therefore, not change other than through natural processes or landowner management, and it would likely continue to support similarly low numbers of flora and fauna.

6.6 Avoidance, Remedial and Mitigation Measures

Mitigation measures are proposed for KERs where a potential significant effect has been identified and include precautionary measures for some potential significant effects.

All measures described below will be implemented in full and included in the Construction Environmental Management Plan (CEMP) that accompanies the planning submission. The CEMP is a live document that will be updated as appropriate by the appointed contractor.

6.6.1 Construction Phase Mitigation

A suitably experienced and qualified ecologist (Ecological Clerk of Works (ECoW) will be employed by the appointed contractor to advise on ecological matters during construction, communicate all findings in a timely manner to statutory authorities, acquire any licences or consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Development.

6.6.1.1 Designated Sites

6.6.1.1.1 European sites

Mitigation measures intended to avoid or reduce any harmful effects of the Proposed Development on European sites are outlined in the NIS (Scott Cawley Ltd., 2025b). Following a consideration and assessment of the Proposed Development on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction;
- Measures to protect groundwater impacts during construction;
- Measures to prevent disturbance and displacement of QI species from European sites and *ex-situ* sites; and
- Measures to prevent habitat degradation as a result of changes to air quality.

The mitigation measures within the NIS are presented in the CEMP within Volume 4 of this EIAR.

6.6.1.1.2 National sites

The mitigation measures in relation to potential impacts arising from the Proposed Development on pNHAs within the ZoI are as per those for European sites as the boundaries coincide with the SACs and SPAs. Therefore, the mitigation measures outlined above in Section 6.6.1.1.1, and as detailed in the NIS (Scott Cawley Ltd., 2025b), will prevent the Proposed Development resulting in a significant effect on these pNHAs at the national geographic scale.

It should be noted that the full suite of mitigation measures proposed are set out in full in the CEMP.

6.6.1.2 Habitats

6.6.1.2.1 Retention and Protection of Vegetation during Construction

Any vegetation (including trees, hedgerows or scrub adjacent to, or within, the Proposed Development boundary) which is to be retained shall be afforded adequate protection during the construction phase in accordance with the "*Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes* "(TII, 2006b), as follows:

- All trees along the Proposed Development boundary that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist.
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it.
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines.
- A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Development boundary but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist.
- A buffer zone of at least 5m will be maintained between construction works and retained hedgerows to ensure that the root protection areas are not damaged.

6.6.1.2.2 Preventing spread of non-native invasive plant species

While there were no non-native invasive species recorded in the Proposed Development site, there is potential for species to spread to the site during the interim between the original surveys and commencement of construction following grant of planning permission (if received). A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence, and/or extent of any Third Schedule non-native invasive species that may have become established in the interim within the Proposed Development site. If the presence of any of these species is confirmed within the Proposed Development site, the implementation of an Invasive Species Management Plan prepared by a suitably qualified professional in line with TII guidelines (2020b) will be required.

6.6.1.2.3 Habitat Degradation – Surface Water Quality and Groundwater Quality

During the Construction Phase, all works will be undertaken in accordance with the Construction Environmental Management Plan (CEMP) (AECOM, 2025c). Following appointment, the contractor will be required to further develop the CEMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. Mitigation works will be adopted as part of the construction works for the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of surface water runoff;
- Control and management of shallow groundwater during excavation and dewatering;
- Management and control of soil and materials;
- Appropriate fuel and chemical handling, transport and storage; and,
- Management of accidental release of contaminants at the site.

Surface water runoff management will be required to prevent runoff entering excavations during construction. Surface water will require diversion around the open excavations using standard temporary drainage methods to ensure that surface water is effectively conveyed around works areas.

The dewatering methodology to be implemented by the appointed Contractor will ensure that any dewatering is confined to the localised zone and does not extend towards the site boundaries.

There will be no authorised discharge of water to ground during the construction phase. Where water must be pumped from the excavations, water will be discharged by the contractor, following appropriate treatment (e.g., settlement or hydrocarbon interceptor) to sewer in accordance with the necessary discharge licences issued by UÉ under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from FCC under Section 4 of the Local Government (Water Pollution) Act 1977, for discharges to surface water. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite. Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers.

Where required, standard design and construction measures (i.e., groundwater drainage around impermeable subsurface structures) will ensure that groundwater flow across the site is maintained and that there will be no impact on groundwater levels.

During the construction phase, fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP in a designated area of the Site away from any watercourses and drains (where not possible to carry out such activities onsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines ‘Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities’ (EPA, 2013). The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing.

Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Proposed Development Site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site. There may also be the requirement for use of portable generators or similar fuel containing equipment during the construction phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times.

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements. The emergency procedures shall be cognisant of the following:

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

Pumping of concrete will be monitored to ensure that there is no accidental discharge. All work will be carried out in the dry and effectively isolated from any onsite drains. A suitable risk assessment for wet concreting will be completed prior to works being carried out. There will be no mixer washings or excess concrete discharged onsite. All excess concrete is to be removed from site and all washout of concrete chutes to be captured in a tank which shall be removed offsite for disposal at an authorised waste facility.

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology will give cognisance to the Environment Agency's (EA) guidance on '*Piling into Contaminated Sites'* (EA, 2002) and '*Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention'* (EA, 2001), in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

All below ground drainage infrastructure will be constructed in accordance with current UÉ requirements to ensure that there are no potential impacts to groundwater quality. Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will either be discharged to temporary holding tank(s), the contents of which will periodically be tankered offsite to a

licensed facility, or discharged to public sewer in accordance with the necessary temporary discharge licences issued by UÉ. The Galway WwTP is operated in accordance with relevant statutory approvals issued by UÉ. The increased discharge to the Galway WwTP as a result of the Proposed Development is considered to be insignificant in terms of the overall scale of the facility. The increased load does not have the capacity to alter the effluent released from the WwTP to such an extent as to result in likely significant effects on its receiving waters.

6.6.1.2.4 Habitat Degradation – Air Quality

Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest sensitive ecological receptors will be controlled to ensure impacts are of negligible significance.

Using the IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the ecological impacts are low risk for earthworks and are high risk for construction and trackout.

In accordance with the IAQM Guidance, the highest risk category should be applied when determining proposed mitigation measures. Therefore, the mitigation measures applicable to a High Risk site will be applied:

General Measures

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.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which shall include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 logbook.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, 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.

Preparing and maintaining the site

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

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles will be permitted;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; and,
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and,

- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials;

The IAQM Guidance Mitigation Measures applicable to the specific works undertaken are as follows:

Measures specific to earthworks

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

Measures specific to construction

- 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; and,
- For smaller supplies of fine power 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 logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from dust sensitive receptors.

6.6.1.3 Otter

Otter are listed on Annex II and Annex IV of the Habitats Directive and are strictly protected under the Birds and Habitats Regulations. Otter, and their breeding and resting places, are also protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure an otter or to wilfully interfere with or destroy their breeding or resting places (holts / couches).

6.6.1.3.1 Disturbance/Displacement

Security lighting in active works areas in close proximity to watercourses with known otter activity will be designed in conjunction with a suitably qualified ecologist to minimise light spill. Similarly, where any new or amended lighting design is required at a watercourse crossing, it should be cognisant of downward light-spill onto watercourses. Measures to reduce light spill may include the following:

- The use of sensor/timer triggered lighting;
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- Column heights should be considered to minimise light spill; and
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.

6.6.1.3.2 Habitat Degradation – Surface Water Quality

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

6.6.1.4 Badger and Other Protected Mammals

As the usage of the Proposed Development site by badgers and other protected mammals can change over time, a confirmatory pre-construction check of the Proposed Development site for potential new burrow entrances, resting places and signs will be carried out within 10-12 months before commencement of construction immediately prior to construction works commencing to confirm their usage by badger or other potential protected mammals.

Although unlikely, any new badger setts (or resting places) identified will be afforded protection in line with the requirements set out in the Transport Infrastructure Ireland (2005) guidance document as follows:

- Badger setts if encountered will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage.
- In the season June to November, no heavy machinery will be used within 30m of badger setts; lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
- During the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts, nor blasting or pile driving within 150m of active setts.
- Where works need to be undertaken within these zones, or where works directly affect newly identified badger setts, consultation with an ecologist with relevant badger management experience is required, and could include advanced badger mitigation measures such camera trapping to confirm sett status and sett closure / destruction, which must be undertaken outside the breeding season as per specialist advice, and will all be conducted under the supervision of an ecologist with experience in badger mitigation.
- Any potential new constraints (other protected mammals) identified will also be afforded protection in line with the requirements set out in the TII guidance documents and mitigated in line with the advice and supervision of an experienced ecologist as needed.

6.6.1.4.1 Protection of Badgers from Accidental Harm during Construction (Excavations)

Uncovered deep excavations could be potentially hazardous for badgers commuting and foraging in the area. Badgers could fall into these excavations, becoming trapped and potentially hurt and distressed.

To protect foraging badgers from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, or fenced off where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow badgers to safely exit should they fall in.

6.6.1.5 Bats

6.6.1.5.1 Lighting Plan

Lighting proposals for the construction phase will adhere to the advice provided in Bats and Lighting – Guidance for Planners, Engineers, Architects and Developers (Bat Conservation Ireland 2010), Guidance Note GN08/23 Bats and Artificial Lighting At Night (Institution of Lighting Professionals & Bat Conservation Trust, 2023) and Guidance Note GN01/21 The Reduction of Obtrusive Light (Institute of Lighting Professionals, 2021). Construction stage lighting details will be reviewed by a qualified bat ecologist. If necessary, the bat ecologist will recommend adjustments to directional lighting (e.g. through cowls, shields or louvres) to restrict light spill in sensitive areas.

6.6.1.6 Breeding Birds

Where feasible, vegetation (e.g. hedgerows, trees, scrub and grassland) will not be removed, between the 1st of March and the 31st of August, to avoid direct impacts on nesting birds.

Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required. Should nesting birds be encountered during surveys, the removal of vegetation will be required to be delayed until after the nesting has finished.

6.6.1.7 Wintering Birds

6.6.1.7.1 Habitat degradation – Surface Water Quality

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

6.6.1.8 Aquatic Species

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

6.6.1.9 Marine Mammals

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

6.6.2 Operational Phase

6.6.2.1 Designated Sites

6.6.2.1.1 European sites

As discussed in the NIS (Scott Cawley Ltd., 2025b) Operational Phase impacts on European sites are not predicted to adversely affect the integrity of any European site, and therefore mitigation measures are not required.

6.6.2.1.2 National Sites

Operational Phase impacts on national sites are not predicted to adversely affect the integrity of any national site (as outlined in Section 6.5.2.1.2), and therefore mitigation measures are not required.

6.6.2.2 Habitats

There are no operational phase impacts on habitats (as outlined in Section 6.5.2.2), and therefore mitigation measures are not required.

6.6.2.3 Badger

Operational impacts on badger are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.3), and therefore mitigation measures are not required.

6.6.2.4 Otter

Operational impacts on otter are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.4), and therefore mitigation measures are not required.

6.6.2.5 Other Small Mammals

Operational impacts on small mammals are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.5), and therefore mitigation measures are not required.

6.6.2.6 Bats

Operational impacts on bats are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.6), and therefore mitigation measures are not required.

6.6.2.7 Breeding Birds

Operational impacts on breeding birds are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.7), and therefore mitigation measures are not required.

6.6.2.8 Wintering Birds

Operational impacts on wintering birds are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.8), and therefore mitigation measures are not required.

6.6.2.9 Fish

Operational impacts on fish are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.9), and therefore mitigation measures are not required.

6.6.2.10 Freshwater Pearl Mussel

Operational impacts on freshwater pearl mussel are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.10), and therefore mitigation measures are not required.

6.6.2.11 Marine Mammals

Operational impacts on marine mammals are not considered to be significant at any geographic scale (as outlined in Section 6.5.2.11), and therefore mitigation measures are not required.

6.6.3 "Worst Case" Scenario

The assessments carried out under Sections 6.5.1 and 6.5.2 are undertaken based on the potential impacts arising from the Proposed Development design and in the absence of mitigation. Therefore, this assessment represents the worst-case scenario of the Proposed Development prior to the inclusion of mitigation measures.

6.7 Residual Impacts

6.7.1 Residual Impacts on European Sites

Following an examination, analysis and evaluation of the best available information, and applying the precautionary principle, it can be concluded that the possibility of any significant effects on any European sites, whether arising from the project alone or in combination with other plans and projects, can be excluded, for the reasons set outlined in section 6.6 of this chapter, and in the NIS report accompanying this application (Scott Cawley Ltd., 2025b). In reaching this conclusion, the nature of the project and its potential relationship with all European sites within the ZoI, and their conservation objectives, have been fully considered. Therefore, the Proposed Development will not have significant residual effects on any European sites.

6.7.2 Residual Impacts on Nationally Designated Sites

The assessment presented in Sections 6.6, concluded that there was no risk of the Proposed Development resulting in a likely significant effect on any nationally designated sites, either alone or in combination with other plans or projects. Therefore, the Proposed Development is not likely to have significant residual effects on any nationally designated sites.

6.7.3 Residual Impacts on Habitats

The implementation of the landscaping design will result in a potential positive impact on local habitats, in that there will be a slight increase in vegetated habitat over the current site.

6.7.4 Residual Impacts on Badger

The potential effects of the Proposed Development are considered in Section 6.5. Significant effects are not predicted with regard to badgers, and therefore residual effects on badgers are not deemed significant at any geographical scale.

6.7.5 Residual Impacts on Otter

The potential effects of the Proposed Development are considered in Section 6.5. However, with the implementation of the mitigation measures outlined, no residual impacts are predicted on bats at any geographical scale.

6.7.6 Residual Impacts on Other Small Mammals

The potential effects of the Proposed Development are considered in Section 6.5. Significant effects are not predicted with regard to other mammals, and therefore residual effects for other mammals are not deemed significant at any geographical scale.

6.7.7 Residual Impacts on Bats

The potential effects of the Proposed Development on bats is documented in Section 6.5. However, with the implementation of the mitigation measures outlined, no residual impacts are predicted on bats at any geographical scale.

6.7.8 Residual Impacts on Breeding Birds

The potential effect of the Proposed Development on breeding birds is documented in Sections 6.5. However, with the implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

6.7.9 Residual Impacts on Wintering Birds

The potential effect of the Proposed Development on wintering birds is documented in Sections 6.5. However, with the implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

6.7.10 Residual Impacts on Fish

The potential effect of the Proposed Development on fish is documented in Sections 6.5. However, with the implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

6.7.11 Residual Impacts on Freshwater Pearl Mussel

The potential effect of the Proposed Development on freshwater pearl mussel is documented in Sections 6.5. However, with the implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

6.7.12 Residual Impacts on Marine Mammals

The potential effect of the Proposed Development on marine mammals is documented in Sections 6.5. However, with the implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

6.8 Enhancement

6.8.1 Provision of Roost Facilities On-site During and Post Development Works

As part of enhancement measures, alternative roosts appropriate to the bat species recorded will be provided within or adjacent to the Proposed Development site. For pipistrelle species these are tree crevice-type boxes, with 25-35mm crevices. Therefore, a combination of two Schwegler type 2F bat boxes and four Schwegler type 1FF flat bat boxes (or similar models) will be installed at a suitable location to be determined by a suitably qualified professional within the site boundary.

The tree-mounted bat boxes will be installed either by the ecologist or by the contractor under the supervision of the ecologist. It is preferable that each box faces a slightly different aspect from southeast to southwest facing, to provide a range of slightly differing temperature regimes (Bat Conservation Ireland, 2015). All bat boxes will be installed at least 3m above ground level to minimise the risk of interference by humans. The bat boxes will be located away from areas that are subject to artificial light spill. All boxes will be installed prior to the commencement of demolition and construction works.

6.9 Monitoring

6.9.1 Construction Phase

A suitably experienced and qualified Ecological Clerk of Works (ECoW) will be retained by the appointed contractor. The ECoW will advise the appointed contractor on ecological matters during construction, give toolbox talks, undertake pre-construction surveys as necessary, communicate all findings in a timely manner to the appointed contractor and statutory authorities, acquire any licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Development.

Pre-construction surveys for habitats, badger, bats and breeding birds will be carried out as described in the respective sections.

6.9.2 Operational Phase

A landscape monitoring plan will be undertaken post implementation to ensure establishment of planting and success of habitat management.

While the success of the proposed bat enhancement will not be measured by occupancy of roosts by bats, it is considered to be best practice and appropriate to implement a monitoring plan to gather information and assess whether the bat population has responded favourably to mitigation measures. A three-year post-installation monitoring programme will be undertaken. The bat boxes will be checked for presence of bats or signs of bats on a biennial basis between August and September in years 1, 3 and 5 post-installation by an appropriately licensed and qualified ecologist. The results of the monitoring surveys will be recorded and shared with the local authority and the NPWS.

6.10 Interactions

Biodiversity interacts with several environmental factors including land and soils, hydrology, air quality, climate and microclimate, and noise and vibrations, discussed in the relevant Chapters of this EIAR. Changes to these environmental factors could result in significant impacts on biodiversity, outlined in the following sections.

6.10.1 Land and Soils

Interactions between land and soils and biodiversity can occur through the spread of any hazardous material/contaminated land which may occur during the construction stage which could result in habitat degradation of habitats within the Proposed Development site and adjacent/downstream designated sites and their associated QIs. Following the implementation measures outlined within the CEMP, impacts to habitats, flora and fauna from soils and land interactions are not predicted to be significant.

6.10.2 Hydrology

Interactions between hydrology and biodiversity including potential changes to habitats, flora and fauna can occur through impacts to water quality either arising from an accidental pollution event or increased sedimentation during the construction stage, or an accidental pollution event during the operational stage. This interaction has the potential to result in significant impacts on hydrologically connected habitats and sensitive fauna that rely on these habitats. However, for reasons outlined in the relevant sections in Section 6.6 impacts to downstream sensitive habitats and fauna are not predicted to be significant post mitigation.

6.10.3 Air Quality, Climate and Microclimate

Interactions between air quality and flora and fauna in adjacent habitats and designated sites can occur during the construction stage due to dust emissions arising from construction works. This interaction has the potential to result in significant impacts on biodiversity. However, once the dust minimisation measures prescribed in the CEMP are implemented, impacts to flora and fauna are not predicted to be significant.

6.10.4 Noise and Vibrations

Interactions between noise and sensitive fauna, namely birds, bats and badgers can arise from increased noise levels during the construction stage. This interaction has the potential to result in significant impacts and has been assessed when considering disturbance impacts during construction. However, for reasons outlined in the relevant Section 6.6 impacts to fauna from noise interactions are not predicted to be significant post mitigation.

6.11 Difficulties Encountered When Compiling

At scoping stage it was determined that a full suite of wintering bird surveys was not required based on the habitats present on site (buildings and hard standing with no potential foraging or roosting functionality for wintering birds). Although there is some suitable wintering bird habitat adjacent to the site along the banks of the River Corrib and in Terryland Forest Park, the site is separated from this habitat by Dyke Road and pedestrian infrastructure. The area

of potential wintering bird habitat along the River Corrib in the vicinity of the Proposed Development is adjacent to an actively used pedestrian path and therefore is subject to ongoing disturbance from pedestrians and their dogs rendering it low suitability for wintering birds. In light of these factors, and in light of the availability of substantial baseline winter bird data in Galway, the absence of a full season of winter bird surveys, and the completion of a subset of surveys does not impose any limitations on the ability to conduct an impact assessment.

6.12 References

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7 LAND AND SOIL

7.1 Introduction

This chapter provides a description of the land, soils and geology within and immediately surrounding the site of the Proposed Development, an assessment of the potential impacts of the Proposed Development on land, soils and geology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Land, soils, and geological characteristics of the receiving environment at the site.
- Potential impacts that the Proposed Development may have on land, soils and geology including “worst case” scenario assessment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development.
- Evaluate the significance of any residual impacts.

7.1.1 Quality Assurance and Competency of Experts

This chapter of the EIAR has been prepared by Gareth Carroll BA, BAI, MIEnvSc, a Principal Consultant of Enviroguide with over 12 years’ experience of environmental assessment of brownfield and greenfield sites.

This chapter was reviewed by Patrick Higgins BSc, MSc, MIEnvSc, CEnv who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide and has over 19 years’ experience in preparing environmental assessments for a range of project types and geological and hydrogeological site settings.

7.2 Study Methodology

7.2.1 Relevant Legislation and Guidance

The methodology adopted for the assessment will take cognisance of relevant guidelines, in particular the following:

- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002).
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).
- Galway City Council, 2023. Galway City Development Plan 2023-2029.

7.2.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with the Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An assessment and impact determination stage were carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of land, soils and geological environment, to establish the activities associated with the Proposed Development and to undertake an assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the site and receiving environment.

The study area, for the purposes of assessing the baseline conditions for the Land, Soils and Geology Chapter of the EIAR, extends beyond the site boundaries and includes potential receptors with which there may be a pathway to/from the Proposed Development and receptors that may be indirectly impacted by the Proposed Development. The extent of the wider study area was based on the IGI, 2013 Guidelines which recommend a minimum distance of 2.0km from the site.

The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area including published information and details pertaining to the Proposed Development provided by the applicant and design team.

The Element 1 stage of the assessment was completed by Enviroguide and included the review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping 2025 (EPA, 2025).
- Geological Survey of Ireland (GSI) Datasets Public Viewer and Groundwater webmapping, 2024 (GSI, 2025).
- Google Earth Mapping and Imagery, 2025 (Google Earth, 2025).
- Ordnance Survey Ireland (OSI) webmapping, 2025 (OSI, 2025).
- National Parks and Wildlife Services (NPWS) webmapping, 2025 (NPWS, 2025).
- Teagasc webmapping, 2025 (Teagasc, 2025).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.

Element 2: Involves direct and indirect site investigation and studies stage where necessary to refine the CSM developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development. Minerex Geophysics Ltd. (MGX) carried out a geophysical survey (Minerex, 2024) in March 2024 consisting of 2D-Resistivity (ERT), seismic refraction (p-wave) and MASW (s-wave) surveying for the site. Intrusive ground investigations (including trial pitting, slit trenches, borehole drilling, and soil sampling) was undertaken by Ground Investigations Ireland (GII) between April and June 2024 (GII, 2024. Dyke Road Galway Ground Investigation Report). The results of the site investigations were used to identify and assess the existing ground conditions and geological environment at the site. The site investigation reports (Minerex, 2024 and GII, 2024) are included in Appendix 7-1.

Element 3: Evaluation of mitigation measures, residual impacts and final impact assessment were based on the outcome of the information gathered in Element 1 and Element 2 of the assessment. Mitigation measures to address all identified adverse impacts that were identified

in Element 1 and Element 2 of the assessment were considered in relation to the Construction and Phase and Operational Phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Land, Soil and Geology sections of the EIAR in this Chapter which includes all the associated figures and documents.

7.2.3 Description of Importance of the Receiving Environment

The Transport Infrastructure Ireland (TII) criteria for rating of the importance of geological features at the site as documented in the National Roads Authority Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009), are summarised in Table 7-1.

Table 7-1. Criteria for Rating Site Importance of Geological Features

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance, or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance, or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil on-site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance, or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil on-site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance, or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

7.2.4 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this chapter is described in Table 7-2 in accordance with EPA, 2022 guidelines on the information to be contained in EIARs.

Table 7-2. Description of Effects

Type of Effect	**Definition**
Quality of Effects/ Impacts	**Definition**
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	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 that is consistent with existing and emerging baseline trends.
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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Extent and Context of Effects	**Definition**
Extent	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions.
Probability of Effects	**Definition**
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years

Type of Effect	Definition
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration
Brief	Effects lasting less than a day
Types of Effects	**Definition**
Indirect Effects	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	he addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
“Do-nothing” Effects	The environment as it would be in the future should the subject project not be carried out
“Worst-case” Effects	he effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Figure 7-1 identifies how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.

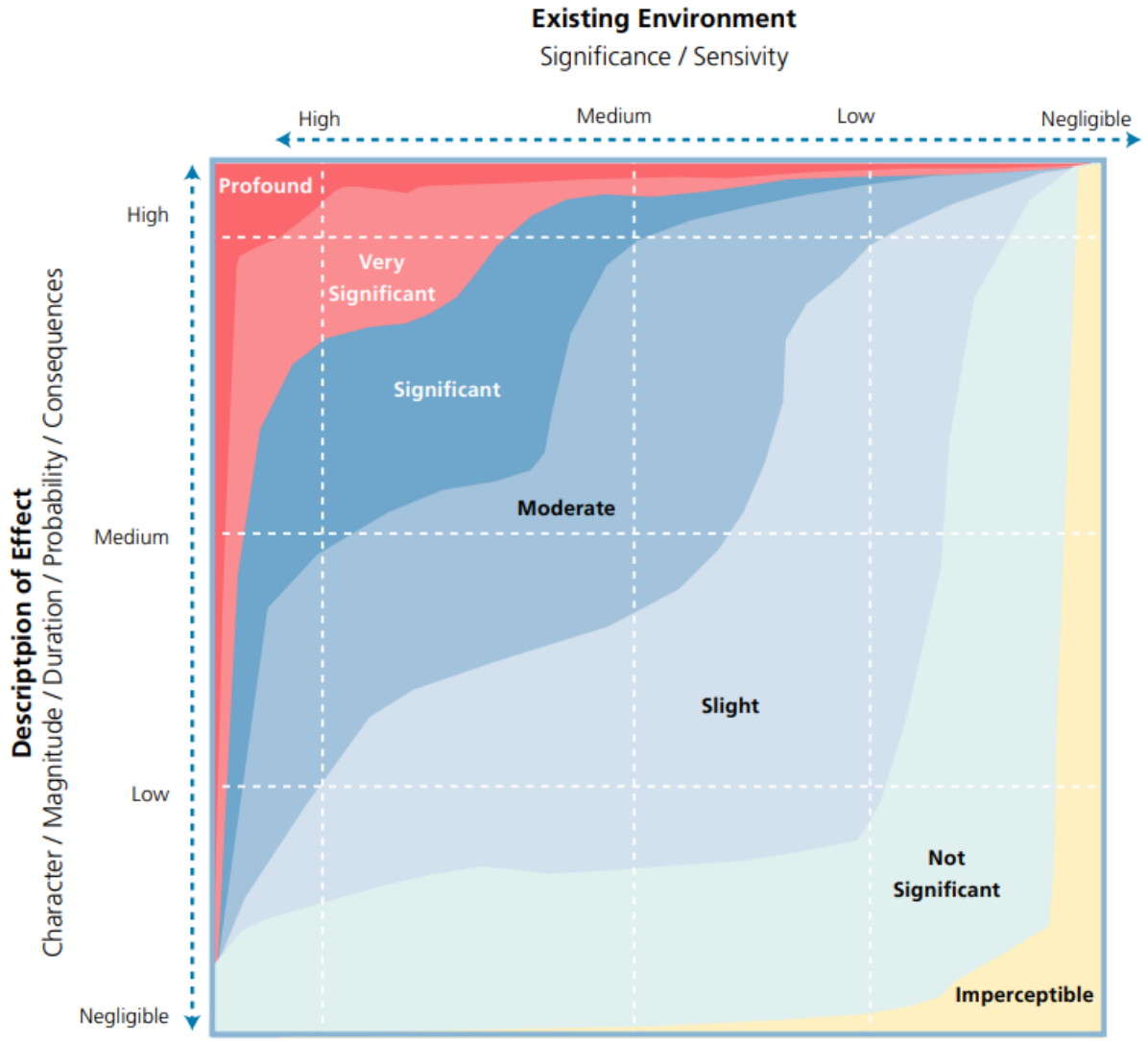

Figure 7-1. Determining Significance

7.3 The Existing and Receiving Environment (Baseline Situation)

7.3.1 Site Location and Description

The site of the Proposed Development is located at Dyke Road, Terryland, Co. Galway. The site of the Proposed Development, which extends to 1.144Ha, is accessed by the Dyke Road and is located within the Headford Road area, to the northeast of the city centre and approximately 0.65km walking distance from Eyre Square.

The Proposed Development forms part of an overall three phase Development Framework, in the form of the Corrib Causeway Development Framework. The overall Development Framework site extends to 1.78 hectares and is located to the northeast of the city centre, within walking distance from Eyre Square and is within the Headford Road area. The development frameworks aims to deliver a residential-led, mixed-use development. Phase 1, relates to the current, subject proposal; Phase 2, an existing car park south of the site, is intended to be redeveloped for a mix of uses such as civic, commercial, and cultural uses; and Phase 3 is intended to provide additional residential units. The current phase 1 development, subject of this planning application, has the potential to act as a catalyst to kick-start the

regeneration of this three phase development framework but also the redevelopment of the wider area. This particular site has been brought forward for the first phase of development on the basis that the Draft Headford Road Framework Plan (2009) envisioned residential development at this particular location with the more civic and commercial uses to be located further south on the phase 2 site. The current Development Framework has been prepared to align with this vision.

The current land use at the site of the Proposed Development comprises a surface car park of approximately 311No. car parking spaces.

The Galway City Development Plan 2023-2029 primarily zones the site of the Proposed Development as “Enterprise, Light Industry and Commercial” (CI), supporting mixed-use development, including residential. The Headford Road Regeneration and Opportunity sites, including the Dyke Road Car Park Site (i.e., the site of the Proposed Development), are prioritised for residential use. Section 11.2.4 of the Galway City Development Plan 2023-2029 allows residential development on publicly owned lands per national housing policy. The Core Strategy of the Galway City Development Plan 2023-2029 promotes regeneration sites for housing delivery. Policy 10.2 of the Galway City Development Plan 2023-2029 supports redevelopment of these sites for sustainable growth, aligning with national and regional policies. The regeneration of these lands is an identified growth enabler in the National Policy Framework and the Dyke Road site specifically is identified within the Galway City Development Plan 2023-2029 is identified as a national priority for housing and other uses, including affordable housing, office/commercial spaces, and civic/cultural infrastructure. It also offers potential for innovation and research linked to the University of Galway. Therefore, the Proposed Development is considered to be specifically supported by the CI zoning, the core strategy, and Policy 10.2 of the Galway City Development Plan 2023-2029.

The site is bound to the north by the Black Box Theatre (i.e., Phase 3 of the overall Development Framework) which adjoins Terryland Forest Park to the south by Dyke Road Car Park comprising approximately 243No. car parking spaces (i.e., Phase 2 of the overall Development Framework) which adjoins local road Bóthar Na Dige, to the east by Galway Retail Park, and to the west by Dyke Road which adjoins the future greenway that intends to re-establish the old Clifden Railway Bridge and provide a greenway running from Galway City to Moycullen.

The surrounding lands are mainly comprised of low density, low grade commercial buildings with extensive surface car parking.

The site location is presented in Figure 7-2 and the current layout of the site is presented in Figure 7-3.

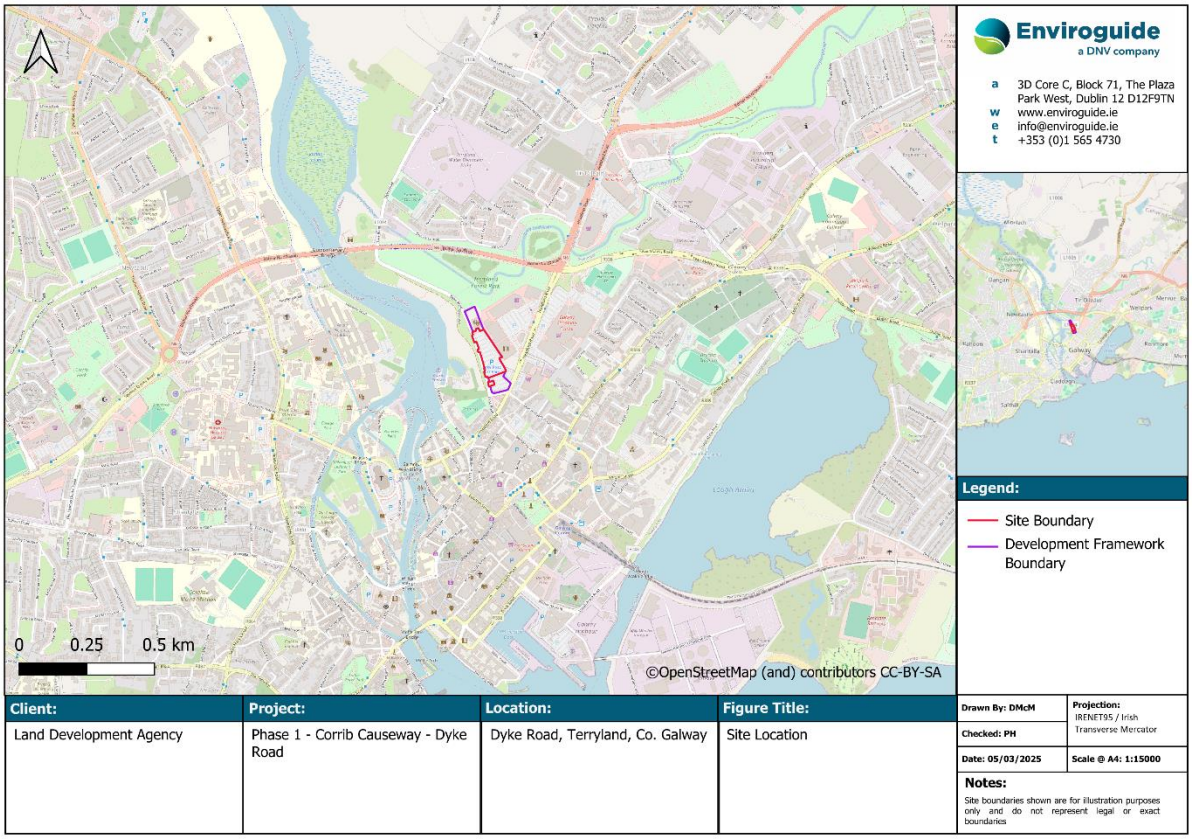

Figure 7-2. Site Location

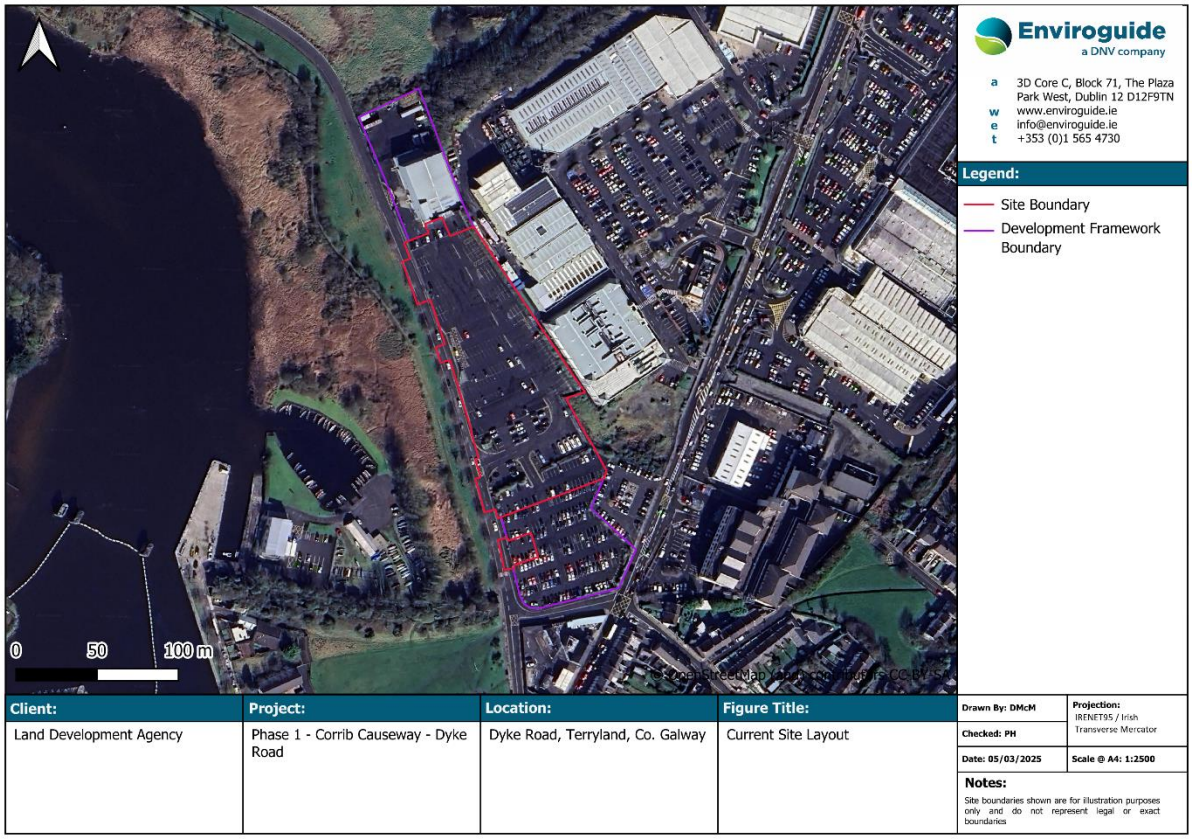

Figure 7-3. Current Site Layout

7.3.2 Historical Land Use

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2025) and Google Earth (Google Earth, 2025) were reviewed and key observations on-site and off-site are summarised in Table 7-3.

Table 7-3. Historical Land Use

Information Source	Site Description	Information Source
1837-1842	OSI Map 6 inch	Onsite: The site is comprised of undeveloped grasslands. Offsite: The surrounding lands to the north and east are predominantly open fields divided by field boundaries. Galway city is adjacent to the site due south.
1888-1913	OSI 25 Inch	Onsite: No significant changes. Offsite: The midland great western railway bounds the site to the south before terminating in Galway City.
1995	OSI Aerial Photograph	Onsite: Ground disturbance works (possible construction of the car park) are observed. Offsite: Surrounding lands are used for commercial developments. The N6 Galway City ring road is built 0.2km north of the site
2001-2005	OSI Aerial Photograph	Onsite: Car park and adjacent commercial park constructed Offsite: Residential housing built in adjacent lands.
2013-2018	OSI Aerial Photograph	Onsite: No significant changes Offsite: No significant changes
2024	Google Earth	On site: No significant changes. Off site: No significant changes.

7.3.3 Topography

As detailed in the Infrastructure Report (AECOM, 2025a), a topographical survey undertaken by Apex Surveys in October 2023 of the overall three phase Development Framework indicates ground levels from 3.84 meters above Ordnance Datum (mOD) at the northern end of the site to 7.12mOD in the southern portion of the site. There is a small retaining wall in the southern portion of the site where the car park levels step up from about 6.0mOD to approximately 7.0mOD.

The ground levels at the site of the Proposed Development typically range from 4.8mOD to 5.9mOD with the level in the centre of the site typically being around 5.3mOD.

7.3.4 Soils

The soils beneath the site of the Proposed Development are mapped by Teagasc (Teagasc, 2025) as made ground (IFS Soil Code: Made). It is noted that the soils beneath the existing Black Box Theatre adjoining the northern boundary of the site (i.e., Phase 3 of the overall Development Framework) are mapped as mineral alluvium (IFS Soil Code: AlluvMIN). As documented in the Infrastructure Report (AECOM, 2025a), it is possible that the site was partially filled in the 1970s and 1980s with rubble from Galway's inner city, which may include medieval and late medieval architecture fragments.

The GSI (GSI, 2025) mapped soils at the site are presented in Figure 7-4.

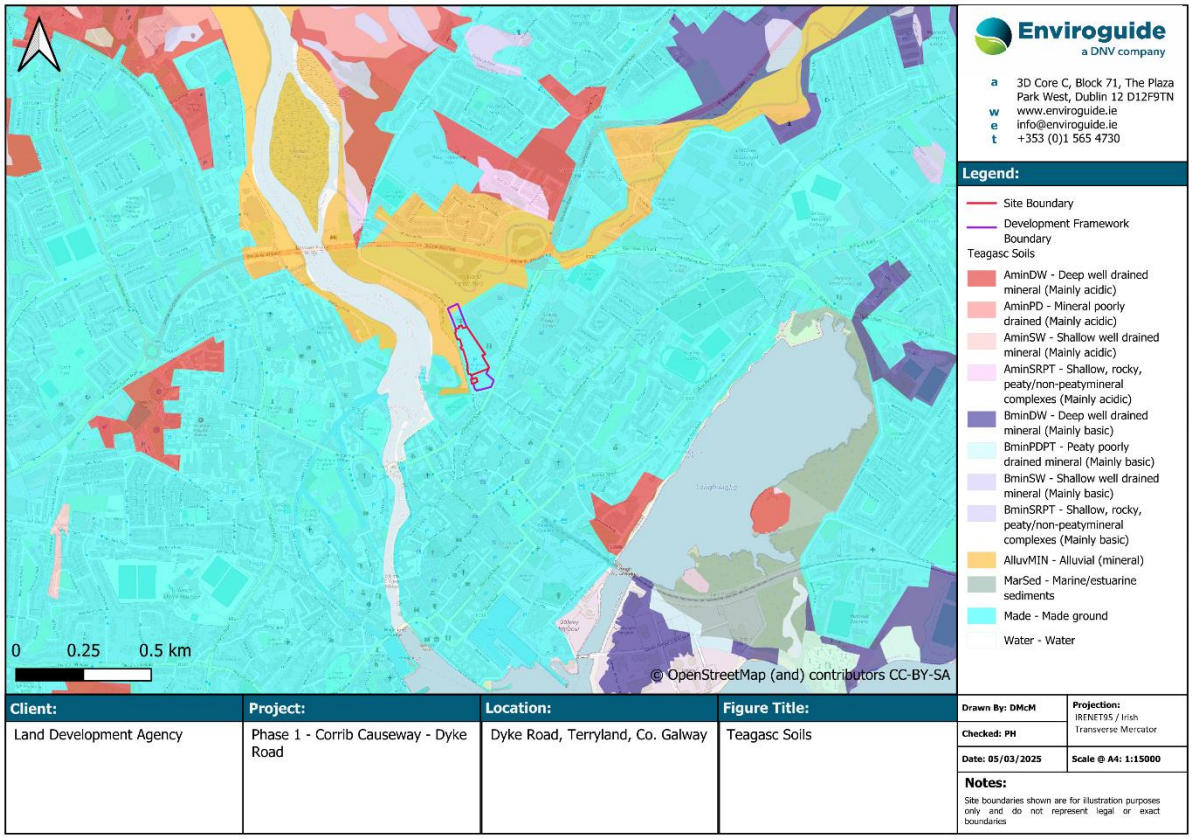

Figure 7-4. Soils

7.3.5 Quaternary Soils

The subsoil or quaternary sediments beneath the site of the Proposed Development are mapped by the GSI (GSI, 2025) as urban. It is noted that the soils beneath the existing Black Box Theatre adjoining the northern boundary of the site (i.e., Phase 3 of the overall Development Framework) are mapped by the GSI (GSI, 2025) as Fen Peat (FenPt).

The GSI (GSI, 2025) mapped quaternary geology at the site is presented in Figure 7-5.

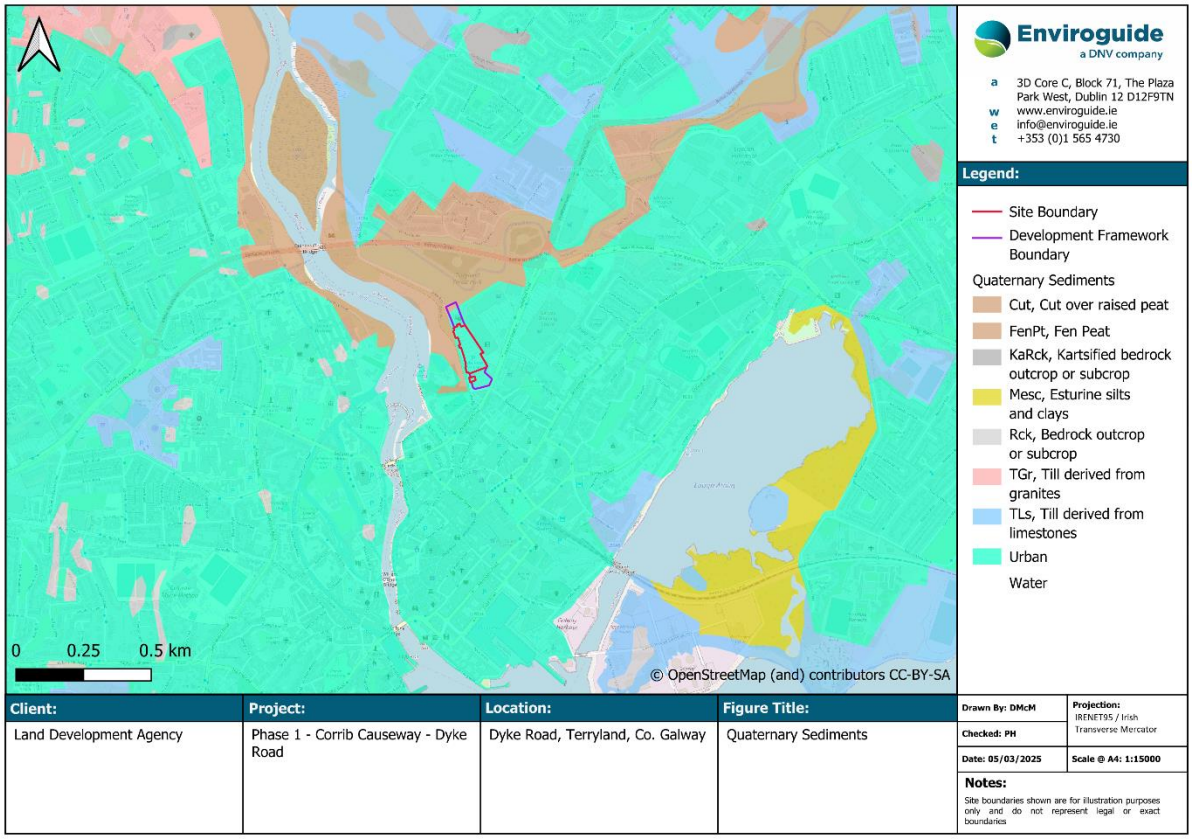

Figure 7-5. Quaternary Soils

7.3.6 Quaternary Geomorphology

There are a number of drumlins mapped by the GSI (GSI, 2025) within a 2 km radius of the site, the closest of which are located approximately 0.5 km southeast and 0.9 km west of the site. The drumlins are oriented in a northeast to southwest direction.

There are also several subglacial striae located within a 2 km radius of the site, the closest of which is approximately 1.0 km west of the site. The striae are oriented to the south/southeast and to the north/northeast.

The streamlined bedrock formations within a 2 km radius of the site are oriented in a northeast to southwest direction. The closest streamlined bedrock formation to the site, mapped by the GSI (GSI, 2025), is approximately 1.15 km north of the site.

7.3.7 Bedrock Geology

The bedrock beneath the site is mapped by the GSI (GSI, 2025) as the Burren Formation (New Code: CDBURR) described as pale grey packstones and wackestones, but also contains intervals of dark cherty limestones, often associated with oolitic grainstones.

While there are no bedrock outcrops mapped within the site boundary there are a number of bedrock outcrops mapped by the GSI (GSI, 2025) within a 2km radius of the site. The closest bedrock outcrop recorded by the GSI (GSI, 2025) is located approximately 0.36km west of the site. Additional outcropping is recorded approximately 0.87km north of the site.

The bedrock geology is presented in Figure 7-6.

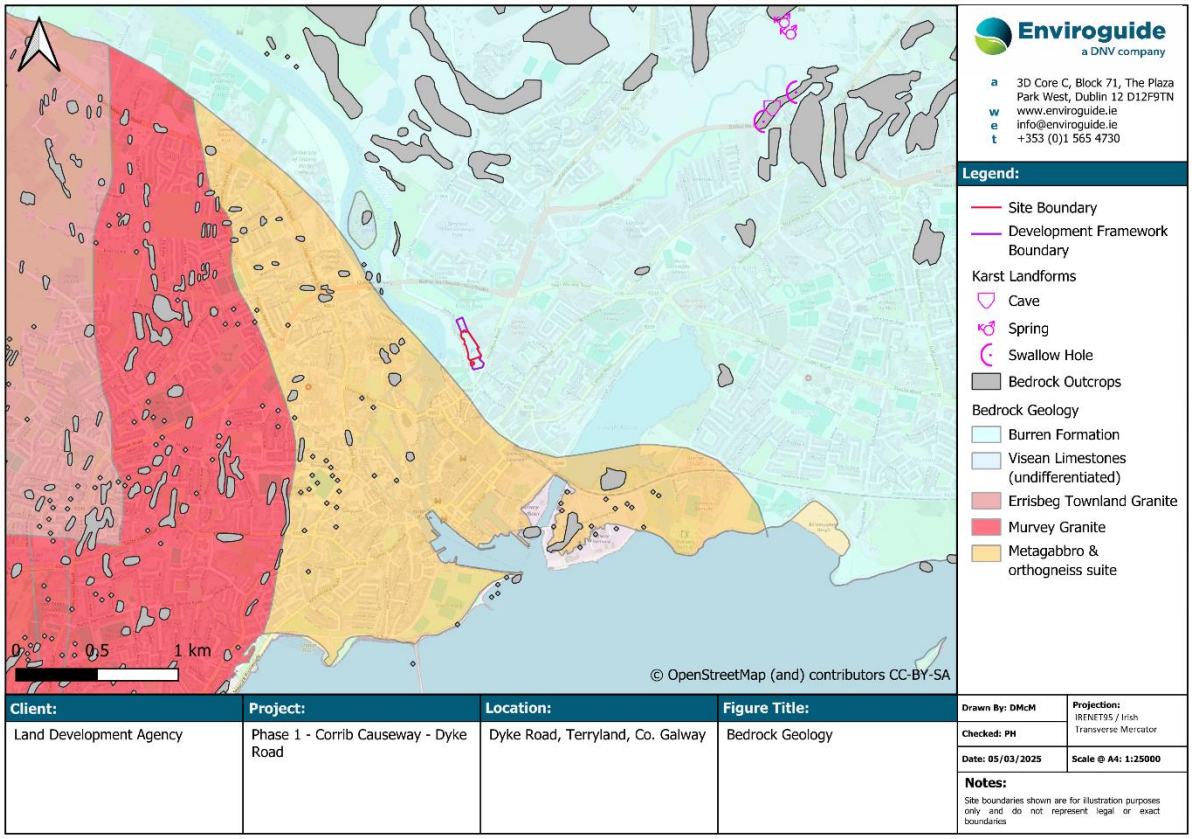

Figure 7-6. Bedrock Geology

7.3.8 Site Investigation Results

7.3.8.1 Intrusive Ground Investigations

As documented in the Ground Investigation Report (GII, 2024), the ground conditions across the site comprise the following:

- SURFACING: Tarmac surfacing was present typically to a depth of 0.06 meters below ground level (mbGL).
- MADE GROUND: Made Ground deposits were encountered beneath the surfacing and were generally present to depths of between 0.5mbGL and 1.0mbGL and a maximum of 3.4mbGL at borehole location BRC04. These deposits were described generally as grey Sand and Gravel FILL and contained occasional fragments of tarmacadam occasionally overlying grey slightly sandy gravelly Clay and brownish black gravelly Peat with occasional red brick, ceramic and rubbish fragments.
- ORGANIC DEPOSITS: Organic deposits were generally encountered beneath the Made Ground and were described typically as brownish black slightly clayey slightly gravelly PEAT. The secondary constituents varied across the site, with silt and clay lenses occasionally present in the peat. The strength of the deposits was typically very soft based on SPT N values.
- SOFT COHESIVE DEPOSITS: Soft Cohesive deposits were encountered beneath the organic deposits and were generally described as beige or cream clayey SILT with frequent shell fragments occasionally onto light grey slightly sandy slightly gravelly clayey SILT with occasional cobbles. The secondary sand and gravel constituents

varied across the site and with depth, and peat lenses were occasionally present within the deposits. The strength of the soft cohesive deposits was typically very soft to soft.

- COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the soft cohesive deposits at some locations and were described typically as light grey to grey slightly sandy slightly gravelly silty CLAY with occasional cobbles. The secondary sand and gravel constituents varied across the site and with depth. The strength of the cohesive deposits typically increased with depth and was stiff or very stiff below 6.0m BGL in the majority of the exploratory holes. These deposits had some occasional cobble content, where noted on the exploratory hole logs.
- GRANULAR DEPOSITS: Granular deposits were occasionally encountered at the base of the cohesive deposits and were typically described as grey very sandy subangular to subrounded fine to coarse GRAVEL with occasional cobbles. The secondary sand constituents varied across the site while occasional cobble content was also present were noted on the exploratory hole logs. Based on the SPT N values the deposits are typically medium dense to dense and become dense with depth. Groundwater strikes were occasionally noted in the boreholes on encountering the granular deposits.
- BEDROCK: The rotary core boreholes recovered strong thinly to medium bedded grey fine to medium grained fossiliferous LIMESTONE, with the exception of borehole location BRC04 which recovered strong to very strong thinly to thickly banded dark green medium to coarsely crystalline METAGABBRO. Occasional calcite veins were noted during logging. The depth to rock increases to the southeast from 11.2mbGL at borehole location BH01 in the north-western corner of the site to a maximum depth of 15.3mbGL at borehole location BRC03 in the centre. The depth to rock decreases to 9.4mbGL at borehole location BRC06 and further decreases to between 6.6mbGL and 6.1mbGL respectively at borehole locations BRC04 and BRC05 in the southeastern portion of the site.

As documented in the Ground Investigation Report (GII, 2024), groundwater strikes were recorded between 1.30mbGL and 9.5mGL during borehole drilling. Four (4No.) groundwater monitoring wells were installed at the site (at borehole locations BRC1, BRC02, BRC04 and BRC05) to allow the equilibrium groundwater level to be determined. Groundwater level measurements ranged from 0.17mbGL to 2.25mbGL. Groundwater is assessed in Chapter 8 of this EIAR.

It is noted that the Ground Investigation Report (GII, 2024) did not identify any karst features at the site.

7.3.8.2 Geophysical Survey

Minerex Geophysics Ltd. (MGX) carried out a geophysical survey (Minerex, 2024) consisting of 2D-Resistivity (ERT), seismic refraction (p-wave) and MASW (s-wave) surveying for the site. The findings of the geophysical survey are summarised as follows:

- The seismic refraction survey was modelled with a total of four layers:
    - Layer 1 is mainly affected by the road construction. High resistivities near the surface indicate road construction material such as gravel and tarmac. This layer would also contain urban made ground and peat.

  - Layer 2 is interpreted as soft to firm clay and silt or urban made ground or peat. This layer extends down to an elevation of approximately 0mOD across much of the site but extends deeper in the northwest.
  - Layer 3 is described as very stiff or very dense overburden. This layer is only present in the northwest of the site. It may contain some very weathered rock.
  - Layer 4 is interpreted as rock. The depth to the top of this layer is between 4mbGL to 9mbGL across most of the site but 11mbGL to 12mbGL in the northwest in RC BRC01 and BH01. Due to the interference the seismic modelling depth was limited here to around 10m.
- Some high resistivities at depth indicate that there is clean limestone present that is liable to karstification, but it does not have to be karstified (refer to Figure 7-7).

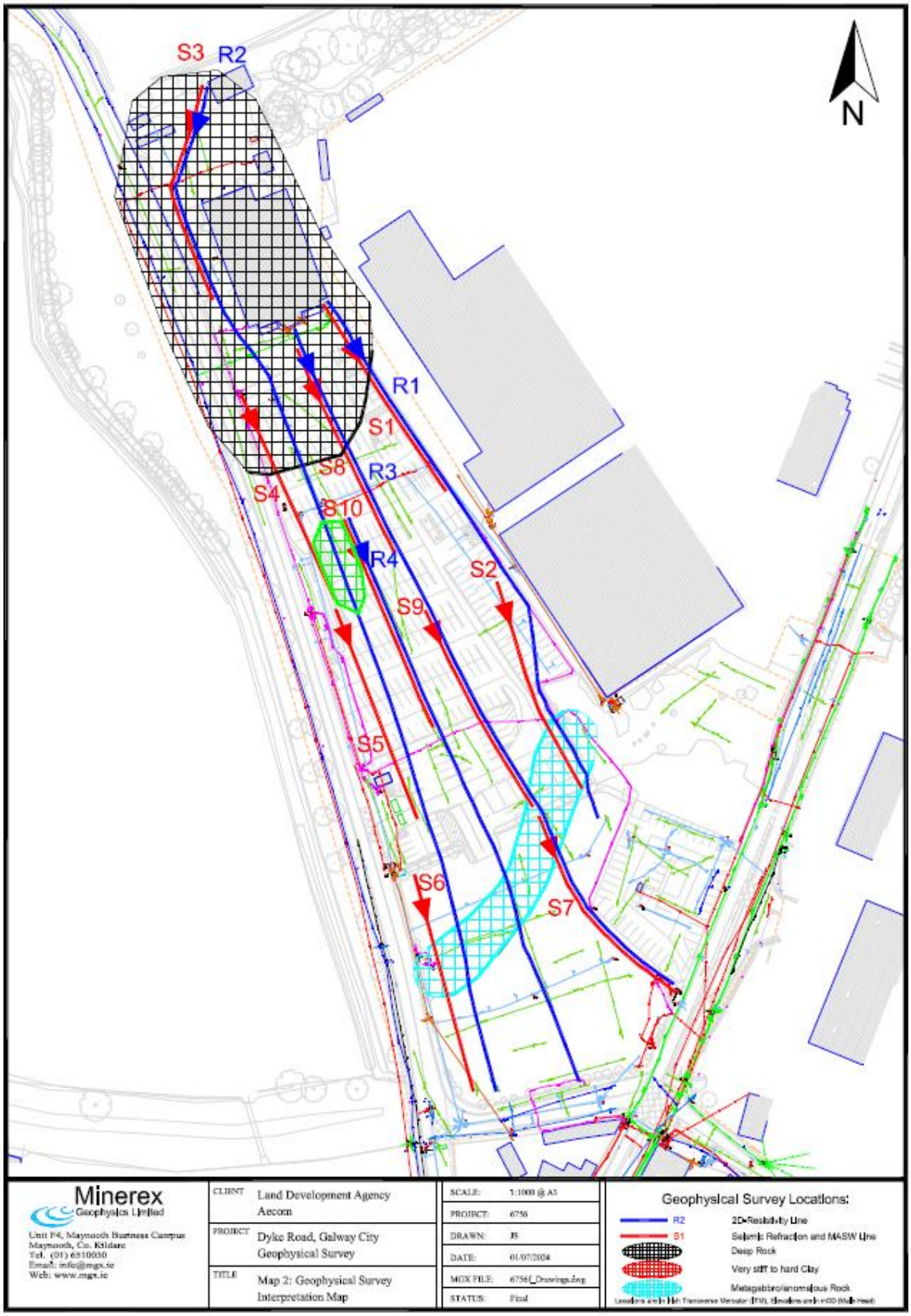

Figure 7-7. Geophysical Survey Interpretation Map (Minerex, 2024)

7.3.8.3 Soil Quality

Soil analytical data for soil samples collected across the site are provided in the ground investigation report (GII, 2024).

As documented in the ground investigation report (GII, 2024), a total of twenty-eight (28No.) soil samples collected were analysed for a suite of parameters suitable to determine the suitability of soils for disposal to a landfill. Soil analytical data for soil samples collected across the site are provided in the in the ground investigation report (GII, 2024). It is noted that a waste classification assessment was not included within the ground investigation report (GII, 2024).

Based on a review of the results, there is evidence of low-level anthropogenic contamination in sampled soils across the site:

- Detectable concentrations of Polycyclic Aromatic Hydrocarbons (PAHs), ranging from 0.67mg/kg to 34.54mg/kg, were reported for ten (10No.) samples collected. The reported concentrations of PAHs at remaining sample locations were below the laboratory limit of detection (LOD).
- Detectable concentrations of Total Petroleum Hydrocarbons (TPH), ranging from 69mg/kg to 3192mg/kg, were reported for fifteen (15No.) samples collected. The reported concentrations of TPH at remaining sample locations were below the LOD.
- Detectable concentrations of Extractable Petroleum Hydrocarbons (EPH), ranging from 877mg/kg to 1033mg/kg, were reported for three (3No.) samples collected. The reported concentrations of EPH at remaining sample locations were below the LOD.
- Detectable concentrations of Mineral Oil, ranging from 52mg/kg to 1047mg/kg, were reported for twelve (12No.) samples collected. The reported concentrations of mineral oil at remaining sample locations were below the LOD.
- Detectable concentrations of toluene and/or m/p xylene, of 7ug/kg, were reported for two (2No.) samples collected. The reported concentrations of toluene and m/p xylene at remaining sample locations were below the LOD.
- The reported concentration of Polychlorinated Biphenyl (PCBs) were reported below the LOD for all samples collected.
- The reported concentration of benzene, ethylbenzene and o-xylene were less than the LOD for all samples collected.
- Asbestos was reported as ‘no asbestos detected’ for all samples collected.

7.3.9 Geochemical Domain

The GSI along with the EPA have developed geochemically appropriate levels (GALs) for soil recovery facilities across Ireland specifically in relation to metals and metalloids in uncontaminated soil and stone (GSI, 2025). There are a total of seven defined domains across the country. The GSI (GSI, 2025) defined Geochemical Domains map indicates that the site of the Proposed Development is located within Domain 2 which is characterised as ‘carboniferous limestones, shales and related rocks’.

A summary of the metals values for Domain 2 are presented below in Table 7-4.

Table 7-4. Geochemically Appropriate Levels for Domain 2

Element	Units	Value
Arsenic	mg/kg	24.90
Cadmium	mg/kg	3.28
Chromium	mg/kg	50.30
Copper	mg/kg	63.50
Mercury	mg/kg	0.36
Nickel	mg/kg	61.90
Lead	mg/kg	86.10
Zinc	mg/kg	197.00

7.3.10 Radon

The Radon Risk Map of Ireland (EPA, 2025) shows a prediction of the number of the houses in any one area that are likely to have high radon levels. The map is based on an analysis of indoor radon measurements plus geological information including, bedrock type, quaternary geology, soil permeability and aquifer type.

The site of the Proposed Development is mapped by the EPA (EPA, 2025) as being in an area where ‘about 1 in 5 homes in this area is likely to have high radon levels’.

The EPA cite the reference level for radon as 200 Bq/m^3 and a High Radon Area where more than 10% of homes may have more than the reference level of radioactivity. As more than 10% of the houses in the area are mapped by the EPA as being over this reference level it indicates that the site is considered a High Radon Area (EPA,2024). It is noted that a high radon level can be found in any home, in any part of the country, but these homes are more likely to be located in High Radon Areas.

7.3.11 Geohazards

Earthquakes are not likely to occur in the vicinity of the site at a sufficient intensity to pose a risk for the Proposed Development.

The GSI database (GSI, 2025) indicated that the site is not located within an area susceptible to landslides. There are no recorded landslides recorded on the GSI database (GSI, 2025) at the site or within a 2km radius of the site.

Galway City and its surrounding areas exhibit a distinctive karst landscape characterised by its unique geological features and limestone formations. Karst weathering is a gradual process occurring over thousands of years, initiated by CO2-enriched rainwater percolating through carbonate bedrock. This slightly acidic water dissolves the rock, forming voids. Over time, these voids can become filled with sub-soils through drop-out subsidence. The region's abundant rainfall, coupled with the presence of carbonate-rich bedrock, has facilitated the development of numerous karst features, including sinkholes, caves, and underground rivers.

There are no karst features mapped by the GSI (GSI, 2025) at the site or within a 2km radius of the site. However, it is noted that the closest karst features to the site, which include two swallow holes (Karst Feature Unique ID: IE_GSI_Karst_40K_890 and

IE_GSI_Karst_40K_942) and a cave (Karst Feature Unique ID: IE_GSI_Karst_40K_1048), are located approximately 2.18km northeast of the site at their closest point (refer to Figure 7-6).

As documented in the Galway City - County Geological Site Report (GSI, 2020), the two (2No.) swallow holes, described as estavelles, are hydraulically connected to the Terryland Stream (River Waterbody Code: IE_WE_30C020600), located approximately 0.13km north of the site at its closest point, when they act as springs and to the Corrib Estuary transitional waterbody (Eu Code: IE_WE_170_0700) via an underground conduit system when they act as sinks. The precise discharge locations of the estavelles are unknown.

It is noted that the Ground Investigation Report (GII, 2024) did not identify any karst features at the site.

7.3.12 Geological Heritage Sites

There are no geological heritage sites mapped by the GSI (GSI, 2025) at the site. However, there are five (5No.) geological heritage sites located within 2km radius of the site as summarised in Table 7-5.

Table 7-5. Geological Heritage Sites within a 2km Radius of the Site

Site Name (Site Code	Location	Description
Shantalla Sliding Rock (GC009)	1.14km Southwest	Landmark outcrop with historical significance in suburban estate amenity park.
Westside Sports Grounds (GC012)	1.77km West	Granite outcrops situated in public amenity area.
Fairlands Park	1.26km Northwest	Metamorphic outcrops situated in green area of suburban estate.
Terryland River (Sink/Rising)	1.91km Northeast	River with unusual flow regime flowing from or into River Corrib, with associated karst features.
St. Augustine's Well	0.77km Southeast	Freshwater karst spring on the shore of a saline tidal lagoon.

7.3.13 Economic Geology

The lands beneath the site are mapped by the GSI (GSI, 2025) to have no mapped granular aggregate potential.

The bedrock beneath the site has been identified by the GSI (GSI, 2025) as having a high potential for crushed rock aggregate.

There are no historical pits or quarries mapped by the GSI (GSI, 2025) at the site. However, there are ten (10No.) historical pits and quarries located within 2km radius of the site as summarised in Table 7-5.

Table 7-6. Historical Pits and Quarries within a 2km Radius of the site

Type	Location
Quarry	0.99km North
Quarry	1.61km North

Type	Location
Quarry	1.91km North
Quarry	2.0km North
Pit	1.27km Northeast
Pit	1.31km Northeast
Pit	1.77km Northeast
Pit	1.96km Northeast
Pit	2.0km Northeast
Quarry	1.74km East

7.3.14 Importance of the Baseline Environment

In accordance with the TII Guidance as documented by the NRA (NRA, 2009) and as outlined in Table 7-1, the soil and geology underlying the site of the Proposed Development would be rated as an attribute of 'low' importance due to due to its current use as a public surface car park and the presence of made ground impacted with low levels of hydrocarbon contamination identified across the site (GII, 2024). The subsoils are not mapped as containing a mineral resource and while the bedrock is mapped as having a high potential for crushed rock, it is considered uneconomical to extract. Furthermore, there are no geological heritage sites recorded at the site.

7.4 Characteristics of the Proposed Development

The Proposed Development (i.e., Phase 1) will consist of the construction of a new residential development of 219 no. apartment units and a childcare facility (approx. 241 sq m) in the form of 1 no. new residential block (5 - 9 storeys over lower ground floor level) with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.144 ha.

A full description of the Proposed Development is outlined in Chapter 2 of this EIAR.

The following components are of particular relevance with respect to land, soils and geology.

7.4.1 Construction Phase

The Construction Phase of the Proposed Development will include:

- It is understood that the foundation design will consist of 640mm diameter ODEX piles with reinforced in-situ concrete ground beams between pile caps and suspended slab.
- Stripping of existing macadam layers and road buildup (approximately 3,3037m^3).
- Excavation of soil and subsoil to formation level with the excavation of approximately 2,219m^3 of soils
- Excavation of soil and subsoil for the construction of building foundations, drainage and other infrastructure with excavation of 7,500m^3 of soils.
- It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the Proposed Development.

- Where possible, it is intended to reuse suitable excavated soil and subsoil for landscaping and engineering use. However, where required, surplus materials will require removal offsite in accordance with all statutory legislation.
- Temporary stockpiling of excavated material pending re-use onsite or export offsite.
- The importation of 3,750m^3 of aggregate fill materials will be required for the construction of the piling matt.
- The importation of 3,072m^3 of aggregate fill materials will also be required for the construction of the Proposed Development (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.).
- Based on the findings of the ground investigation (GII, 2024) and the design requirements for the Proposed Development, it is anticipated that granular deposits may be encountered during excavations for building foundations, drainage and other infrastructure. Any excavations which penetrate the granular deposits will be required to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages.

7.4.2 Operational Phase

The operational phase of the Proposed Development consists of the typical activities in a residential development and with the exception of localised gardening works by the appointed management company, there will be no bulk excavation of soils or bedrock or infilling of waste.

The land use at the site will change from a public surface car park, to mixed use residential and commercial land use with associated vehicular and pedestrian access, car parking and landscaping.

There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase of the Proposed Development as the main operating system for heating will be natural gas. Further details are provided in Chapter 15 of this EIAR.

7.5 Potential Impact of the Proposed Development

The procedure for determination of potential impacts on the receiving land, soils and geology is to identify potential receptors within the Proposed Development site boundary and surrounding environment and use the information gathered during the desk study and site walkover to assess the degree to which these receptors will be impacted upon in the absence of mitigation. Impacts are described in terms of quality, significance, duration and type as detailed in Table 7-2.

7.5.1 Construction Phase

7.5.1.1 Land Take and Land Use

The Proposed Development will require land take of approximately 1.144Ha and will change from a public surface car park to mixed use residential and commercial land use. The lands across the site are zoned ‘Enterprise, Light Industry and Commercial (CI). The zoning objective allows for the development of strategic regeneration and opportunity sites which includes for residential. Therefore, the Proposed Development is considered to meet the zoning objectives of the Galway City Development Plan 2023-2029. There will be an

unavoidable land take with loss of land and soil with a 'negative', 'imperceptible' and 'permanent' impact taking account of the surrounding land and zoning objectives.

7.5.1.2 Excavation and Removal of Soil and Subsoil

There will be an unavoidable loss of in-situ soils and bedrock from the Proposed Development site to achieve the required formation levels for the Proposed Development including building foundations, roads, drainage and other infrastructure.

The construction of the Proposed Development will require the excavation of approximately 9,719m^3 of soils. Where possible, it is intended to reuse suitable excavated soil and subsoil for landscaping and engineering use. However, it is anticipated that there will be surplus and unsuitable material to be removed offsite. The soils underlying the site are considered to be of 'low' importance (refer to Section 7.3.14). Accordingly, there will be a 'negative' 'slight' and 'permanent' impact on the underlying soils at the site.

The removal of surplus soil offsite will be undertaken in accordance with applicable statutory requirements. This may include where suitable, removal as by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011 as amended. The potential impact with removal offsite of surplus soil and other material as waste is assessed in Chapter 14 of this EIAR.

7.5.1.3 Soil Quality and Contamination

As documented in the Infrastructure Report (AECOM, 2025a), it is possible that the site was partially filled in the 1970s and 1980s with rubble from Galway's inner city. The Ground Investigation Report (GII, 2024) has identified made ground across the site to depths ranging between 0.5mbGL and 3.4mbGL (refer to Section 7.3.8). There will be a requirement for the excavation and removal of soils and subsoils including made ground impacted with low levels of anthropogenic contamination (i.e., PAHs and petroleum hydrocarbons – refer to Section 7.3.8.3) and permanent removal off-site that will result in a 'positive', 'slight to moderate' and 'permanent' impact on the quality of shallow soils underlying the site.

Where possible, it is intended to reuse suitable excavated soil and subsoil for landscaping and engineering use. The reuse of soil and subsoil at the site will have a 'neutral', 'imperceptible' and 'permanent' impact given that it will have undergone testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

There is a potential risk associated with the use of cementitious materials during construction of subsurface structures (such as foundations) on the underlying soil and geology at the Proposed Development. It is considered that this may result in a 'negative', 'moderate' and 'long-term' impact on existing quality of soil within a localised area underlying the site.

The potential accidental release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary containment or a materials' handling accident on the Proposed Development could potentially result in a 'negative', 'moderate to significant', 'long-term' impact on the receiving soil and geology depending on the nature of the incident. This worst-case scenario is deemed to be unlikely to occur.

7.5.1.4 Dust Generation

There is a potential for creation of windblown dust generation from the temporary stockpiling of materials onsite. There will be some exhaust emissions generated from use of excavators, HGVs (heavy goods vehicles) and vibrating rollers during the construction phase of the Proposed Development. An assessment of the potential impact of the Proposed Development with regard to the generation of dust is addressed in Chapter 10 of this EIAR.

7.5.1.5 Soil Structure

The excavation and re-use of soil at the site (where possible) will result in the exposure of the materials to various elements including weather, construction traffic and temporary stockpiling. This exposure can lead to changes in the soil's moisture content, temperature, and structure (e.g., rain can cause the soil to become waterlogged, dry weather can lead to desiccation and cracking, movement of construction vehicles and equipment over the soil can cause compaction and disturbance. Reducing the soil's porosity, making it less able to absorb water and nutrients). Over time, the soil may become less cohesive and more prone to erosion and instability. The combined effects of exposure to elements, construction traffic, and temporary stockpiling will have a potential 'negative,' slight' and 'long term' impact on the natural strength of the materials.

7.5.1.6 Importation of Fill Materials

The importation of approximately 6,822m^3 of aggregate fill materials will be required for the construction of the proposed development (e.g., construction of the piling mat and granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds). The potential impacts may include loss of attribute and changes in the geological regime at the source site. It is anticipated that the required aggregates identified for importation onsite will be 'indirect' and have a 'neutral,' 'imperceptible' and 'permanent' impact on the source site taking account of the fact that the statutory consent process would have required the necessary environmental impacts to be assessed and mitigated as appropriate at the source site.

7.5.1.7 Geological Hazards

Earthquakes are not likely to occur in the vicinity of the site at a sufficient intensity to pose a risk for the Proposed Development. The GSI database (GSI, 2025) indicates that the Proposed Development site is not located within an area susceptible to landslides.

Galway City and its surrounding areas are characterised by a unique karst landscape defined by limestone formations and geological features. While no evidence of karst features was identified during the ground investigation (GII, 2024), the geophysical survey undertaken for the site (Minerex, 2024) indicated the potential presence of karstified rock. During the Construction Phase of the Proposed Development, there will be a temporary reduction in impermeable surfaces across the site. In karst-prone areas, alterations in groundwater flow, exacerbated by additional water such as rainfall infiltration, can lead to increased rock erosion and the formation of voids. The depth to rock across the site ranges from 6.1mbGL in the southeast of the site to 15.3mbGL in the centre. Where bedrock was encountered during ground investigations (GII, 2024) the absence of karst features was proven to depths ranging between 11.0mbGL and 20.1mbGL. It is considered that karst features located 10m or more below ground level are unlikely to impact building foundations and roads at the Proposed

Development. The design and specification for all buildings will be in accordance with current Building Regulations and therefore avoiding any potential risks associated with karst features.

The ground investigation (GII, 2024) did not reference any issues associated with pyrite. All aggregates imported to the site for use in the Proposed Development will be subject to strict quality control procedures in accordance with the design specification and relevant Building Regulations therefore avoiding any potential issues with pyrite in aggregates.

The site is identified as being located within a High Radon Area. The design and specification for all buildings will be in accordance with current Building Regulations and therefore any potential issues associated with radon will be addressed and avoided.

Overall, taking account the design for the Proposed Development, there are no identified likely significant effects associated with geological hazards.

7.5.2 Operational Phase

During the operational phase of the Proposed Development there is no likely potential for any direct adverse impact on the receiving land, soil and geological environment at the site taking account of the design for the Proposed Development.

The design and construction of the Proposed Development in accordance with current Building Regulations will ensure that the site will be suitable for use for the Operational Phase as a mixed use residential and commercial development taking account of the geological site setting.

7.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as “impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”. Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

As part of this assessment, other offsite developments and proposed offsite developments as detailed in Chapter 2 of this EIAR were reviewed and considered for possible cumulative effects with the Proposed Development.

7.5.3.1 Excavation and Removal- of Soil and Subsoil

Excavated soil and subsoil during the construction phase of the Proposed Development could potentially be directed to the same receiving waste facilities for recovery / disposal as excavated materials from other developments detailed in Chapter 2 of this EIAR and within the wider Galway City area. All surplus soils and subsoils from the site will be removed offsite in accordance with all statutory legislation. Accordingly, it is considered that any cumulative impact on lands, soils and geology associated with the Proposed Development will be ‘neutral’, ’imperceptible’ and ‘permanent’.

7.5.3.2 Import of Aggregates and Materials

The importation of aggregates to the Proposed Development may be sourced from the same borrow site as other permitted developments detailed in Chapter 2 of this EIAR and within the

wider Galway City area. However, contract and procurement procedures will ensure that all aggregates and fill material originating from quarry sources that will be required for construction are sourced from reputable authorised suppliers operating in a sustainable manner and in accordance with the necessary statutory consents. Therefore, regardless of the number of other projects and developments using aggregates from the same source sites, there will be an 'indirect', 'neutral', 'imperceptible' and 'permanent' impact on the geological environmental at the source site.

There are no other cumulative impacts associated with land, soil and geology associated with the construction phase and operational phase of the Proposed Development.

7.5.4 "Do Nothing" Impact

The 'Do Nothing' scenario assesses the potential impact on the receiving land, soils, and geological environment if the Proposed Development did not proceed.

It is considered that there would be no change or resulting impact on the nature of the site with respect to land, soil and geology at the site which would remain as a public surface car park with localised areas of underlying soils impacted with hydrocarbon contamination.

The land-use is zoned as 'Enterprise, Light Industry and Commercial (Cl) in accordance with the Galway City Development Plan 2023-2029. The zoning objective allows for the development of strategic regeneration and opportunity sites. As such, it is reasonable to assume another similar development proposed for the lands could be brought forward for the site. This would require a separate assessment or EIAR applicable to the relevant scheme design.

7.6 Avoidance, Remedial & Mitigation Measures

The mitigation measures as outlined below, will ensure that there will be no significant impact on the receiving land, soil and geology.

7.6.1 Construction Phase

During the Construction Phase, all works will be undertaken in accordance with the Outline Construction Environmental Management Plan (CEMP) (AECOM, 2025c) and the Outline Resource and Waste Management Plan (RWMP) (AECOM, 2025d). Following appointment, the main contractor will be required to further develop the CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development.

The Contractor will produce a Pollution Prevention Plan (or similar document). This will include procedures and diagrams for:

- Dewatering of excavations.
- Temporary soil storage.

- Fuel storage/refuelling.
- Concrete wash-out area.
- Controlling surface water entering Site.
- Preventing existing drainage features becoming pathways for construction run-off.
- Reducing soil exposure and reinstating as rapidly as possible.
- Contingency measures.

7.6.1.1 Import of Aggregates and Materials

Contract and procurement procedures will ensure that all imported aggregates and materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates and materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

7.6.1.2 Airborne Dust

Excavated and handling of soils will be carefully managed and maintained in accordance with documented procedures that will be set out in order to protect ground and minimise airborne dust. As outlined in the CEMP (AECOM, 2025c), the measures required to prevent airborne dust emissions and associated nuisance arising from site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the site. Potential impacts and avoidance and mitigation measures associated with generation of dust are addressed in Chapter 10 of this EIAR.

7.6.1.3 Reuse of Soil

Soil and subsoil materials to be reused within the Proposed Development (i.e., for landscaping on site) will be subject to assessment of the suitability of the soil for use in accordance with engineering and environmental specifications for the Proposed Development.

As documented in the CEMP (AECOM, 2025c), the main contractor will, as part of their RWMP, prepare a project-specific Excavated Material Management Plan, which will detail the following as a minimum:

- Detail in-situ (prior to excavation) and ex-situ (post excavation) methodologies to classify waste soil for appropriate disposal, in accordance with relevant Irish and EU legislation and guidance.
- Identify reuse requirements and soils suitable for reuse on site in consultation with the design team, including assessment methodology to determine which soils are suitable for re-use onsite.
- Site management procedures, including waste minimisation, stockpile management, temporary storage procedures, waste license requirements, and Waste Management documentation, including waste generation record keeping, waste transfer notes, confirmation of appropriate disposal and details of any rejected consignments.

The RWMP (AECOM, 2025d) will detail relevant procedures including further environmental sampling, testing and assessment requirements, sampling protocols and sample density targets to supplement any existing soil data.

Where any hotspots of potential contamination are encountered, and prior to disposal, further assessment will be undertaken by a suitably qualified environmental scientist to determine the nature and extent of remediation required.

Where the main contractor proposes to reuse excavated soil within the works (e.g., as backfill), and where reuse is permitted in accordance with the relevant legislation, the main contractor will set out their proposal for its management, documentation and reuse. This will include:

- Define the criteria by which the suitability of the soils for reuse will be assessed (e.g., analytical parameters and limits), the engineering requirements such as geotechnical parameters for the material to be used within the works.
- Delineation of areas where excavated soil is intended for disposal off-site as waste, and where it is intended for reuse on site.
- Identification and recording of the location from where the soil will be excavated and its proposed reuse location and function.
- Engineering assessment to confirm its suitability for reuse.
- Any proposed treatment or processing required to enable its reuse, as well as any associated treatment permits, or licences required.

7.6.1.4 Management and Control of Soils and Stockpiles

Segregation and storage of soils for re-use on-site or removal off-site and waste for disposal off-site will be segregated and temporarily stored on-site pending removal or for reuse on-site.

Specific routes for construction vehicles will be identified in advance of construction works commencing to minimise soil compaction and disturbance.

Where possible, stockpiling of soils and subsoils onsite will be avoided. However, in the event that stockpiling is required, stockpiled materials, pending reuse on-site, will be located away from the location of any sensitive receptors (watercourses and drains). In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 30m of the open water where sufficient working areas are available within the site boundary.

The re-use of suitable cut material on-site for the Proposed Development (i.e., landscaping, raising levels or engineering fill) will be undertaken in accordance with the engineered design of the Proposed Development. Where required, organic matter or soil conditioners to improve soil structure and fertility before re-use. Surplus or unsuitable soils will be removed offsite.

Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite. For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area will be identified and designated.
- Stockpiles will not be positioned adjacent to ditches, watercourses or existing or future excavations. Stockpiles will be a minimum of 30m from existing drains.
- All stockpiles will be assigned a stockpile number.

- Material identified for reuse on site, off site and waste materials will be individually segregated and all segregation, storage and stockpiling locations will be clearly delineated on the site drawings.
- Soil stockpiles will be covered to prevent run-off from the stockpiled material generation and/or the generation of dust.
- Material identified for reuse on site, off site and waste materials will be individually segregated. When a stockpile has been sampled for classification purposes, it shall be considered to be complete, and no more soil shall be added to that stockpile prior to disposal.
- Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross-contamination of the soil below or cross contamination with soil.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.

An excavation/ stockpile register will be maintained on site showing at least the following information:

- Stockpile number.
- Origin (i.e., location and depth of excavation).
- Approximate volume of stockpile.
- Date of creation.
- Description and Classification of material.
- Date sampled.
- Date removed from site.
- Disposal/recovery destination.
- Photograph.

7.6.1.5 Export of Resource (Soil ad Subsoil) and Waste

All surplus materials and any waste will be removed off-site in accordance with the requirements outlined in the CEMP (AECOM, 2025c) and will be managed in accordance with all legal obligations. It will be the contractor's responsibility to either obtain a waste collection permit or to engage specialist waste service contractors who will possess the requisite authorisations for the collection and movement of waste off-site.

As documented in the CEMP (AECOM, 2025c), where appropriate, excavated soil and material intended for recovery or disposal offsite will require appropriate waste classification in order to select an appropriate receiving facility. Assessment of the excavated material will be carried out with due regard to the following guidance and legislation:

- Environmental Protection Agency document entitled Waste Classification; List of waste and determining if waste is Hazardous or Non-Hazardous.
- EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002).
- Environmental Protection Agency documented entitled Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities.

- Environment Agency, 2018. Technical Guidance WM3: Guidance on the classification and assessment of waste.
- Any other guidance or legislation that might be applicable or relevant at the time of disposal.

The re-use of soil and subsoil offsite will be undertaken in accordance with all statutory requirements and obligations including where appropriate re-use as by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011) as amended.

Any surplus material not suitable for re-use as a by-product and other waste materials arising from the Construction Phase will be removed offsite by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility sites will have been adequately assessed and mitigated.

Any waste soils will be transported under a valid waste collection permit issued under the Waste Management (Collection Permit) Regulations 2007 as amended, and will be delivered to an appropriately authorised waste management facility.

Materials and waste will be documented prior to leaving the site. All information will be entered into a waste management register kept on the site.

Vehicles transporting material with potential for dust emissions to an off-site location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust.

Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles. Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.

7.6.1.6 Concrete Works

The cementitious grout and other concrete works during the Construction Phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the main contractor and in accordance with the CEMP and relevant industry standards.

Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.

All ready-mixed concrete will be delivered to the site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal off-site in accordance with all relevant waste management legislation. Any excess concrete will not be disposed of onsite.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

7.6.1.7 Piling

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), a piling risk assessment will be completed by the main contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology will give cognisance to the UK Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

7.6.1.8 Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (AECOM, 2025c), in a designated area of the site away from any watercourses and drains (where not possible to carry out such activities offsite).

Any diesel, fuel or hydraulic oils stored on-site will be stored in designated areas (AECOM, 2025c). These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

The main contractor will ensure that strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site.

There may also be the requirement for use of portable generators or similar fuel containing equipment during the construction phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times

The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the main contractor will ensure that in advance of any works commencing. Construction staff will be familiar with the emergency response plan.

Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the site will also be equipped with its own spill kit.

7.6.1.9 Emergency Procedures

Emergency procedures will be developed by the main contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry best practice standards and legislative requirements including but not limited to the Environmental Protection Agency Act, 1992 (as amended), Waste Management Act, 1996 (as amended) and the Safety, Health and Welfare at Work Act, 2005 (as amended):

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development.

7.6.1.10 Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE.

7.6.2 Operational Phase

During the operational phase of the Proposed Development there is no likely potential for any direct adverse impact on the receiving land, soil and geological environment at the site taking account of the design for the Proposed Development. Therefore, there is no requirement for mitigation measures for the Operational Phase.

7.6.3 "Worst Case" Scenario

In a 'Worst Case' scenario the potential accidental release of hazardous material including fuels, or other hazardous materials being used on-site during the Construction Phase would present a 'negative', 'moderate to significant' and 'long-term' impact on the receiving land, soils, and geology environment. However, this scenario would only occur through the failure of secondary containment or a major incident on the site. This worst-case scenario is deemed to be unlikely to occur.

7.7 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessment and mitigation measures'. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

The predicted impacts of the construction phase and operational phase of the Proposed Development are described in Table 7-7 below in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

The excavation of made ground including some soils impacted with low levels of anthropogenic contamination (i.e., PAH's and petroleum hydrocarbons) and permanent removal off-site will have an overall positive impact on the quality of shallow soils underlying the site.

Overall, there is no significant residual impacts on land, soils and geology anticipated regarding this Proposed Development.

Table 7-7. Residual Impacts

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Construction of the Proposed Development	Land Take and Land Use	The Proposed Development will require land take of 1.144Ha and will change from a public surface car park to mixed use residential and commercial land use.	Negative	Imperceptible	Permanent	Direct	Unavoidable and no mitigation. The Proposed Development is in line with the zoning objectives as set out in the Galway City Development Plan 2023-2029.	Imperceptible
Excavation of In-situ soils and subsoil	Soils and Subsoil	There will be an unavoidable loss of in-situ soils from the site to achieve the required formation levels for the Proposed Development including building foundations, roads, drainage and other infrastructure.	Negative	Slight	Permanent	Direct	None required. Where possible, it is intended to retain and re-use the excavated soils on the site for engineering fill and landscaping. The removal of all surplus soil will be undertaken in accordance with applicable statutory requirements.	Slight
Excavation of Made Ground	Soil Quality	The excavation of made ground including some soils impacted with low levels of anthropogenic contamination (i.e., PAHs and petroleum	Positive	Slight to Moderate	Permanent	Direct	None required.	Positive

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
		hydrocarbons) and permanent removal off-site is a design requirement of the Proposed Development						
Use of Cementitious Materials.	Soils and Subsoils	Potential release of cementitious material during construction works for foundations, pavements and infrastructure to the land, soil, and geological environment.	Negative	Moderate	Long Term	Direct	Where cast-in-place concrete is required, all work will be carried out to avoid any contamination of the receiving land, soil and geological environment through the use of appropriate design and methods implemented by the main contractor and in accordance with the CEMP and relevant industry standards	Imperceptible
Accidental Release of Deleterious Materials (e.g., Fuels or Other Hazardous Materials Being Used Onsite).	Soils, Subsoils and Bedrock	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used on-site, through the failure of secondary and tertiary containment or a materials handling accident, to the land,	Negative	Moderate to Significant	Long Term	Direct / Worst Case	Refuelling of plant and storage of any deleterious materials including fuels will be undertaken in accordance with the requirements and procedures outlined in the CEMP.	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
		soil, and geological environment.						
Stockpiling of Excavated Soil and Subsoils	Soil Structure	The temporary stockpiling of excavated soils will result in exposure of the materials to various elements including weather.	Negative	Slight	Long-term	Direct	The segregation and stockpiling of soil and stone at the site pending reuse or removal offsite will be carefully managed and maintained in order to minimise potential impact on soil quality.	Slight
Import of Required Soil, Subsoil and Aggregates	Land, Soil and Geology at the Source Site	The Proposed Development will require the importation of 6,822m^3 of aggregates for the construction of the piling mat and for roads and utility infrastructure. The potential impacts may include loss of attribute and changes in geological setting at the source site.	Negative	Slight	Permanent	Indirect	Only certified materials from authorised sources will be used.	Imperceptible.
Operational Phase								
There will be no direct or indirect impact on the receiving land, soils and geological environment associated with the operational phase of the Proposed Development.								

7.8 Monitoring

7.8.1 Construction Phase

During the construction phase the following monitoring measures will be considered:

- Routine monitoring and inspections during refuelling and concrete works to ensure no impacts and compliance with relevant avoidance, remedial and mitigation measures.
- Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality are fully implemented and effective.
- As documented in the CEMP (AECOM, 2025c), the main contractor in consultation with the Project Ecological Clerk of Works (ECoW), will provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the Construction Phase of the Proposed Development. The frequency of monitoring and the monitoring parameters (e.g., dust, noise limits) will be in line with best practice and guidance and will be agreed with GCC prior to commencement of the works.
- The main contractor will employ a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) to undertake co-ordination for monitoring of the works' impacts and implementation of the main contractor's proposal, in respect of all environmental requirements (AECOM, 2025c). The CEMPC will be present onsite for the duration of the Construction Phase of the Proposed Development. The CEMPC will prepare, implement, manage, review and revise the CEMP with the sole purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils on-site and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the site; and
    - Ensure records are maintained of material acceptance at the end destination.

7.8.2 Operational Phase

There are no monitoring requirements specifically in relation to land, soil and geology during the operational phase of the Proposed Development.

7.9 Interactions

7.9.1 Population and Human Health

An assessment of the potential impact of the Proposed Development on human health is included in Chapter 5 of this EIAR.

There is a potential risk of dust generated from excavation and stockpiling of soil during the Construction Phase of the Proposed Development posing a human health risk in the absence

of standard avoidance and mitigation measures which will be implemented to be protective of human health. Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of site workers.

While no evidence of karst features was identified during the ground investigation (GII, 2024), the geophysical survey undertaken for the site (Minerex, 2024) indicated the potential presence of karstified rock. In karst-prone areas, alterations in groundwater flow, exacerbated by additional water such as rainfall infiltration, can lead to increased rock erosion and the formation of voids. The design and specification for all buildings will be in accordance with current Building Regulations and therefore avoiding any potential risks associated with karst features.

7.9.2 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the site are included in Chapter 6 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

7.9.3 Hydrology and Hydrogeology

An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is included in Chapter 8 of this EIAR. In the absence of avoidance, remedial and mitigation measures, piling during the construction phase of the Proposed Development, may potentially create pathways for potential sources of contamination in shallow soils to enter underlying groundwater. Procedures for the protection of receiving water environment are set out in Chapter 8 of this EIAR.

7.9.4 Air Quality and Climate

The excavation of soils across the Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the Construction Phase of the Proposed Development. An assessment of the potential impact of the Proposed Development on air quality and climate is included in Chapter 10 of this EIAR.

7.9.5 Landscape and Visual

During the construction phase and into the operational phase of the Proposed Development, the site landscape will undergo a change from undeveloped lands to commercial / industrial with associated landscaping. An assessment of the potential impact of the Proposed Development on the receiving landscape is included in in Chapter 12 of this EIAR.

7.9.6 Material Assets- Waste and Traffic and Transportation

Where possible, it is intended to retain and re-use the excavated soil and subsoil on the site for engineering fill and landscaping. However, it is anticipated that surplus material will require removal offsite. There is also a requirement to import aggregates during the construction phase of the Proposed Development. An assessment of the potential impact of the Proposed

Development on the Material Assets (Traffic and Transportation) and Material Assets (Waste) are included in Chapter 13 and Chapter 14 of this EIAR respectively.

7.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter of the EIAR.

7.11 References

AECOM, 2025a. Dyke Road Residential Development Infrastructure Report.

AECOM, 2025b. Dyke Road Residential Development Site Specific Flood Risk Assessment.

AECOM, 2025c. Dyke Road Residential Development Outline Construction Environmental Management Plan.

AECOM, 2025d. Dyke Road Residential Development Outline Resource and Waste Management Plan.

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Environmental Protection Agency, 2025. EPA Envision Maps. https://gis.epa.ie/EPAMaps/. Consulted on 03/01/2025.

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Minerex Geophysics Limited, 2024. LDA Dyke Road Galway Geophysical Survey.

National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

S.I. No. 92 of 2011- European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment including amendments S.I. No. 52 of 2014.

S.I. No. 98 of 2008- European Parliament and of the Council on waste and repealing certain Directives.

8 HYDROLOGY AND HYDROGEOLOGY

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the hydrology and hydrogeology (water) environment within and immediately surrounding the site of the Proposed Development and an assessment of the potential impacts of the Proposed Development on hydrology and hydrogeology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Hydrological and hydrogeological characteristics of the receiving environment at the site of the Proposed Development.
- Potential impacts that the Proposed Development may have on the receiving water environment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development.
- Evaluate the significance of any residual impacts.

8.1.1 Quality Assurance and Competency of Experts

This chapter of the EIAR has been prepared by Warren Vokes Ba MSc MCIWEM C.WEM, a Senior Consultant of Enviroguide Consulting with over 8 years' experience of preparing environmental and hydrogeological assessments.

This chapter was reviewed by Gareth Carroll BA, BAI, MIEnvSc, CEnv a Principal Consultant of Enviroguide with over 12 years' experience of environmental assessment of brownfield and greenfield sites and by Patrick Higgins BSc, MSc, MIEnvSc, CEnv who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide and has over 19 years' experience in preparing environmental assessments for a range of project types and geological and hydrogeological site settings.

8.2 Study Methodology

8.2.1 Regulations and Guidance

The methodology adopted for the assessment has regard to the relevant guidelines in particular the following:

- Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.
- Commission Directive 2014/80/EU of 20 June 2014 amending Annex II to Directive 2006/118/EC of the European Parliament and of the Council on the protection of groundwater against pollution and deterioration.

- EU Water Framework Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC (Water Framework Directive (WFD)).
- European Commission, 2022. WFD Reporting Guidance 2022. Final Draft V4.
- Local Government, October 2021. No. 1.1977. Local Government (Water Pollution (Amendment) Act.
- Local Government, October 2007. No. 30.2007. Water Services Act 2007.
- Local Government, July 1990. No. 21.1990. Local Government (Water Pollution) (Amendment) Act, 1990.
- Local Government, March 1977. No. 01/1977. Local Government (Water Pollution) Act, 1977 with amendments.
- S.I. No. 722/2003 – European Communities (Water Policy) with amendment S.I. No. 413/2005.
- S.I. No. 489/2011 – European communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011.
- S.I. No. 122/2010 – European Communities (Assessment and Management of flood Risks) Regulations 2010 including amendment S.I. No. 495/2015.
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019.
- S.I. No. 9 of 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 including amendments S.I. No. 149 of 2012 and S.I. No. 366 of 201.

Other guidance used in the assessment of potential impacts on the receiving water environment are referenced where relevant in this EIAR chapter and include:

- Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites (CIRIA – C532).
- Construction Industry Research and Information Association, 2015. Environmental Good Practice on Site Guide (CIRIA – C741).
- Construction Industry Research and Information Association, 2016. Groundwater Control: Design and Practice (CIRIA – C750).
- Department of the Environment, Heritage and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999. Groundwater Protection Schemes (DEHLG/EPA/GSI, 1999).
- Department of the Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, 2009).
- Department of Housing, Planning and Local Government, August 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018).
- Environmental Protection Agency, 2014. Guidance on the Authorisation of Direct Discharges to Groundwater.
- Environmental Protection Agency, 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.

- Environmental Protection Agency, 2013. Storage and Transfer of Materials for Scheduled Activities.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Galway City Council, 2023. Galway City Development Plan 2023-2029.

8.2.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An initial Assessment and Impact Determination stage was carried out by Enviroguide Consulting to establish the project location, type and scale of the Proposed Development, the baseline conditions, and the type of hydrological and hydrogeological environment, to establish the activities associated with the Proposed Development and to undertake an initial assessment and impact determination.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Proposed Development site. The study area, for the purposes of assessing the baseline conditions for the hydrology chapter of the EIAR, extends beyond the site boundaries and includes potential receptors within a 2.0km radius of the Proposed Development site. The extent of the wider study area was based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013) that recommends a minimum distance of 2.0km radius from the Proposed Development site. This distance was reviewed during the desk top studies and revised to 15km, to identify potentially sensitive habitats which is a distance set out in AA / NIS methodologies (DEHLG, 2009). Designated and protected areas potentially hydraulically connected to the Proposed Development site were also considered. The purpose of this increased search radius was to ensure that any potential hydrogeological / hydrological connections to sensitive habitats were identified.

The desk study involved collecting all the relevant data for the site and surrounding area including published information and details pertaining to the Proposed Development provided by the Applicant.

Element 1: stage of the assessment was completed by Enviroguide Consulting and included the review of the following sources of information:

- Environmental Protection Agency (EPA) web mapping (EPA, 2025).
- Geological Survey Ireland (GSI) Datasets Public Viewer and Groundwater web mapping (EPA, 2025).
- National Parks and Wildlife Services (NPWS) web mapping (NPWS, 2025).
- Ordnance Survey Ireland (OSI) web mapping (OSI, 2025).
- Water Framework Directive Ireland (WFD) web mapping (WFD, 2025).
- Teagasc web mapping (Teagasc, 2025).
- Office of Public Works (OPW) database on historic flooding and the Catchment Flood Risk Assessment and Management (CFRAM) maps (OPW, 2025).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.

Element 2: Involves direct and indirect site investigation and studies stage where necessary to refine the CSM developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development.

Minerex Geophysics Ltd. (MGX) carried out a geophysical survey (Minerex, 2024) in March 2024 consisting of 2D-Resistivity (ERT), seismic refraction (p-wave) and MASW (s-wave) surveying for the site. Intrusive site investigation (including trial pitting, borehole drilling, the installation of groundwater monitoring wells, groundwater level monitoring and infiltration tests) was undertaken by Ground Investigations Ireland (GII) between April and June 2024 (GII, 2024. Dyke Road Galway Ground Investigation Report). The results of the site investigations were used to identify and assess the hydrogeological subsurface features at the site. The site investigation reports (Minerex, 2024 and GII, 2024) are included in Appendix 7.1.

A hydrological and hydrogeological risk assessment (HRA) was also undertaken by Enviroguide Consulting (Enviroguide, 2025) to establish the baseline hydrological and hydrogeological conditions at the site and to identify the potential for any impacts on receptors associated with the site and the Proposed Development. The HRA (Enviroguide, 2025) is included in Appendix 8.1.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 and Element 2 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 and Element 2 of the assessment were considered in relation to the Construction Phase and Operational Phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Hydrology Chapter of the EIAR which includes all the associated figures and documents.

8.2.3 Description of Importance of the Receiving Environment

The Transport Infrastructure Ireland (TII) criteria for rating of the importance of hydrogeological features at the site as documented in the National Roads Authority Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009), are summarised in Table 8-1.

Table 8-1. Criteria for Rating Site Importance of Hydrogeological Features

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by European Union (EU) legislation e.g., SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland, or surface water body. ecosystem protected by national legislation – e.g., NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.

Importance	Criteria	Typical Example
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

8.2.4 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this chapter is described in Table 8-2 in accordance with EPA, 2022 guidelines on the information to be contained in EIARs.

Table 8-2. Description of Effects

Quality of Effects/Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Extend and Context of Effects	**Definition**
Extend	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe weather the extent, duration or frequency will conform or contrast with established (baseline) conditions

Probability of Effects	Definition
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration
Types of Effects	**Definition**
Indirect Effects	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	he addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
“Do-nothing” Effects	The environment as it would be in the future should the subject project not be carried out
“Worst-case” Effects	he effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Figure 8-1 identifies how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.

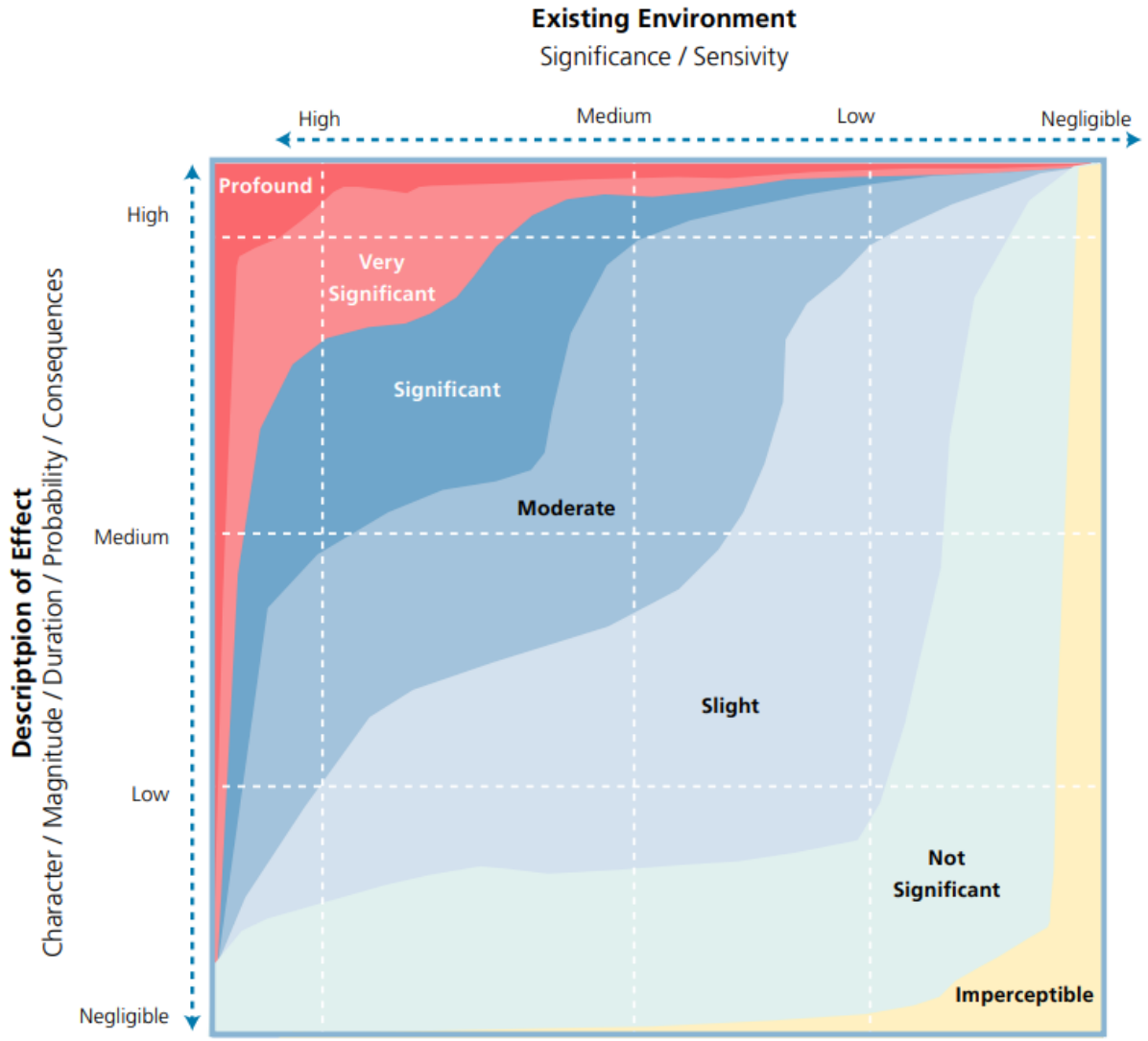

Figure 8-1. Determining Significance

8.3 The Existing and Receiving Environment (Baseline Situation)

8.3.1 Site Location and Description

The site of the Proposed Development is located at Dyke Road, Terryland, Co. Galway. The site of the Proposed Development, which extends to 1.144Ha, is accessed by the Dyke Road and is located within the Headford Road area, to the northeast of the city centre and approximately 0.65km walking distance from Eyre Square.

The Proposed Development forms part of an overall three phase Development Framework, in the form of the Corrib Causeway Development Framework. The overall Development Framework site extends to 1.78 hectares and is located to the northeast of the city centre, within walking distance from Eyre Square and is within the Headford Road area. The development frameworks aims to deliver a residential-led, mixed-use development. Phase 1, relates to the current, subject proposal; Phase 2, an existing car park south of the site, is intended to be redeveloped for a mix of uses such as civic, commercial, and cultural uses; and Phase 3 is intended to provide additional residential units. The current Phase 1 development, subject of this planning application, has the potential to act as a catalyst to kick-start the

regeneration of this three phase development framework but also the redevelopment of the wider area. This particular site has been brought forward for the first phase of development on the basis that the Draft Headford Road Framework Plan (2009) envisioned residential development at this particular location with the more civic and commercial uses to be located further south on the Phase 2 site. The current Development Framework has been prepared to align with this vision.

The current land use at the site of the Proposed Development comprises a surface car park of approximately 311No. car parking spaces.

The site of the Proposed Development is bound to the north by the Black Box Theatre (i.e., Phase 3 of the overall Development Framework) which adjoins Terryland Forest Park to the south by Dyke Road Car Park comprising approximately 243No. car parking spaces (i.e., Phase 2 of the overall Development Framework) which adjoins local road Bóthar Na Dige, to the east by Galway Retail Park, and to the west by Dyke Road which adjoins the future greenway that intends to re-establish the old Clifden Railway Bridge and provide a greenway running from Galway City to Moycullen.

The surrounding lands are mainly comprised of low density, low grade commercial buildings with extensive surface car parking.

The site location is presented in Figure 8-2 and the current layout of the site is presented in Figure 8-3.

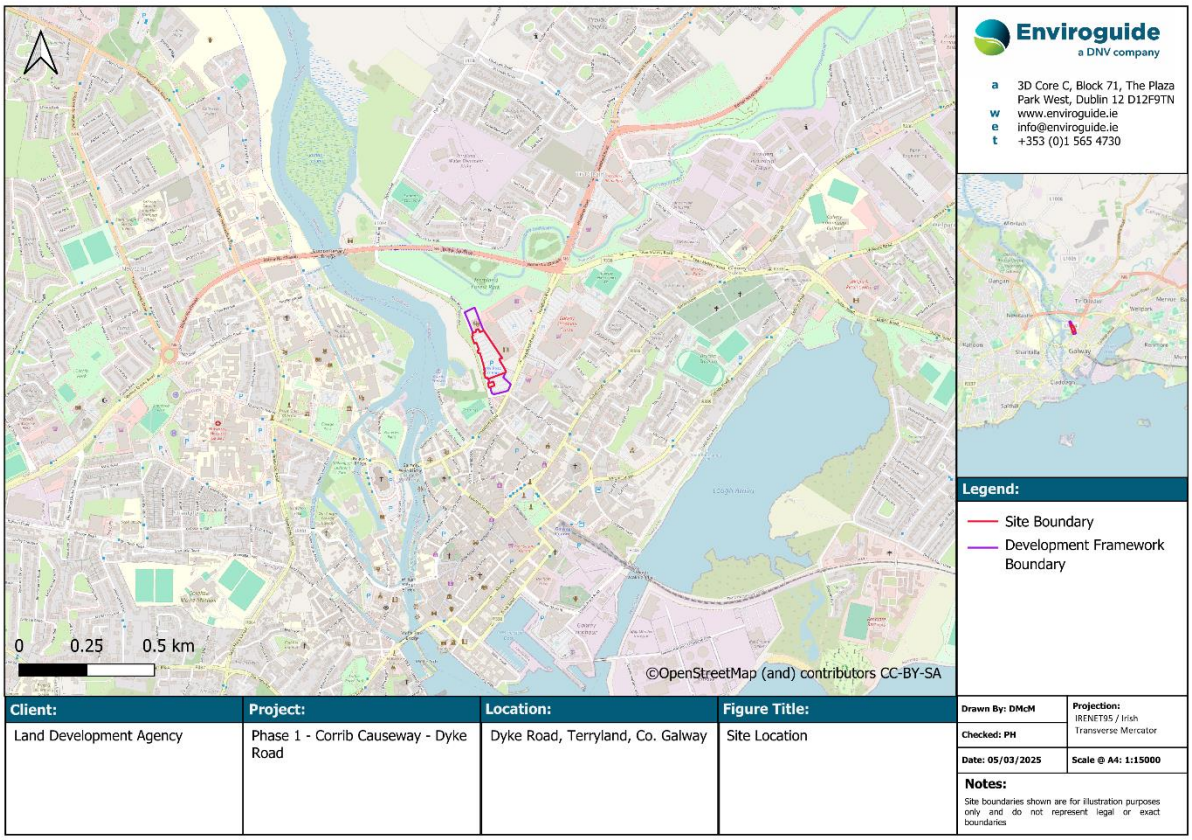

Figure 8-2. Site Location

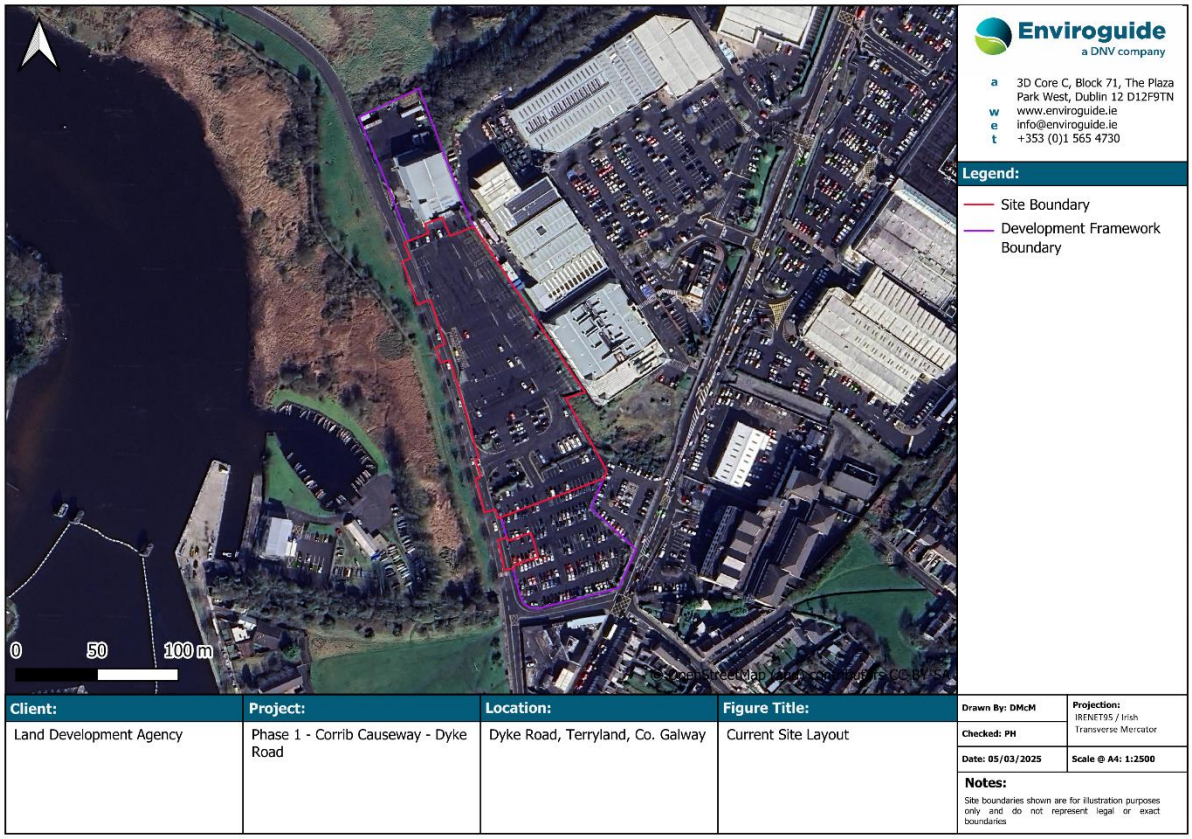

Figure 8-3. Current Site Layout

8.3.2 Topography

As detailed in the Infrastructure Report (AECOM, 2025a), a topographical survey undertaken by Apex Surveys in October 2023 of the overall three phase Development Framework indicates that ground levels from 3.84 meters above Ordnance Datum (mOD) at the northern end of the site to 7.12mOD in the southern portion of the site. There is a small retaining wall in the southern portion of the site where the car park levels step up from about 6.0mOD to approximately 7.0mOD.

The ground levels at the site of the Proposed Development typically range from 4.8mOD to 5.9mOD with the level in the centre of the site typically being around 5.3mOD.

8.3.3 Soil and Subsoil

The soils beneath the site of the Proposed Development are mapped by Teagasc (Teagasc, 2024) as made ground (IFS Soil Code: Made). It is noted that the soils beneath the existing Black Box Theatre adjoining the northern boundary of the site are mapped as mineral alluvium (IFS Soil Code: AlluvMIN). As documented in the Infrastructure Report (AECOM, 2025a), it is possible that the site was partially filled in the 1970s and 1980s with rubble from Galway's inner city, which may include medieval and late medieval architecture fragments.

The subsoil or quaternary sediments beneath the site of the Proposed Development are mapped by the GSI (GSI, 2025) as urban. It is noted that the soils beneath the existing Black Box Theatre adjoining the northern boundary of the site are mapped by the GSI (GSI, 2025) as Fen Peat (FenPt).

The GSI (GSI, 2025) mapped soils and quaternary geology at the site are presented in Figure 8-4 and Figure 8-5.

As documented in the Ground Investigation Report (GII, 2024), the ground conditions across the stie comprise the following:

- SURFACING: Tarmac surfacing was present typically to a depth of 0.06 meters below ground level (mbGL).
- MADE GROUND: Made Ground deposits were encountered beneath the surfacing and were generally present to depths of between 0.5mbGL and 1.0mbGL and a maximum of 3.4mbGL in BRC04. These deposits were described generally as grey Sand and Gravel FILL and contained occasional fragments of tarmacadam occasionally overlying grey slightly sandy gravelly Clay and brownish black gravelly Peat with occasional red brick, ceramic and rubbish fragments.
- ORGANIC DEPOSITS: Organic deposits were generally encountered beneath the Made Ground and were described typically as brownish black slightly clayey slightly gravelly PEAT. The secondary constituents varied across the site, with silt and clay lenses occasionally present in the peat. The strength of the deposits was typically very soft based on SPT N values.
- SOFT COHESIVE DEPOSITS: Soft Cohesive deposits were encountered beneath the organic deposits and were generally described as beige or cream clayey SILT with frequent shell fragments occasionally onto light grey slightly sandy slightly gravelly clayey SILT with occasional cobbles. The secondary sand and gravel constituents varied across the site and with depth, and peat lenses were occasionally present within the deposits. The strength of the soft cohesive deposits was typically very soft to soft.
- COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the soft cohesive deposits at some locations and were described typically as light grey to grey slightly sandy slightly gravelly silty CLAY with occasional cobbles. The secondary sand and gravel constituents varied across the site and with depth. The strength of the cohesive deposits typically increased with depth and was stiff or very stiff below 6.0m BGL in the majority of the exploratory holes. These deposits had some occasional cobble content, where noted on the exploratory hole logs.
- GRANULAR DEPOSITS: Granular deposits were occasionally encountered at the base of the cohesive deposits and were typically described as grey very sandy subangular to subrounded fine to coarse GRAVEL with occasional cobbles. The secondary sand constituents varied across the site while occasional cobble content was also present were noted on the exploratory hole logs. Based on the SPT N values the deposits are typically medium dense to dense and become dense with depth. Groundwater strikes were occasionally noted in the boreholes on encountering the granular deposits.

Land and soil are assessed in Chapter 7 of this EIAR.

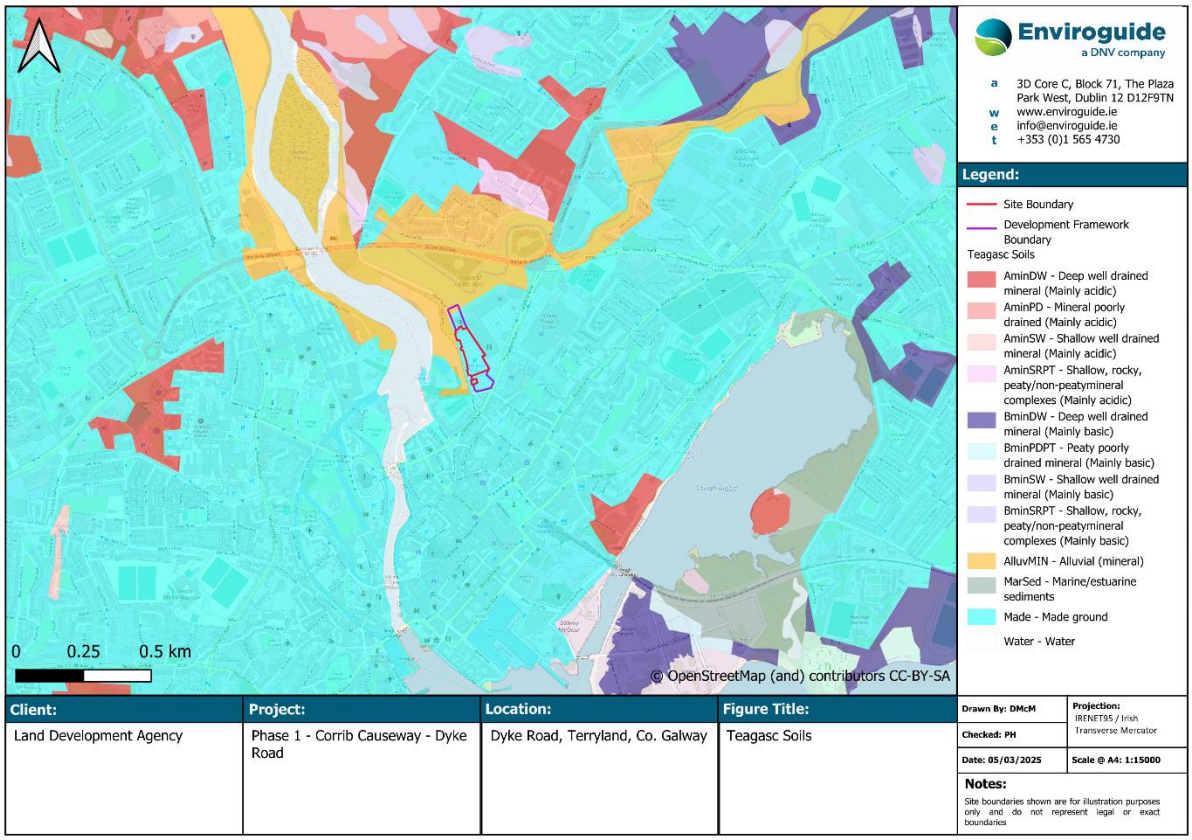

Figure 8-4. Soils

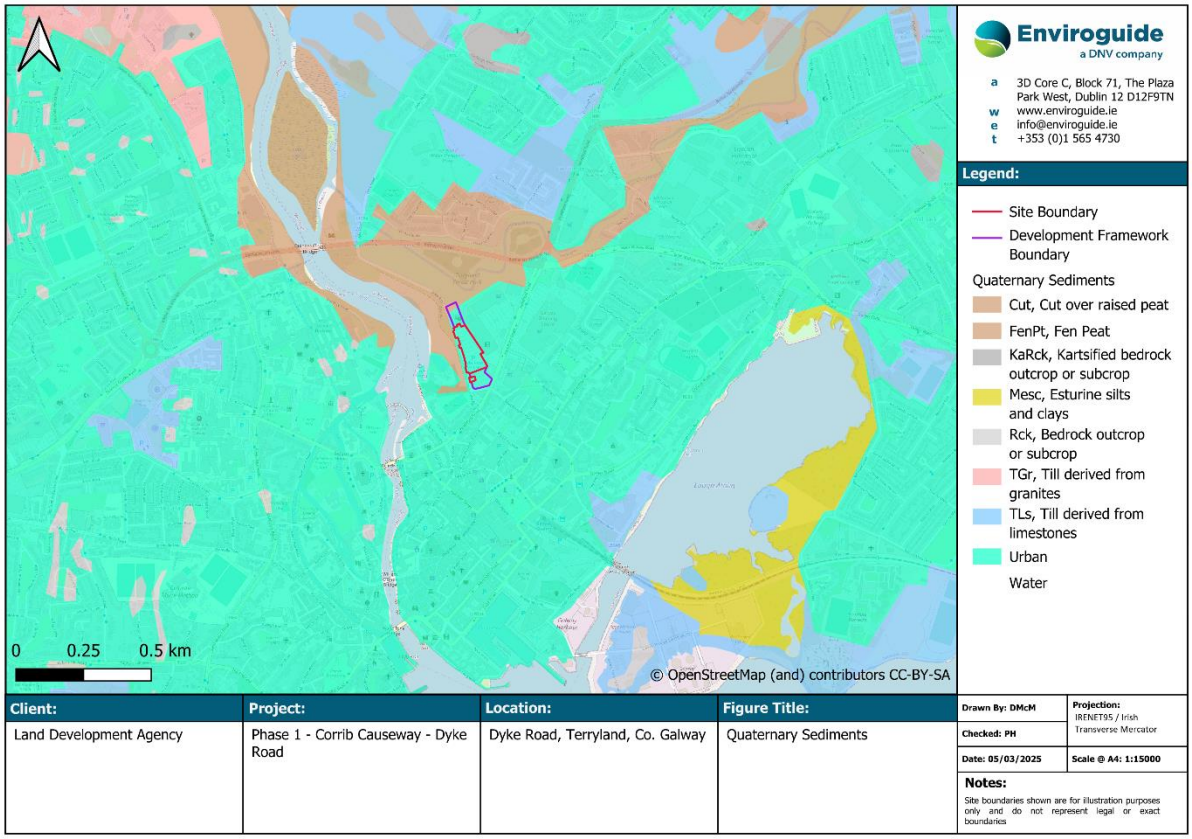

Figure 8-5. Quaternary Soils

8.3.4 Bedrock Geology

The bedrock beneath the site is mapped by the GSI (GSI, 2025) as the Burren Formation (New Code: CDBURR) described as pale grey packstones and wackestones, but also contains intervals of dark cherty limestones, often associated with oolitic grainstones.

The bedrock geology is presented in Figure 8-6 below.

While there are no bedrock outcrops mapped within the site boundary there are a number of bedrock outcrops mapped by the GSI (GSI, 2025) within a 2km radius of the site. The closest bedrock outcrop recorded by the GSI (GSI, 2025) is located approximately 0.36km west of the site. Additional outcropping is recorded approximately 0.87km north of the site.

As documented in the Ground Investigation Report (GII, 2024), the bedrock across the site comprise the following:

- BEDROCK: The rotary core boreholes recovered strong thinly to medium bedded grey fine to medium grained fossiliferous LIMESTONE, with the exception of BRC04 which recovered strong to very strong thinly to thickly banded dark green medium to coarsely crystalline METAGABBRO. Occasional calcite veins were noted during logging. The depth to rock increases to the southeast from 11.2mbGL in BH01 in the north-western corner of the site to a maximum depth of 15.3mbGL in BRC03 in the centre. The depth to rock decreases to 9.4mbGL in BRC06, and further decreases to between 6.6mbGL and 6.1mbGL respectively in BRC04 and BRC05 in the southeastern portion of the site.

Bedrock is assessed in Chapter 7 of this EIAR.

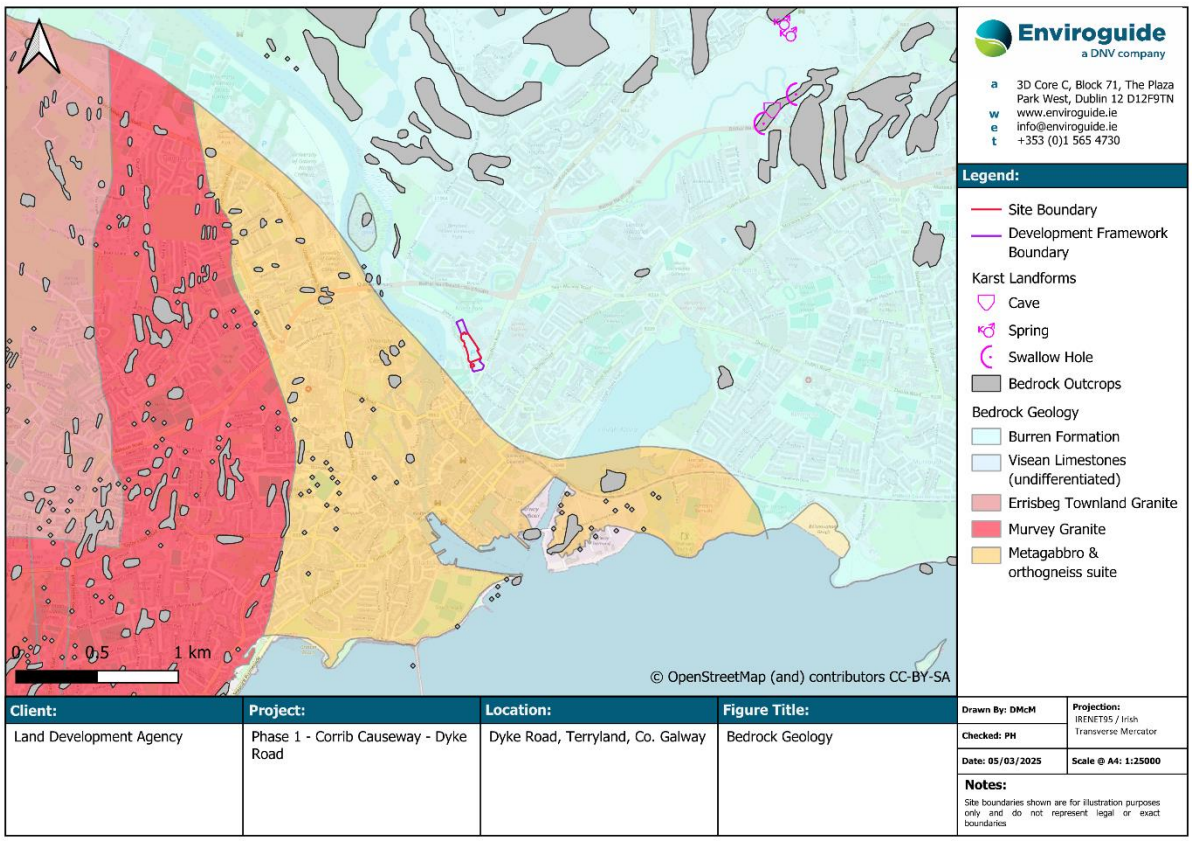

Figure 8-6. Bedrock Geology

8.3.4.1 Karst

Galway City and its surrounding areas exhibit a distinctive karst landscape characterised by its unique geological features and limestone formations. Karst weathering is a gradual process occurring over thousands of years, initiated by CO2-enriched rainwater percolating through carbonate bedrock. This slightly acidic water dissolves the rock, forming voids. Over time, these voids can become filled with sub-soils through drop-out subsidence. The region's abundant rainfall, coupled with the presence of carbonate-rich bedrock, has facilitated the development of numerous karst features, including sinkholes, caves, and underground rivers.

There are no karst features mapped by the GSI (GSI, 2025) at the site or within a 2km radius of the site. However, it is noted that the closest karst features to the site, which include two swallow holes (Karst Feature Unique ID: IE_GSI_Karst_40K_890 and IE_GSI_Karst_40K_942) and a cave (Karst Feature Unique ID: IE_GSI_Karst_40K_1048), are located approximately 2.18km northeast of the site at their closest point (refer to Section 8.3.7).

As documented in the Galway City County Geological Site Report (GSI, 2020), the two (2No.) swallow holes, described as estavelles, are hydraulically connected to the Terryland Stream (River Waterbody Code: IE_WE_30C020600), located approximately 0.13km north of the site at its closest point, when they act as springs and to the Corrib Estuary transitional waterbody (EU Code: IE_WE_170_0700) via an underground conduit system when they act as sinks. The precise discharge locations of the estavelles are unknown.

Minerex Geophysics Ltd. (MGX) carried out a geophysical survey (Minerex, 2024) at the site consisting of 2D-Resistivity (ERT), seismic refraction (p-wave) and MASW (s-wave) surveying for the site. Some high resistivities at depth indicated that there is clean limestone present that is liable to karstification, but it does not have to be karstified. It is noted that the Ground Investigation Report (GII, 2024) did not identify any karst features at the site.

8.3.4.2 Soil Quality

Soil analytical data for soil samples collected across the site are provided in the ground investigation report (GII, 2024).

As documented in the ground investigation report (GII, 2024), a total of twenty-eight (28No.) soil samples collected were analysed for a suite of parameters suitable to determine the suitability of soils for disposal to a landfill. Soil analytical data for soil samples collected across the site are provided in the ground investigation report (GII, 2024). It is noted that a waste classification assessment of was not included within the ground investigation report (GII, 2024).

Based on a review of the results, there is evidence of low-level anthropogenic contamination in sampled soils across the site:

- Detectable concentrations of Polycyclic Aromatic Hydrocarbons (PAHs), ranging from 0.67mg/kg to 34.54mg/kg, were reported for ten (10No.) samples collected. The reported concentrations of PAHs at remaining sample locations were below the laboratory limit of detection (LOD).
- Detectable concentrations of Total Petroleum Hydrocarbons (TPH), ranging from 69mg/kg to 3192mg/kg, were reported for fifteen (15No.) samples collected. The reported concentrations of TPH at remaining sample locations were below the LOD.

- Detectable concentrations of Extractable Petroleum Hydrocarbons (EPH), ranging from 877mg/kg to 1033mg/kg, were reported for three (3No.) samples collected. The reported concentrations of EPH at remaining sample locations were below the LOD.
- Detectable concentrations of Mineral Oil, ranging from 52mg/kg to 1047mg/kg, were reported for twelve (12No.) samples collected. The reported concentrations of mineral oil at remaining sample locations were below the LOD.
- Detectable concentrations of toluene and/or m/p xylene, of 7ug/kg, were reported for two (2No.) samples collected. The reported concentrations of toluene and m/p xylene at remaining sample locations were below the LOD.
- The reported concentration of Polychlorinated Biphenyl (PCBs) were reported below the LOD.
- The reported concentration of benzene, ethylbenzene and o-xylene were less than the Limit of Detection (LOD).
- Asbestos was reported as 'no asbestos detected' for all samples.

8.3.5 Rainfall

Monthly rainfall data available for 1km x 1km grids (for the period 1991 to 2020) was sourced from Met Éireann (Met Éireann, 2023) and is presented in Table 8-3.

Table 8-3. Long Term Mean Monthly Rainfall Data (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
126.4	103.6	95.3	73.8	77.2	83.3	95.5	111.2	102.7	123.5	138.0	144.9	1275.4
Note: 1km x 1km Irish Grid Coordinated selected for the site =X (Easting): 130000, Y (Northing): 226000												

The closest synoptic meteorological station to the Proposed Development site, Athenry, is located approximately 18.1km east of the site. A summary of the long-term average PE for 2023 at the Athenry station (Met Éireann, 2023) is presented in Table 8-4.

Table 8-4. Average Potential Evapotranspiration (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
10.6	18.5	32.6	54.0	83.8	100.4	74.3	65.7	46.7	23.1	10.7	11.9	532.3

8.3.6 Hydrogeology

8.3.6.1 Groundwater Body and Flow Regimes

The EPA (EPA, 2025) maps the groundwater body (GWB) beneath the site as the Clare-Corrib GWB (EU Code: IE_WE_G_0020). The Clare-Corrib GWB covers some 642 km2 and occupies an area across Co. Galway, Co. Mayo and Co. Roscommon (GSI, 2025).

The Clare-Corrib GWB Report (GSI, 2025) identifies that diffuse recharge occurs over the GWB via rainfall percolating through the permeable subsoil and point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines.

Groundwater primarily discharges into rivers, large springs, and Lake Corrib (EU Code: IE_WE_30_666a), located approximately 3.55m north of the site at its closest point. During winter, it contributes to turloughs and is directed through artificial channels to manage flooding.

Contributions to the River Corrib (River Waterbody Code: IE_WE_30C020600), located approximately 0.07km west of the site at its closest point, and the Terryland Stream, located approximately 0.13km north of the site at its closest point, are also considered likely.

The karstic systems within the Clare-Corrib GWB exhibit high levels of interconnection, facilitating regional-scale flow systems. Groundwater can bypass surface water catchments by flowing beneath surface water channels and across catchment divides. Flow paths within karst areas can extend up to 10km in length.

Groundwater flow occurs through various geological features such as fissures, faults, joints, and bedding planes. Notably, in limestone formations, karstification significantly enhances permeability, particularly along structural elements like fold axes and faults. This intricate network of pathways complicates predictions of groundwater flow. While the overall groundwater flow direction generally trends towards the River Clare and Lake Corrib, the highly karstified bedrock introduces significant local variability in flow directions. In the vicinity of the site groundwater flow likely follows a path that ultimately leads towards the River Corrib.

8.3.6.2 Aquifer Classification

The GSI (GSI, 2025) has classified the bedrock of the Burren Formation beneath the site and within the surrounding areas as a ‘Regionally Important Aquifer - Karstified (conduit) (RKc).

Regionally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or ‘excellent’ yields (>400 m3/d). ‘Karstification’ is the process whereby limestone is slowly dissolved away by percolating waters. Karstification frequently results in the uneven distribution of permeability through the rock, and the development of distinctive karst landforms at the surface (e.g. swallow holes, caves, dry valleys), some of which provide direct access for recharge/surface water to enter the aquifer.

The bedrock aquifer beneath the site is presented in Figure 8-7.

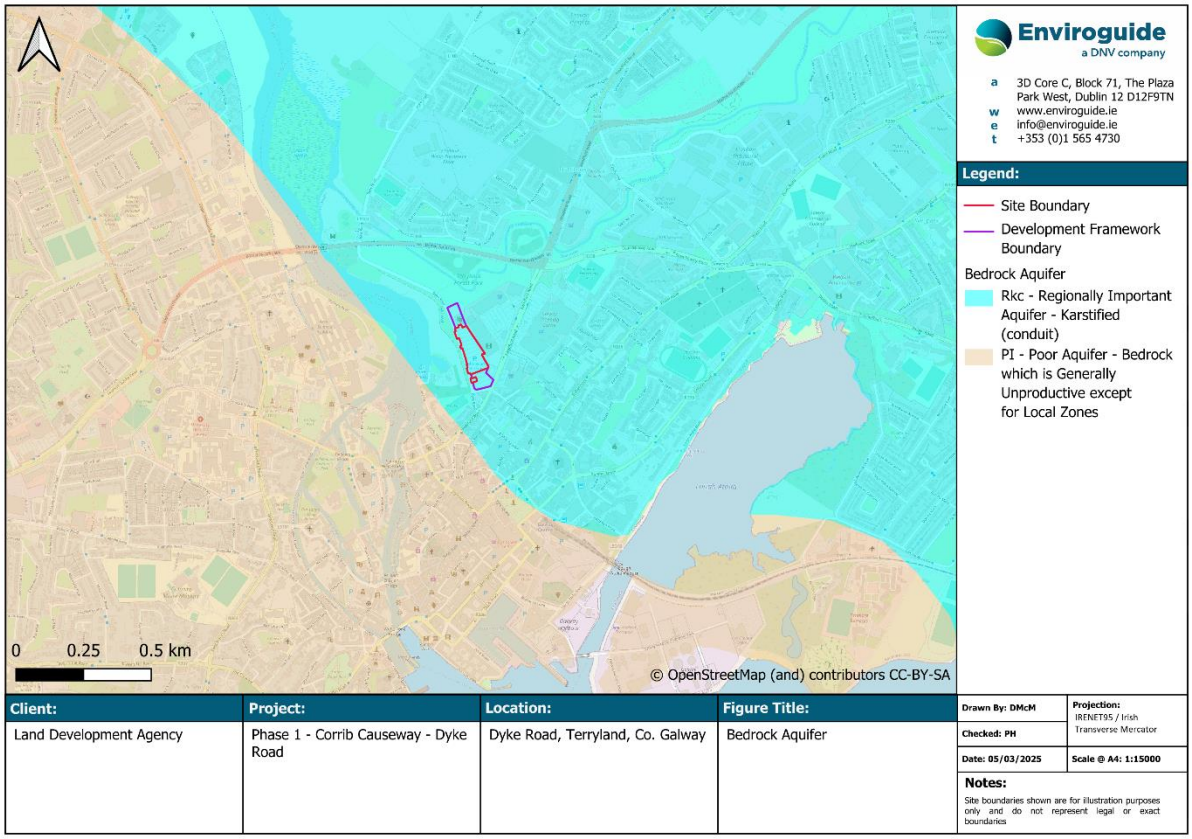

Figure 8-7. Bedrock Aquifers

8.3.6.3 Aquifer Vulnerability Rating

The vulnerability categories, and methods for determination, are presented in the Groundwater Protection Schemes publication (DEHLG/EPA/GSI, 1999) and summarised in Table 8-5. The publications state that *'as all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area'.*

Table 8-5. Vulnerability Mapping Criteria

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point recharge	Unsaturated Zone
	Subsoil Permeability & Type			(Swallow holes, losing streams)	(sand & gravel aquifers only)
	High permeability (sand & gravel)	Moderate permeability (sandy subsoil)	Low permeability (clayey subsoil, clay, peat)		
0-3m	Extreme	Extreme	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point recharge	Unsaturated Zone
	Subsoil Permeability & Type			(Swallow holes, losing streams)	(sand & gravel aquifers only)
	High permeability (sand & gravel)	Moderate permeability (sandy subsoil)	Low permeability (clayey subsoil, clay, peat)		
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High
Notes: (i) N/A = not applicable (ii) Permeability classifications relate to the material characteristics as described by the subsoil description and classification method.					

The GSI (GSI, 2025) has assigned a groundwater vulnerability rating of 'High' for the groundwater beneath the site. The anticipated depth to bedrock based on the high groundwater vulnerability rating and moderate permeability subsoils beneath the site is between 3.0mbGL and 5.0mbGL.

Site Investigations (GII, 2024) recorded a depth to bedrock ranging from 6.1mbGL to 15.3mbGL. Considering the moderate permeability subsoils encountered this indicates a vulnerability rating of 'High'.

The groundwater vulnerability rating map is provided in Figure 8-8.

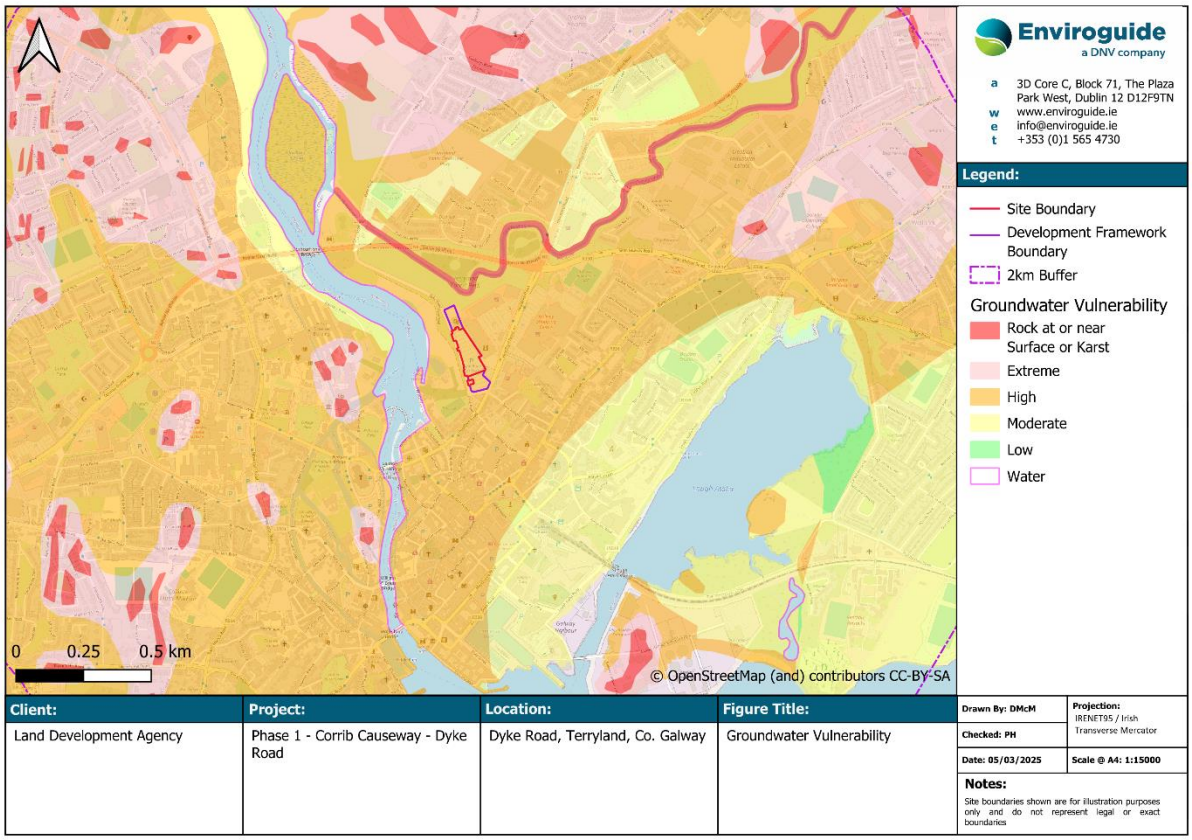

Figure 8-8. Groundwater Vulnerability

8.3.6.4 Site Hydrogeology

As documented in the Ground Investigation Report (GII, 2024), groundwater strikes were recorded between 1.30mbGL and 9.5mGL during borehole drilling. Four (4No.) groundwater

monitoring wells were installed at the site (BRC1, BRC02, BRC04 and BRC05) to allow the equilibrium groundwater level to be determined.

Groundwater level measurements at each of the monitoring wells were recorded by GII relative to ground level on the 26th of June 2024 and are presented in Table 8-6.

Table 8-6. Measured Water Levels (26/06/2024)

Monitoring Location ID	Measured Water Level (mbTOC)
BRC01	0.17
BRC02	0.87
BRC04	2.25
BRC05	1.30

8.3.7 Hydrology

The site is mapped by the EPA (EPA, 2025) as within the Corrib WFD Catchment (Catchment I.D.: 30), the Corrib_SC_010 WFD Sub-catchment (Sub-catchment I.D.: 30_18) and the Terryland_010 WFD River Sub-Basin (River Waterbody Code: IE_WE_30T010500).

The closest surface water feature is recorded on the EPA database (EPA, 2025) as the Terryland Stream (River Waterbody Code: IE_WE_30T010500), which is located approximately 0.13km north of the site at its closest point.

As detailed in the Galway City County Geological Site Report (GSI, 2020), the Terryland Stream originates from a narrow channel on the east side of Jordan's Island, just north of the ruins of Terryland Castle, and approximately 0.62km northwest of the site. Typically, the Terryland Stream flows eastward toward two stream sinks, which are situated approximately 2.18km northeast of the site at their closest point (refer to Section 4.4.1). Although these sinks are near limestone outcrops, the Terryland Stream continues its course through a low-lying area characterised by substantial overburden. The subsoil's low permeability facilitates the conveyance of surface water across the valley until encountering limestone on the southern side. During periods of elevated groundwater levels, these sinks undergo a transformation into resurgences, releasing groundwater into the Terryland Stream. This augmented flow eventually converges with the Corrib River (River Waterbody Code: IE_WE_30C020600), located approximately 0.07km west of the site at its closest point. This shift from sink to resurgence categorises these features as estavelles. It is understood that these estavelles are connected to Galway Bay or Lough Atalia (i.e., the Corrib Estuary) through an underground conduit system, although the precise discharge locations remain unknown.

The Corrib River flows south before discharging to the Corrib Estuary transitional waterbody (EU Code: IE_WE_170_0700) approximately 0.99km southwest of the site at its closest point. The Corrib Estuary ultimately discharges to the Inner Galway Bay North coastal waterbody (EU Code: IE_WE_170_0000) located approximately 3.32km southeast of the site at its closest point.

The local surface waterbodies within a 2km radius of the site are presented in Figure 8-9.

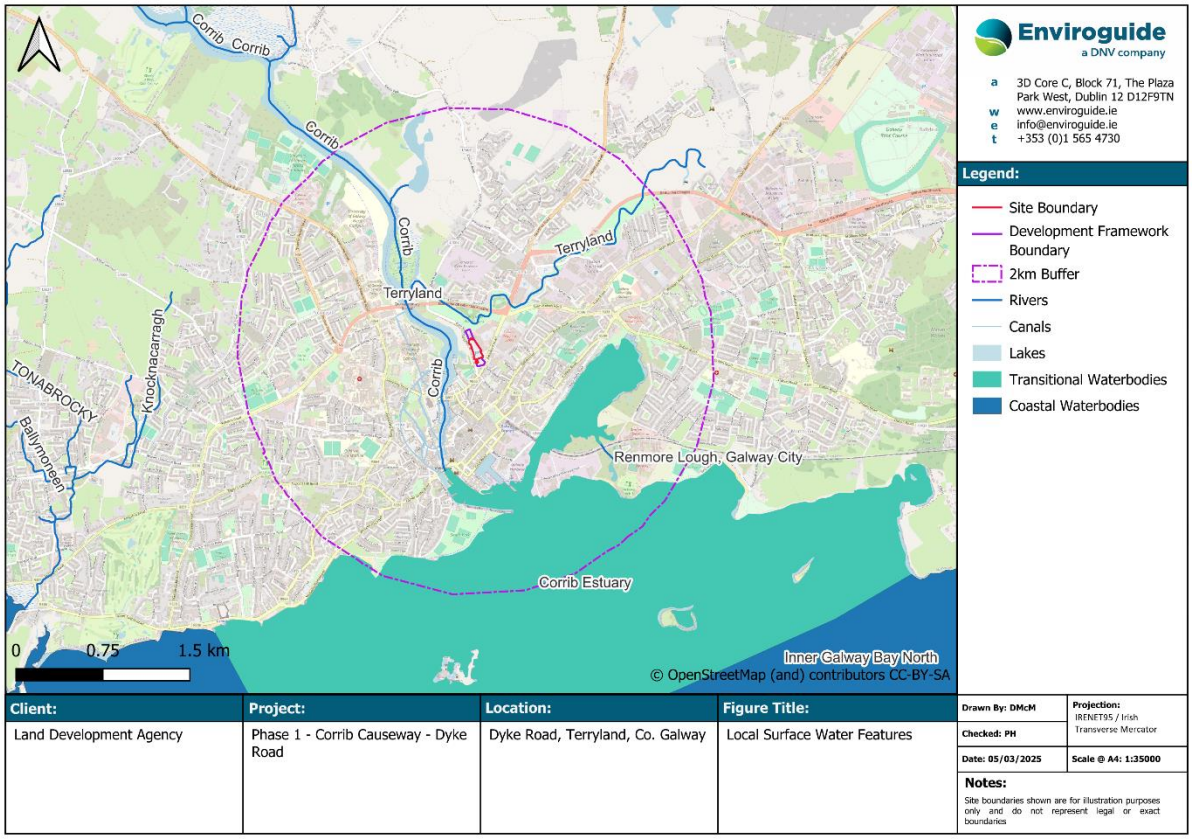

Figure 8-9. Local Surface Water Features

8.3.7.1 Existing Surface / Storm Drainage

As documented in the Infrastructure Report (AECOM, 2025a), the main surface water pipe running south to north along the western boundary of the site is a 450mm Ø concrete pipe. The pipe starts at an invert level of 5.8m on Bóthar Na Dige Road and falls to an invert level of 3.73m around the middle of the site, where it increases in size to a 600mm Ø concrete pipe and continues northwards until the discharge point. There is also a surface water pipe running through the site which serves the retail development on the Headford Road to the east of the proposed development which discharges into this surface water pipe (refer to Figure 8-10).

Based on the information shown on the record mapping (refer to Figure 8-10), and as confirmed by GCC, the existing network runs in a northerly direction along the western boundary of the site before discharging to the Terryland Stream. The bed level of the anticipated discharge point is approximately 2.9mOD (AECOM, 2025a). It is noted that preliminary investigations undertaken by LDA and GCC indicate sections of the pipe north of the Phase 1 site (on Phase 3 lands) may require repairs. GCC advises it will consider any potential future repairs in conjunction with LDA contribution from Phase 1, to ensure the Proposed Development can connect to the existing surface water infrastructure.

The carpark site is nearly 100% impermeable and unattenuated flows discharges to the Terryland Steam. The unattenuated run-off rate from the site at 80mm/hour is estimated to be 216 l/s (AECOM, 2025a).

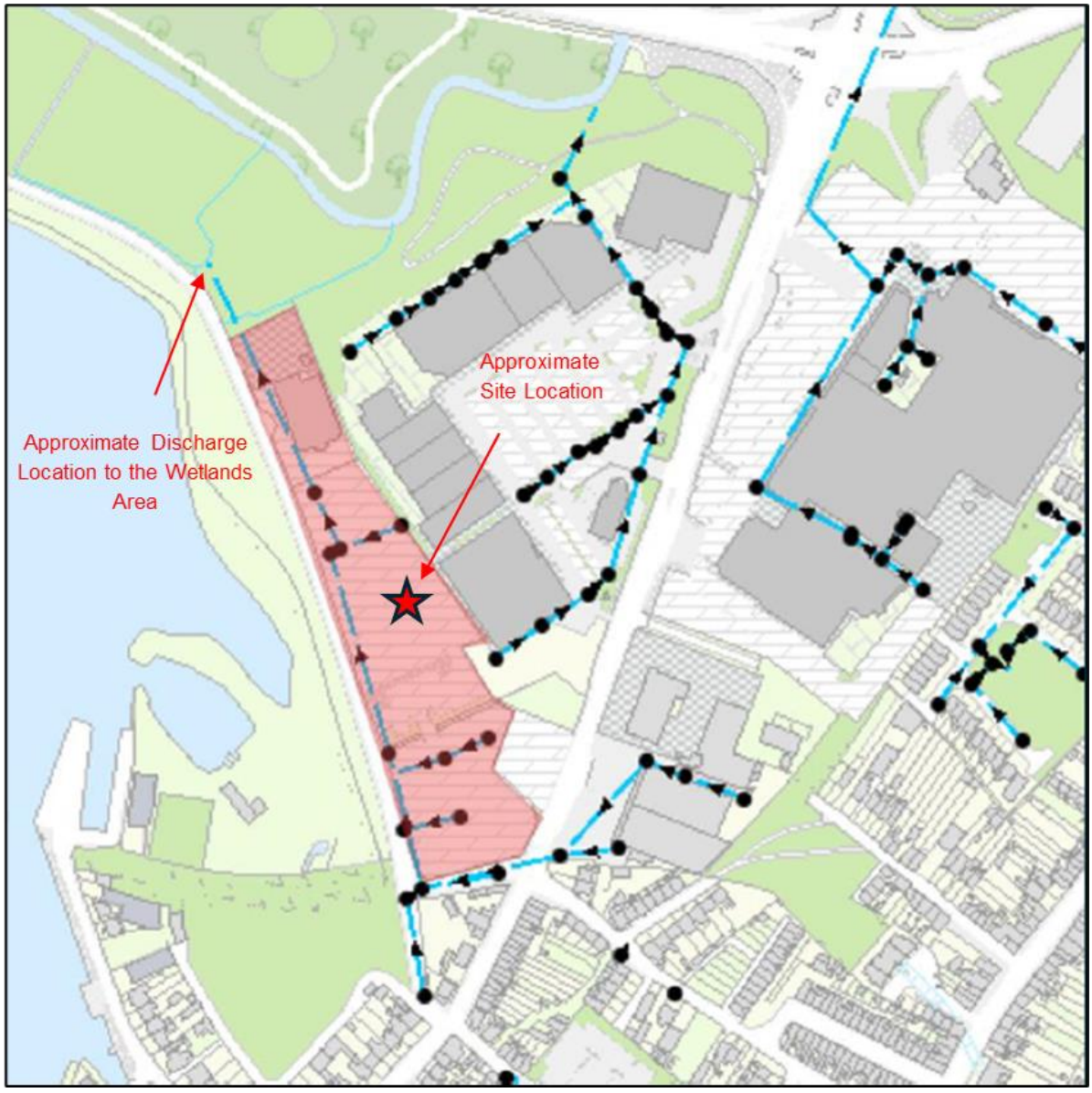

Figure 8-10. Drainage Infrastructure (AECOM, 2025a)

8.3.8 Flood Risk

The Site-Specific Flood Risk Assessment (SSFRA) report produced by AECOM (AECOM, 2025b) evaluates the flood risks associated with the Proposed Development. The assessment identifies the primary sources of flood risk as fluvial flooding from the River Corrib and the Terryland Stream, with additional considerations for coastal, pluvial, and groundwater flooding. The site benefits from the Dyke Road flood protection embankment, which provides some defence against the 1% Annual Exceedance Probability (AEP) event, though it lacks sufficient freeboard and climate change allowances. The Proposed Development includes measures such as setting the finished floor level at 7.28m OD, above the 1% AEP level with climate change and freeboard allowances and maintaining flood storage volume by constructing the building on stilts.

The SSFRA (AECOM, 2025b) also outlines the flood risk management strategies, including the sequential approach to avoid, substitute, justify, and mitigate flood risks. The assessment incorporates the Galway City Council Development Plan 2023-2029, which emphasises the

importance of flood risk management through policies and land use zoning. The proposed development will include flood mitigation measures such as watertight external services, anti-flood valves, and emergency evacuation routes above the design flood level. The hydraulic modelling conducted by Arup confirms that the Proposed Development will not significantly impact flood levels in the surrounding areas, with a maximum increase of approximately 3mm in water levels during the 1% AEP event. Additionally, the hydraulic model demonstrates that the permeability of the lower ground façade, which includes screens and louvres, does not impede the storage or flow of floodwaters below the building.

In conclusion, the SSFRA (AECOM, 2025b) demonstrates that the flood risks to the Proposed Development can be adequately managed through the implementation of appropriate mitigation measures and adherence to the guidelines set out in the Galway City Council Development Plan and the Planning System and Flood Risk Management Guidelines. The Proposed Development will not adversely impact flood risk in the surrounding areas, and the inclusion of flood compensatory storage and sustainable drainage systems will ensure that the flood risk to the development and adjacent properties is minimised.

8.3.8.1 Water Use and Source Protection

A search of the GSI groundwater well database (GSI, 2025) was conducted to identify registered wells and groundwater sources in the surrounding area. There is one (1No.) known groundwater source recorded within a 2km radius of the site. The source use for the supply (GSI Name: 1121NEW005), which is located approximately 0.66km northeast of the site is domestic. The yield for the supply is classified as 'Good' with a reported yield of 141.8m^3/day (GSI, 2025). There are also a small cluster of five (5No.) boreholes of unknown use located approximately 0.72km southeast of the site. The location of the groundwater wells in the vicinity of the site is presented in Figure 8-12.

The site of the Proposed Development is located within an area serviced by mains water supply. There is an existing 9" cast-iron watermain in Dyke Road to the west of the site (refer to Figure 8-11). A water connection feeds the Black Box theatre and the Headford Road shopping centre. It is noted that water supply to the Proposed Development will be via this existing 9" cast-iron watermain in Dyke Road. A 300mm asbestos-cement watermain also runs in Headford Road and Bóthar Na Dige Road, while a shorter section of 100mm uPVC water distribution main runs along a short section of Headford Road (AECOM, 2025).

There are no groundwater source protection areas located within a 2km radius of the site (GSI, 2025).

The Corrib River, located approximately 0.07km west of the site at its closest point, is identified by the EPA (EPA, 2025) as a surface water drinking water sources, under Article 7 of the Water Framework Directive. There are no other surface water drinking water sources recorded within a 2km radius or hydraulically downstream of the site.

Figure 8-11. Water Supply Infrastructure (AECOM, 2025a)

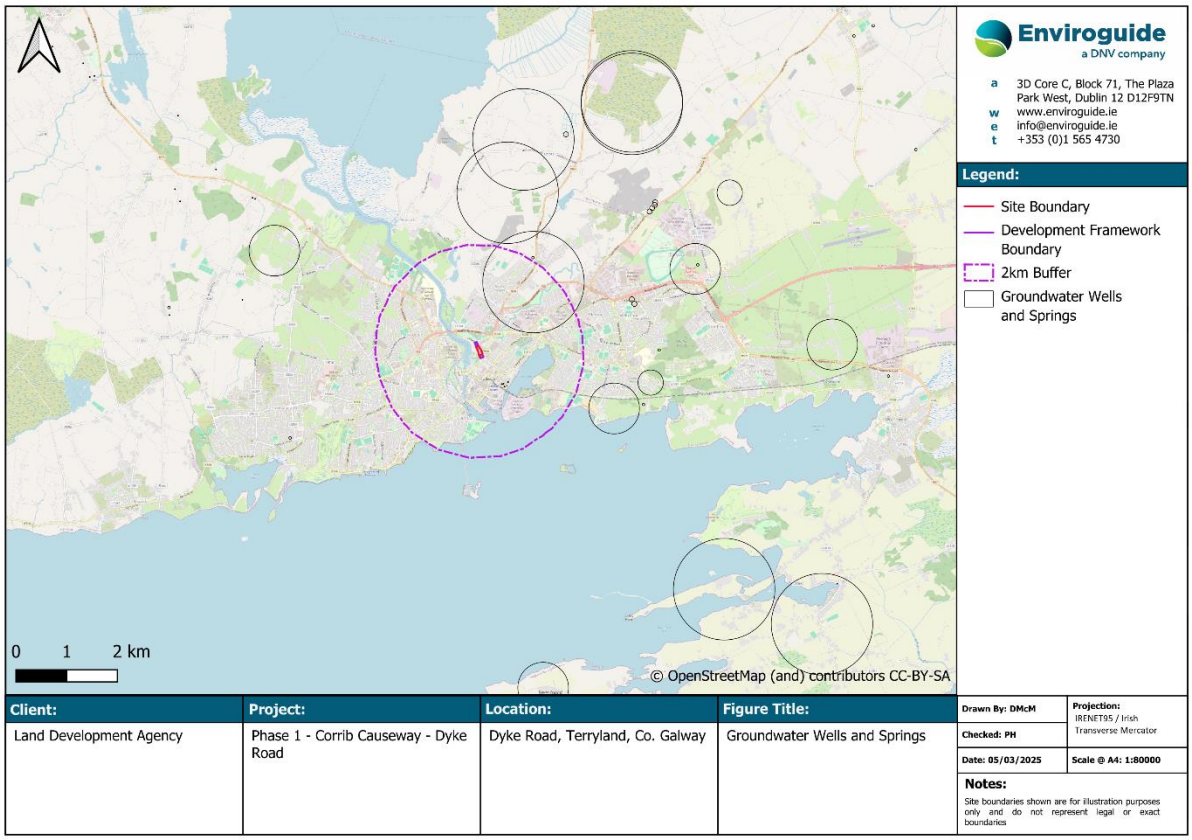

Figure 8-12. Groundwater Wells and Springs within a 2km Radius

8.3.9 Water Quality

8.3.9.1 Published Regional Surface Water Quality

The EPA surface water quality monitoring database (EPA, 2025) was consulted. A summary of the most recent published EPA water quality monitoring data (EPA, 2025) for waterbodies which have a potential hydraulic connection to the site is presented in Table 8-7 below.

The Corrib River flows south before discharging to the Corrib Estuary transitional waterbody (EU Code: IE_WE_170_0700) approximately 0.99km southwest of the site at its closest point. The Corrib Estuary ultimately discharges to the Inner Galway Bay North coastal waterbody (EU Code: IE_WE_170_0000) located approximately 3.32km southeast of the site at its closest point.

Table 8-7. Surface Water Quality

River I.D. (Monitoring Station Location)	EPA WFD Parameter Quality & Trend Analysis				
	Parameter	Period	Indicative Quality	Trend	Baseline Conc. (2017)
Terryland Stream (At Terryland Castle -1.88km northeast)	Ammonia-Total (as N)	Annual	Moderate	Upwards	0.166mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Upwards	0.516mg/l
	ortho-Phosphate (as P) - unspecified	Annual	Good	Upwards	0.028mg/l
Terryland Stream (Bridge on Galway-Headford Rd – 1.58km northeast)	Ammonia-Total (as N)	Annual	Moderate	Upwards	0.150mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Upwards	0.516mg/l
	ortho-Phosphate (as P) - unspecified	Annual	Good	Upwards	0.026mg/l
Terryland Stream (50 m d/s Terryland Bridge – 0.75km northeast)	Ammonia-Total (as N)	Annual	Moderate	Upwards	0.110mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.398mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Upwards	0.016mg/l
Terryland Stream (Br d/s Terryland Br on ring road – 0.36km northwest)	Ammonia-Total (as N)	Annual	High	Downwards	0.032mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.288mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Downwards	0.007mg/l
Corrib River (Menlough Castle – 2.15km northwest)	Ammonia-Total (as N)	Annual	High	Downwards	0.016mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.337mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Downwards	0.005mg/l
Corrib River (Quincentennial Bridge – 0.58km northwest)	Ammonia-Total (as N)	Annual	High	Downwards	0.019mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.312mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Downwards	0.005mg/l

River I.D. (Monitoring Station Location)	EPA WFD Parameter Quality & Trend Analysis				
	Parameter	Period	Indicative Quality	Trend	Baseline Conc. (2017)
Corrib River (Waterside-Galway - 0.23km west)	Ammonia-Total (as N)	Annual	High	Downwards	0.017mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.328mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Downwards	0.005mg/l
Corrib River (Salmon Weir Bridge- Galway - 0.45km southwest)	Ammonia-Total (as N)	Annual	High	Upwards	0.018mg/l
	Total Oxidised Nitrogen (as N)	Annual	Good	Downwards	0.359mg/l
	ortho-Phosphate (as P) - unspecified	Annual	High	Downwards	0.005mg/l
Corrib Lower Lake (3.56km northwest)	Ammonia-Total (as N)	Annual	High	Upwards	0.026mg/l
	Chlorophyll	Annual	High	Downwards	2.104ug/l
	Total Phosphorus (as P)	Annual	High	Downwards	0.009mg/l
Corrib Estuary (0.99km south)	Chlorophyll	Summer	High	Upwards	2.5mg/m^3
		Winter	High	Downwards	1.4mg/m^3
	Dissolved Inorganic Nitrogen (as N)	Summer	High	Upwards	0.035mg/l
		Winter	High	None	0.288mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Upwards	5.9ug/l
		Winter	High	Downwards	7.4ug/l
Inner Galway Bay North (3.32km southeast)	Chlorophyll	Summer	High	Upwards	2.6mg/m^3
		Winter	High	Upwards	1.3mg/m^3
	Dissolved Inorganic Nitrogen (as N)	Summer	High	Upwards	0.034mg/l
		Winter	High	Upwards	0.225mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Upwards	5.5ug/l
		Winter	High	Downwards	8.0ug/l
Inner Galway Bay South (6.63km south	(No Chemical Monitoring data available)				
Outer Galway Bay (7.0km southwest)	Chlorophyll	Summer	High	Upwards	1.5mg/m^3
		Winter	High	Downwards	0.5mg/m^3
	Dissolved Inorganic Nitrogen (as N)	Summer	High	None	0.029mg/l
		Winter	High	Upwards	0.148mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Downwards	2.5ug/l
		Winter	Good	Downwards	6.6ug/l
Aran Islands, Galway Bay, Connemara (HAs 29;31) (17.06km southwest)	(No Chemical Monitoring data available)				

8.3.9.2 Published Regional Groundwater Quality

The EPA (EPA, 2025) groundwater monitoring data was reviewed and there are no hydraulically connected groundwater quality monitoring stations within a 2km radius of the site.

8.3.9.3 Receiving Water Quality – Galway Wastewater Treatment Plant (WWTP)

Foul water from the site will discharge via the Galway WWTP to the Corrib Estuary transitional waterbody (EU Code: E_WE_170_0700) and the Inner Galway Bay North coastal waterbody (EU Code: IE_WE_170_0000).

The Galway WWTP is operated under relevant statuary approvals. The most recent available Annual Environmental Report (AER) for the Galway WWTP is 2022 (UE, 2023). The AER identified that the final effluent was compliant with the Emission Limit Values (ELVs) specified in the wastewater discharge license (EPA Licence No. D0050-01). The 2022 AER notes the following in relation to ambient monitoring in the Corrib Estuary transitional waterbody and the Inner Galway Bay North coastal waterbody:

'The coastal/transitional ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

The discharge from the wastewater treatment plant does not have an observable impact on the water quality.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.'

8.3.10 Water Framework Directive (WFD)

The WFD status for river, lake, groundwater, transitional and/or coastal water bodies that have a potential hydraulic connection to the subject site as recorded by the EPA (EPA, 2025) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 8-8 and shown in Figure 8-13.

Table 8-8. Water Framework Directive Status

WFD Waterbody Name (EPA Name)	Waterbody EU Code	Location from Site	Distance from Site (km)	WFD Status (2016-2021)	WFD Risk	Hydraulic Connection to the Site
River Waterbodies						
Terryland_010 (Terryland Stream)	IE_WE_30T010500	North	0.13	Moderate	At Risk	Yes, receives surface water drainage from the site.
Corrib_020 (Corrib River)	IE_WE_30C020600	West	0.07	Good	Not at Risk	Yes, downstream of the Terryland Stream (diurnal flow) and receives groundwater from the site.
Corrib_010 (Corrib River)	IE_WE_30C020300	Northwest	3.22	Good	Not at Risk	No, hydraulically upstream of the site.
Lake Waterbodies						

WFD Waterbody Name (EPA Name)	Waterbody EU Code	Location from Site	Distance from Site (km)	WFD Status (2016-2021)	WFD Risk	Hydraulic Connection to the Site
Corrib Lower	IE_WE_30_666a	Northwest	3.56	Good	Not at Risk	No, hydraulically upstream of the site.
Transitional Waterbodies						
Corrib Estuary	IE_WE_170_0700	South	0.99	Moderate	Review	Yes, downstream of the Terryland Stream (via an underground conduit system) and the Corrib River. Also receives treated effluent from the Galway WWTP
Coastal Waterbodies						
Inner Galway Bay North	IE_WE_170_0000	Southeast	3.32	Good	Not at Risk	Yes, downstream of the Corrib Estuary and receives treated effluent from the Galway WWTP
Inner Galway Bay South	IE_WE_160_0000	South	6.63	High	Not at Risk	Yes, downstream of the Inner Galway Bay North coastal waterbody
Outer Galway Bay	IE_WE_100_0000	Southwest	7.00	High	Not at Risk	Yes, downstream of the Inner Galway Bay North coastal waterbody
Aran Islands, Galway Bay, Connemara (HAs 29;31)	IE_WE_010_0000	Southwest	17.06	High	Review	Yes, downstream of the Outer Galway Bay coastal waterbody
Groundwater Bodies						
Clare-Corrib	IE_WE_G_0020	Underlying Aquifer	n/a	Good	Not at risk	Yes, Underlying Aquifer

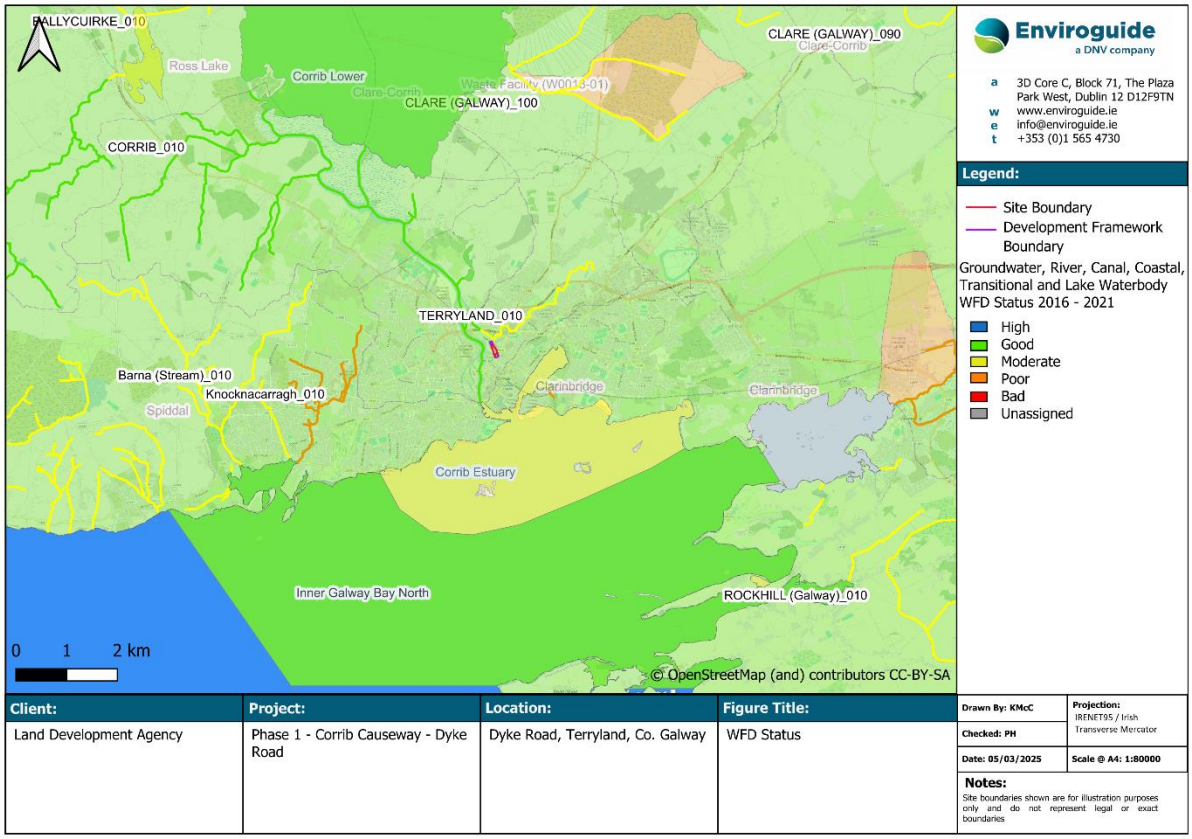

Figure 8-13. Water Framework Directive Status

8.3.10.1 Designated and Protected Areas

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). SACs and SPAs are collectively known as Natura 2000 or European sites (referred to hereafter as Natura 2000 sites).

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

As documented in the AA Screening Report prepared by Scott Cawley (Scott Cawley, 2025a) and submitted with the planning application, the identification of source-pathway-receptor connection(s) between the Proposed Development and European sites essentially is the process of identifying which European sites are within the Zone of Influence (ZoI) of the Proposed Development, and therefore potentially at risk of significant effects. The ZoI is defined as the area within which the Proposed Development could affect the receiving environment such that it could potentially have significant effects on the QI habitats or QI/SCI species of a European site, or on the achievement of their conservation objectives (as defined in CIEEM, 2022).

There are four (4No.) Natura 2000 Sites that are identified with a potential hydraulic connection to the Proposed Development which are located within the ZoI whereby the Proposed Development could affect the receiving environment such that it could potentially have significant effects on the Natura 2000 site or on the achievement of their conservation objectives.

- Lough Corrib SAC (Site Code: 000297) – approximately 0.015km west of the site.
- Lough Corrib SPA (Site Code: 004042) – approximately 2.80km north of the site.
- Galway Bay Complex SAC (Site Code: 000268) – approximately 0.70km south of the site.
- Inner Galway Bay SPA (Site Code: 004031) – approximately 0.70km south of the site.

Other Natura 2000 Sites that are identified with a potential hydraulic connection to the Proposed Development but are located outside of the ZoI include:

- Black Head-Poulsallagh Complex SAC (Site Code: 000020).
- Inisheer Island SAC (Site Code: 001275).
- Inishmaan Island SAC (Site Code: 000212).
- Inishmore Island SAC (Site Code: 000213).
- Inishmore Island SPA (Site Code: 004152).
- Kilkieran Bay And Islands SAC (Site Code: 002111).

There are two (2No.) proposed NHAs identified with a potential hydraulic connection to the Proposed Development which are considered to be located within the ZoI:

- Lough Corrib (Site Code: 000297).
- Galway Bay Complex (Site Code: 000268).

Other proposed NHAs that are identified with a potential hydraulic connection to the Proposed Development but are considered to be located outside of the ZoI include:

- Black Head-Poulsallagh Complex (Site Code: 000020).
- Inisheer Island (Site Code: 001275).
- Inishmaan Island (Site Code: 000212).
- Inishmore Island (Site Code: 000213).

The SACs, SPAs, and pNHAs with a potential hydraulic connection to the site and proposed development are presented in Figure 8-14.

The AA Screening Report completed for the Proposed Development (Scott Cawley Ltd., 2025a submitted with the planning application), concluded that *'there is the possibility for significant effects on European sites, in the absence of mitigation, either arising from the project alone or in combination with other plans and projects as result of habitat degradation as a result of hydrological impacts, habitat degradation as a result of hydrogeological impacts, habitat degradation as a result of air quality, and disturbance and displacement impacts, on Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and Inner Galway Bay SPA'.*

Therefore, a Natura Impact Statement (NIS) Report (Scott Cawley Ltd., 2025b) submitted with the planning application) was prepared in order to further examine the potential direct and indirect impacts of the Proposed Development on Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and Inner Galway Bay SPA. Where potentially significant effects

were identified, a range of mitigation and avoidance measures have been recommended to address them. This NIS has concluded that *'the effective implementation of these mitigation measures will ensure that any impacts on the conservation objectives of European sites will be avoided during the Construction and Operational Phases of the Proposed Development such that there will be no adverse effects on any European sites'.*

The impact on designated and protected sites is further assessed in Chapter 6 of the EIAR.

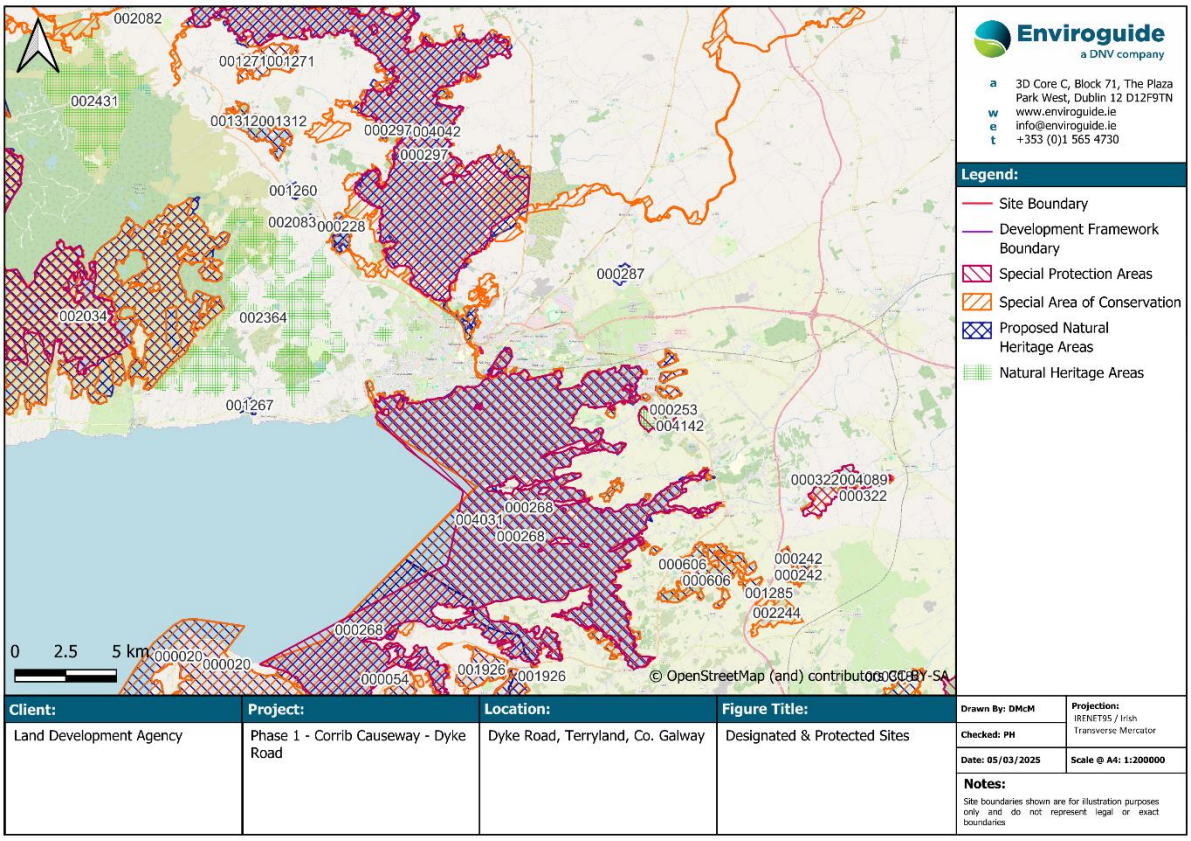

Figure 8-14. Designated and Protected Areas

8.3.10.2 Drinking Water

The river drinking water protected areas (DWPA) are represented by the full extent of the WFD river waterbodies from which there is a known qualifying abstraction of water for human consumption as defined under Article 7 of the WFD.

As stated in section 8.3.8.1, The CORRIB_020 river ~120m to the west is identified by the EPA (EPA, 2025) as a surface water drinking water sources, under Article 7 of the Water Framework Directive. There are no other surface water drinking water sources recorded within a 2km radius or hydraulically downstream of the site.

8.3.10.3 Shellfish Areas

Although the Shellfish Waters Directive (SWD) has been repealed, areas used for the production of shellfish that were designated under the SWD, are protected under the WFD as 'areas designated for the protection of economically significant aquatic species'.

The requirement from a WFD perspective is to ensure that water quality does not impact on the quality of shellfish produced for human consumption. In Ireland, 64 areas have been designated as shellfish waters (S.I. No. 268 of 2006, S.I. No. 55 of 2009, S.I. 464 of 2009).

The closest designated Shellfish Area location is Clarinbridge/Kinvara Bay approximately 7.5km downstream of the site across Galway Bay. There are also two SWD along the southern shore of Galway Bay, Ballyvaughan/Poulnaclough Bay and The Bay at Aughinish.

8.3.10.4 Nutrient Sensitive Areas

EU member states are required under the Urban Wastewater Treatment Directive (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as “natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken”.

There are no Nutrient Sensitive Areas directly upstream, downstream or within 2km of the development site.

8.3.10.5 Bathing Waters

Bathing waters are designated under Regulation 5 of Directive 2006/7/EC. Designated Bathing Waters exist under S.I. No. 79/2008 and S.I. No. 351/2011 Bathing Water Quality (Amendment) Regulations 2011. EC Bathing Water Profiles - Best Practice and Guidance 2009.

Ballyloughane Beach and Grattan Road Beach are both approximately 3.3km downstream with Grattan Road Beach being 1.2km from Galway WWTP. Salthill Beach is approximately 4.6km downstream to the west of Grattan Road Beach.

8.3.11 Importance of Receiving Environment

The receiving water bodies have been assigned a WFD Status of ‘good’ for groundwater, and ‘moderate’ to ‘good’ for the closest surface water bodies hydraulically connected to site.

Overall, taking account of the receiving hydrological and hydrogeological environment, in accordance with the criteria set out in Table 8-1, the site is considered to be of ‘high’ hydrogeological importance given that the bedrock aquifer beneath the site is classified as regionally important karstified aquifer with a high vulnerability rating and taking account of the characteristics of the environment including WFD Status.

8.4 Characteristics of the Proposed Development

The Proposed Development will consist of the construction of a new residential development of 219 no. apartment units and a childcare facility (approx. 241 sq m) in the form of 1 no. new residential block (5 - 9 storeys over lower ground floor level) with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.144 ha.

A full description of the Proposed Development is outlined in Chapter 2 of this EIAR.

The following components are of particular relevance with respect to hydrology and hydrogeology.

8.4.1 Construction Phase

The Construction Phase of the Proposed Development will include:

- It is understood that the foundation design will consist of 640mm diameter ODEX piles with reinforced in-situ concrete ground beams between pile caps and suspended slab.
- Stripping of existing macadam layers and road buildup (approximately 3,3037m^3).
- Excavation of soil and subsoil to formation level with the excavation of approximately 2,219m^3 of soils
- Excavation of soil and subsoil for the construction of building foundations, drainage and other infrastructure with excavation of 7,500m^3 of soils.
- It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the Proposed Development.
- Where possible, it is intended to reuse suitable excavated soil and subsoil for landscaping and engineering use. However, where required, surplus materials will require removal offsite in accordance with all statutory legislation.
- Temporary stockpiling of excavated material pending re-use onsite or export offsite.
- The importation of 3,750m^3 of aggregate fill materials will be required for the construction of the piling matt.
- The importation of 3,072m^3 of aggregate fill materials will also be required for the construction of the Proposed Development (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.).
- Based on the findings of the ground investigation (GII, 2024) and the design requirements for the Proposed Development, it is anticipated that granular deposits may be encountered during excavations for building foundations, drainage and other infrastructure. Any excavations which penetrate the granular deposits will be required to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages.
- There may be a requirement for management of surface water (rainwater) and shallow groundwater (recorded at levels ranging between 0.17mbGL and 2.25mbGL), where encountered during groundworks.
- Construction of new foul and mains water connections in accordance with UE Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03), UE's Code of Practice for Water Infrastructure (IW-CDS-5020-03).
- Construction of new surface water drainage designed in accordance with the principles and objectives of Sustainable Drainage Systems (SuDS) and the requirements of Galway City Council (GCC).
- Diversion of existing surface water pipes within the site from the footprint of proposed buildings.

8.4.2 Operational Phase

8.4.2.1 Surface Water Drainage

As documented in the Infrastructure Report (AECOM, 2025a), the proposed surface water drainage network, which will accommodate surface water runoff from impermeable surfaces in the Proposed Development (including roadways, roofs, and parking areas), will be managed in accordance with the policy requirements of Galway City Council Development Plan 2023-2029 and the principles and objectives of Sustainable Drainage Systems (SuDS) and the

Greater Dublin Strategic Drainage Study (GDSDS) to treat and attenuate surface water prior to discharging offsite as follows:

- It is proposed to install a new surface water piped gravity network which will discharge, at a restricted rate agreed with GCC of 25l/s, to the existing 600mm diameter concrete pipe which runs from south to north along the western boundary of the site and ultimately discharges to the Terryland Stream located approximately 0.13km north of the site at its closest point.
- As part of the Proposed Development, the LDA on behalf of GCC proposes to install a new separate gravity surface water drainage network to service the Proposed Development, which will discharge into the existing GCC 600mm Ø surface water concrete pipe. GCC confirms this pipe runs south-north along the western boundary of the Proposed Development, and discharges into the Terryland Stream. Preliminary investigations undertaken by LDA and GCC indicate sections of the pipe north of the Proposed Development (i.e., on Phase 3 development lands) may require repairs. GCC advises it will consider any potential future repairs in conjunction with LDA contribution from Phase 1, to ensure the Phase Proposed Development can connect to the existing surface water infrastructure.

The proposed surface water drainage network has been designed to convey run-off associated with a 1 in 5-year return period event without surcharge and a 1 in 100-year return period event without flooding. An additional 20% has been allowed for climate change in relation to rainfall intensities.

As detailed in the Infrastructure Report (AECOM, 2025a), the following attenuation and SuDS measures will be incorporated into the Proposed Development:

- Intensive green roof, providing a maximum storage volume of 131.2m^3.
- Exfiltration permeable paving car parking spaces
- Extensive linear rain gardens / swales (incorporating impermeable liner).
- Two (2No.) shallow reinforcement concrete attenuation tanks (providing a combined storage of 72.8m^3) with a hydrobrake installed at the outfall manhole.
- Class I By-Pass hydrocarbon separator.

The proposed surface water drainage layout and SuDS design are presented in Figure 8-15.

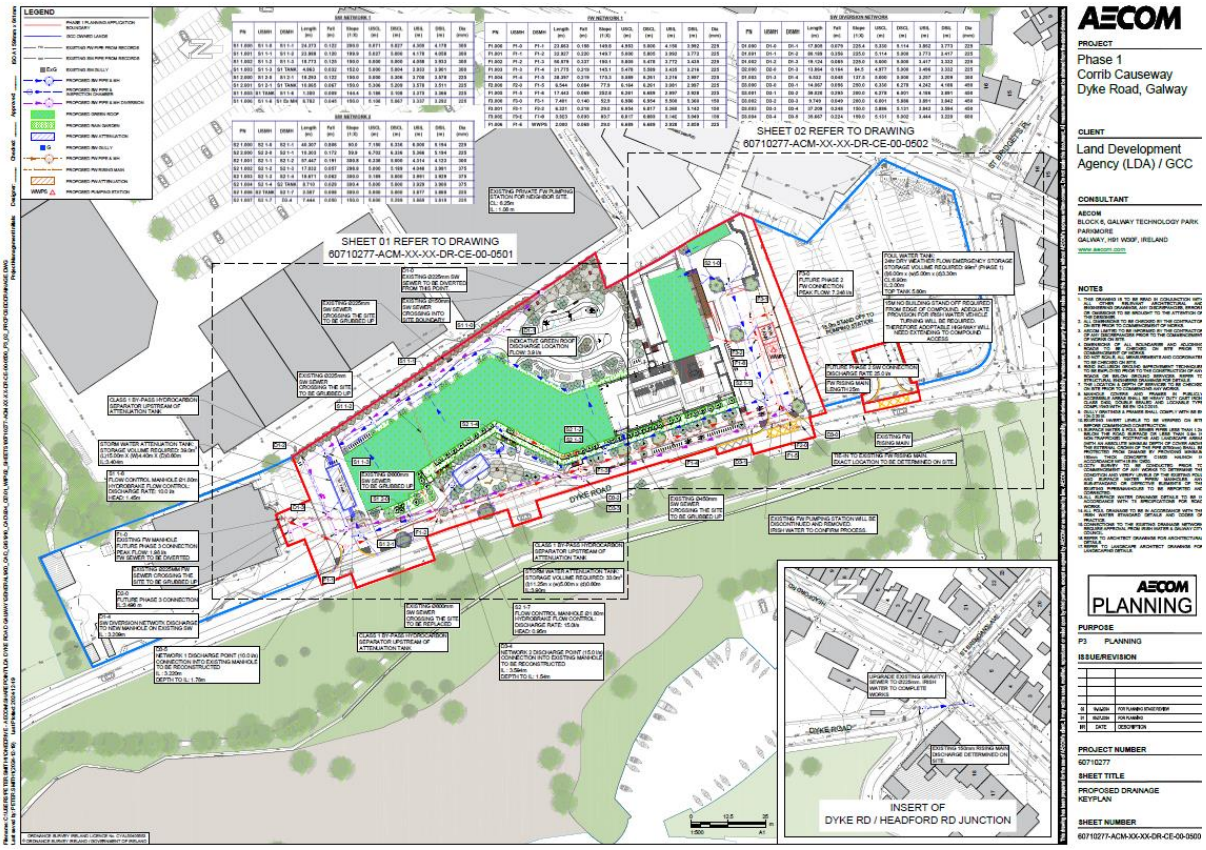

Figure 8-15. Proposed Drainage Layout (AECOM, 2025a)

8.4.2.2 Foul Drainage

As documented in the Infrastructure Report (AECOM, 2025a), the estimated peak wastewater loading generated by the Proposed Development is estimated at 2.97 l/s.

Uisce Éireann (UE) have confirmed that the existing wastewater pumping station (WWPS) was designed to cater only for the Black Box Theatre and that it doesn't have capacity to cater for any additional flows. Therefore, it is proposed to relay the gravity foul sewer serving the Black Box Theatre and install a new gravity sewer network to serve the Proposed Development. The existing wastewater pumping station (WWPS) that serves the Black Box Theatre is to be decommissioned and a new WWPS constructed (AECOM, 2025a). The new WWPS has been positioned based on the flood extents within the site and to maximize the separation from buildings. The pumping station is located so that it is above the 1 in 100-year return period event water level and as far away from all buildings as possible. In addition, the above ground elements (kiosk and control room) are located above the 1:200-year return period. UE's minimum separation distance to be provided between pumping stations and habitable buildings is 15m which can be achieved within the site. An emergency tank with 24-hour storage capacity at DWF has been provided to serve Phase 1 development and the Black Box Theatre (AECOM, 2025a).

As documented in the Infrastructure Report (AECOM, 2025a), the UE Confirmation of Feasibility (CoF) letter states that the proposed foul water connection is feasible subject to upgrades.

The existing 150mm rising main serving the existing WWPS is to be retained and reused. UE have confirmed that a 20m upgrade of a 150mm diameter sewer from Dyke Road to Wood Quay will be required. These works will be funded by the Applicant (AECOM, 2025a). Furthermore, the Applicant will also investigate the separation of storm water and foul water within the site of the Proposed Development and ensure that any existing storm water which is entering into the UE combined system is eliminated. The Applicant will ensure that there is no storm water discharge to the UE network.

A Statement of Design Acceptance (SoDA) has subsequently been issued by UE (AECOM, 2025a).

The proposed foul drainage will be designed in accordance with the Technical Guidance Document – Part H of the Building Regulations, UE's Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03), BS EN 752 – Drains and sewer systems outside buildings, Sewers for Adoption, 6th Edition and Micro Drainage Software Pipeline Design (AECOM, 2025a).

It is understood that foul water from the Proposed Development will be treated in the Galway Wastewater Treatment Plant (WWTP) (Discharge Licence No. D0050-01) before ultimately discharging to the Corrib Estuary transitional waterbody (EU Code: IE_WE_170_0700).

8.4.2.3 Water Supply

As documented in the Infrastructure Report (AECOM, 2025a), it is proposed to take a connection off the existing 300mm watermain on the Headford Road. The new watermain will pass through the Phase 2 lands and loop around all 4 sides of the Proposed Development .

The internal water supply network is based on the requirements of the Uisce Éireann Code of Practice for Water Supply (IW-CDS-5030-02) and the Technical Guidance Document – Part B of the Building Regulations.

Firefighting water supplies and fire hydrants will be provided as required in accordance with the Building Regulations and the requirement of Galway City Fire Service.

The UE CoF letter states that the proposed water supply connection is feasible without infrastructure upgrade from UE (AECOM, 2025a).

A SoDA has subsequently been issued by UE (AECOM, 2025a).

8.5 Potential Impact of the Proposed Development

The procedure for determination of potential impacts on the receiving hydrology and hydrogeology is to identify potential receptors within the site boundary and surrounding environment and use the information gathered during the desk study, site walkover, site investigations (Minerex, 2024 and GII, 2024) and the HRA (Enviroguide, 2025) to assess the degree to which these receptors will be impacted upon in the absence of mitigation.

The potential impacts associated with the Construction Phase and Operational Phase of the Proposed Development are summarised below.

8.5.1 Construction Phase

8.5.1.1 Construction Phase - Hydrological and Hydrogeological Flow Regime

During the Construction Phase there will be no direct discharges to or abstractions from surface water or groundwater at the Proposed Development with the exception of rainfall which will infiltrate to ground over a limited portion of the site during the Construction Phase. Water supply will be from mains supply in accordance with a connection agreement from UE and therefore there will be no impact on water resources.

Diversions of water courses are not required for the Construction Phase, however based on the findings of the Ground Investigation (GII, 2024), there may be a requirement for management of surface water (rainwater) and shallow groundwater (recorded at levels ranging between 0.17mbGL and 2.25mbGL), where encountered during groundworks. Where required, shallow recharge wells will be utilised to ensure the existing hydrogeological regime is maintained by allowing water to infiltrate back into the ground, ensuring that groundwater levels remain stable. There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the Construction Phase.

Overall, it is considered that any impact on the hydrological and hydrogeological flow regime during the Construction Phase will be 'negative', 'imperceptible' – 'slight' and 'temporary' within a very localised zone of the aquifer only and there will be no impact on the flow regime of receiving water bodies.

8.5.1.2 Construction Phase - Water Quality

Surface Water Runoff - There will be no storage or handling of deleterious materials such as lubricants, oils etc. and any refuelling will be controlled to minimise the potential for release to ground. There may be the requirement for use of portable generators or similar fuel containing equipment during the Construction Phase of the Proposed Development, which will be placed on suitable drip trays. In the absence of standard and appropriate construction management and mitigation measures, if the accidental release of hazardous material including fuels and oils being used onsite, through the failure of secondary containment or a materials handling accident, were to occur over open ground then these materials could infiltrate to the underlying groundwater. In the event of such scenarios, it is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Terryland Stream and River Corrib depending on the nature of the incident. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 8.6 below.

Karstic Flow Contaminants - As documented in the HRA (Enviroguide, 2025), during the Construction Phase of the Proposed Development, there will be a temporary reduction in impermeable surfaces across the site and the groundwater vulnerability is expected to temporarily increase. In karstified limestone areas like the Clare-Corrib GWB, there is a high degree of interconnection between groundwater and surface water. Furthermore, groundwater storage in karstified bedrock is low, limiting the potential for contaminant attenuation in such aquifers. During the Construction Phase the release of contaminants used onsite could enter the underlying aquifer and rapidly migrate towards receiving watercourses including the Terryland Stream, the Corrib River and the Corrib Estuary. In the event of such scenarios, it is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Terryland Stream and River Corrib depending on the nature of the incident. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 8.6 below.

Piling Impacts - Piling in karstified aquifers presents unique challenges and risks due to the characteristics of karst landscapes. Karst terrain is characterised by soluble bedrock such as limestone, which can form conduits, caves, and sinkholes through dissolution by groundwater over time. As documented in the HRA (Enviroguide, 2025), piling during the Construction Phase of the Proposed Development, may potentially create pathways for contaminants to enter underlying groundwater systems more rapidly and directly than in non-karst areas. The risk of piling in karstified aquifers lies in the potential for contaminants used during construction, such as grout or other materials, to infiltrate quickly into the groundwater through existing conduits, fractures, or dissolution features created by the piling process. These contaminants can then spread rapidly through the interconnected network of underground pathways characteristic of karst landscapes to receiving watercourses including the Terryland Stream, the Corrib River and the Corrib Estuary. In the event of such scenarios, it is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Terryland Stream and River Corrib depending on the nature of the incident. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 8.6 below.

Mobilisation of Existing Site Contaminants - As documented in the Infrastructure Report (AECOM, 2025), it is possible that the site was partially filled in the 1970s and 1980s with rubble from Galway's inner city. The Ground Investigation Report (GII, 2024) has identified made ground across the site to depths ranging between 0.5mbGL and 3.4mbGL (refer to Section 8.3.3). There will be a requirement for the excavation and removal of soils and subsoils including made ground impacted with low levels of anthropogenic contamination (i.e., PAHs and petroleum hydrocarbons – refer to Section 8.3.4.2). Construction works have the potential to mobilise these contaminates in the underlying groundwater. It is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Terryland Stream and River Corrib depending on the nature of the incident. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 8.6 below.

Discharge of Entrained Sediment or Other Contaminants in Surface Runoff - As documented in the HRA (Enviroguide, 2025), during the Construction Phase of the Proposed Development, there is a potential risk of runoff with contaminants migrating offsite via existing surface water drainage within the site it is considered that this could result in 'negative', 'moderate' and 'medium-term' impact to water quality of the Terryland Stream, the Corrib River and downstream waterbodies. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 8.6 below.

Flood Risk - During a flood event there is the potential for pollutants derived from construction materials to be mobilised by flood waters. Overall, flood events during the Construction Phase have the potential to have 'negative', 'temporary', 'moderate to significant' effects on hydrological receptors as detailed in section 8.6.1 below.

Wastewater - Foul water discharge from the temporary welfare units at the site during the Construction Phase will be either tankered offsite in accordance with waste management legislation or discharged under temporary consent to the UE mains foul network for treatment at Galway WWTP subject to agreement with UE. It is considered that any impact on the relating to waste water during the Construction Phase will be 'neutral', 'imperceptible' and 'temporary'.

8.5.2 Operational Phase

8.5.2.1 Operational Phase - Hydrological and Hydrogeological Flow Regime

During the Operational Phase there will be no discharges to groundwater at the Proposed Development.

Surface water runoff from the Proposed Development, which will be managed in accordance with the principles and objectives of SuDS, will be treated and attenuated prior to discharge from the site. The inclusion of SuDS is likely to increase volumes lost to evapotranspiration and reduce flashy peak discharge rates associated with traditional drainage currently on site. Impacts to the hydrological flow regime will likely be 'positive', 'imperceptible' – 'slight' and 'permanent'.

The proposed land use will not increase or decrease contribution to ground water compared to existing land cover. The use of piling has potential to alter karstified flow routing locally. The affect is likely negligible due to the close proximity of the receiving waterbody (Corrib estuary). Overall, it is considered that the likely impact on the hydrogeological regime of the regionally important aquifer will be 'negative', 'imperceptible' and 'permanent'.

8.5.2.2 Operational Phase - Water Quality

During the Operational Phase there will be no discharges to groundwater at the Proposed Development. There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase as the main operating system for heating will be natural gas.

Surface Water Runoff - During the Operational Phase of the Proposed Development, there is limited potential for discharge of any contaminated runoff to the receiving water courses associated with surface water runoff from the site. Surface water runoff from the Proposed Development, will be managed in accordance with the principles and objectives of SuDS, will be treated and attenuated prior to discharging to the Terryland Stream.

Based on the design of the Proposed Development there is limited potential sources of contamination during the Operational Phase and there will be limited potential for discharge of contaminants associated with surface water runoff to ground via unpaved, permeable areas due to the low infiltration potential at the site. Furthermore, the proposed attenuation design does not allow for infiltration due to poor ground conditions, a high-water table and the potential presence of karst features beneath the site. It is considered that the likely impact on the water quality form surface water runoff will be 'positive', 'imperceptible' – 'slight' and 'permanent'.

Wastewater - Foul water from the Proposed Development will be treated in the Galway WWTP before ultimately discharging to the Corrib Estuary transitional waterbody and the Inner Galway Bay North coastal waterbody. The increase discharge to the Galway WWTP as a result of the Proposed Development will reduce the overall available capacity of the facility. Foul water from the Proposed Development will only be discharged to Uisce Eireann (UE) foul sewer under agreement from UE and other applicable statutory consents verifying capacity at the Galway WWTP for the Proposed Development. The UE CoF notes that the foul water connection is feasible subject to infrastructure upgrades by UE. The Applicant will ensure that these upgrades are completed prior to any connections from the Proposed Development. A SoDA has subsequently been issued by UE. It is considered that the likely impact on the water

quality form wastewater generated on site runoff will be 'negative', 'imperceptible' and 'permanent'.

Flood Risk - The site is located within Flood Zone A where the probability of flooding is high. As documented in the SSFRA (AECOM, 2025b) and summarised in Section 8.3.8 above, when in operation in a future climate scenario, all proposed structures will be defended from flooding to an appropriate standard. As such, the risk of contamination of surface waters exacerbated during a future climate scenario flood event is considered low. Overall, flood events during the Operational Phase have the potential to have 'negative', 'imperceptible' 'permanent', effects on water quality and hydrological receptors.

Mobilisation of Existing Site Contaminants - There will be a requirement for the excavation and removal of soils and subsoils including made ground impacted with low levels of anthropogenic contamination (i.e., PAHs and petroleum hydrocarbons – refer to Section 8.3.4.2) and permanent removal off-site that will result in a 'positive', 'slight' – 'moderate' and 'permanent' impact on the quality of shallow soils underlying the site and subsequent improvements to quality of groundwater.

8.5.2.3 Operational Phase – Flood Risk

The SSFRA (AECOM, 2025) demonstrates that the flood risks to the Proposed Development can be adequately managed through the implementation of appropriate mitigation measures and adherence to the guidelines set out in the Galway City Council Development Plan and the Planning System and Flood Risk Management Guidelines. The proposed development will not adversely impact flood risk in the surrounding areas, and the inclusion of flood compensatory storage and sustainable drainage systems will ensure that the flood risk to the Proposed Development and adjacent properties is minimised. Likely impacts to flood risk as a result of the proposed development are 'negative', 'imperceptible to slight 'and 'permanent'. The site is located within the flood zone and therefore while residual risk is low, there remains a potential imperceptible to slight negative risk to the site.

8.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

As part of this assessment, other offsite developments and proposed offsite developments as detailed in Chapter 2 of this EIAR were reviewed and considered for possible cumulative effects with the Proposed Development.

8.5.3.1 Water Resources

Water supply to the Proposed Development will be from the existing 300mm UE mains water supply located on Headford Road. The UE CoF letter states that the proposed water supply connection is feasible without infrastructure upgrade from UE. A SoDA has subsequently been issued by UE. The mains water supply will be operated in accordance with relevant existing statutory consents therefore there will be no cumulative impacts associated with the Proposed Development on the supply network and water resources.

8.5.3.2 Water Quality

Foul water from the Proposed Development will be discharged to the mains foul network for treatment at Galway WWTP. UE have confirmed (23rd of May 2024) that a connection is feasible subject to upgrades. It is proposed to relay the gravity foul sewer serving the Black Box Theatre and install a new gravity sewer network to serve the development. The existing WWPS that serves the Black Box Theatre is to be decommissioned and a new WWPS constructed (AECOM, 2025).

The new WWPS has been positioned based on the predicted flood extents within the site in a future climate scenario and to maximise the separation from buildings. An emergency tank with 24-hour storage capacity at DWF has been provided to serve the Proposed Development and the Black Box Theatre (AECOM, 2025).

The existing 150mm rising main serving the existing WWPS is to be retained and reused. Uisce Éireann (UE) have confirmed that a 20m upgrade of a 150mm diameter sewer from Dyke Road to Wood Quay will be required. These works will be funded by the Applicant (AECOM, 2025a).

The Galway WWTP is operated in accordance with relevant statutory approvals and the available 2022 AER for the Galway WWTP indicates that discharges from the WWTP to the Corrib Estuary were compliant with the licenced ELVs (UE, 2024). The HRA (Enviroguide, 2025) identified that there is no impact on the receiving environment associated with foul discharges from the Proposed Development site via Galway WWTP individually or cumulatively.

There are no other potential cumulative impacts associated with the Proposed Development.

8.5.4 "Do Nothing" Impact

In the 'Do Nothing' scenario it is considered that the Proposed Development did not proceed and the potential impact on the receiving hydrological and hydrogeological environment is considered.

In the 'Do Nothing' scenario potential negative impacts during the Construction Phase in terms of introduction and mobilisation of contaminants in surface water and groundwater would be avoided. However, the removal and reduction of contaminants that would be required as part of the Proposed Development would also not take place.

The Proposed Development is likely to lead to improvements to the water quality of surface water runoff and receiving waterbodies with the formalisation of the surface water drainage network and implementation of SuDS. In a 'Do Nothing' scenario surface water treatment and discharge volumes would remain unchanged with potential for increased negative effects in response to climate change pressures.

In a 'Do Nothing' Scenario, the risk to persons and property from flooding remains unchanged. The Proposed Development will increase the residual risk of flooding as more people will be in an area of flood risk both during the Construction and Operational Phases. Nonetheless, the Proposed Development as assessed in the supporting SSFRA is appropriate as per the OPW Guidelines for Flood Risk Management which includes measures for minimising residual risk.

8.6 Avoidance, Remedial & Mitigation Measures

The measures outlined in this section of the report will ensure that there will be no significant impact on the receiving groundwater and surface water environment and associated receptors (e.g., Natura 2000 sites). The effective implementation of these measures will ensure that the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations (S.I. 272 of 2009 and as amended) and the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010 and as amended) individually or in combination.

8.6.1 Construction Phase

During the Construction Phase, all works will be undertaken in accordance with the Outline Construction Environmental Management Plan (CEMP) (AECOM, 2025c) and the Outline Resource and Waste Management Plan (RWMP) (AECOM, 2025d). Following appointment, the contractor will be required to further develop the CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of surface water runoff.
- Control and management of shallow groundwater during excavation and dewatering.
- Management and control of soil and materials.
- Appropriate fuel and chemical handling, transport and storage.
- Management of accidental release of contaminants at the site.
- Control and handling of cementitious materials.

The appointed contractor will produce a Pollution Prevention Plan (or similar document). This will include procedures and diagrams for:

- Dewatering of excavations.
- Temporary soil storage.
- Fuel storage/refuelling.
- Concrete wash-out area.
- Controlling surface water entering Site.
- Preventing existing drainage features becoming pathways for construction run-off.
- Reducing soil exposure and reinstating as rapidly as possible.
- Contingency measures.

Surface water runoff management will be required to prevent runoff entering excavations during construction. Surface water will require diversion around the open excavations using standard temporary drainage methods to ensure that surface water is effectively conveyed around works areas.

As documented in the CEMP (AECOM, 2025c), the following best practice construction measures will be followed to ensure that there are no significant effects on the Terryland Stream as a result of the in-stream construction works related to the outfall pipes:

- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and the water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Terryland Stream.
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Terryland Stream will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st to September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Terryland Stream at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the coffer-dammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated, and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.
- Sondes will be put in place in the Terryland Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.

Where required, stockpiles will be kept to a minimum, to control erosion areas of exposed ground, to reduce silty runoff. They will be located well away from watercourses, drains and dewatering points.

The dewatering methodology to be implemented by the appointed Contractor will ensure that any dewatering is confined to the localised zone and does not extend towards the site boundaries. Where required, shallow recharge wells will be utilised to ensure the existing hydrogeological regime is maintained by allowing water to infiltrate back into the ground, ensuring that groundwater levels remain stable.

There will be no unauthorised discharge of water to ground during the Construction Phase. Where water must be pumped from the excavations, water will be discharged by the contractor, following appropriate treatment (e.g., settlement or hydrocarbon interceptor) to sewer in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from GCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water. Under no circumstances will any untreated

wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite. Where required, all existing drainage channels and public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers. Drainage channels will be clearly identified on site and shown on method statements and site plans.

Where required, standard design and construction measures (i.e., groundwater drainage around impermeable subsurface structures) will ensure that groundwater flow across the site is maintained and that there will be no impact on groundwater levels.

During the Construction Phase, fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP in a designated area of the site away from any watercourses and drains (where not possible to carry out such activities offsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013).

The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the main contractor in advance of any works commencing.

The main contractor will ensure that strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Proposed Development site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site.

There may also be the requirement for use of portable generators or similar fuel containing equipment during the Construction Phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times.

Emergency procedures will be developed by the main contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with best practice standards and legislative requirements including but not limited to the Environmental Protection Agency Act, 1992 (as amended), Waste Management Act, 1996 (as amended) and the Safety, Health and Welfare at Work Act, 2005 (as amended):.

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development site and compliantly disposed of off-site. Residual soil will be tested to

validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.

- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

Pumping of concrete will be monitored to ensure that there is no accidental discharge. All work will be carried out in the dry and effectively isolated from any onsite drains. A suitable risk assessment for wet concreting will be completed prior to works being carried out. There will be no mixer washings or excess concrete discharged onsite. All excess concrete is to be removed from site and all washout of concrete chutes to be captured in a concrete washout container lined with an impermeable membrane which shall be removed offsite for disposal at an authorised waste facility. The container will be of good condition, will not overflow or leak and will be easily accessible to vehicles clearly marked. It will be located away from storm drain inlets, open drainage facilities, water courses & ditches. The containers will be checked and emptied at a frequency equivalent to the volume of concrete being used to prevent runoff leaving the washout location.

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), a piling risk assessment will be completed by the main contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology, will give cognisance to the Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), (or similar best practice) in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

All below ground drainage infrastructure will be constructed in accordance with current UE requirements to ensure that there are no potential impacts to groundwater quality.

The main contractor will prepare method statements for weather and tide/storm surge fore-casting and continuous monitoring of water levels in the River Corrib and Corrib Estuary. These will be made available to the local authority where requested. The main contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the waterbodies during flood events.

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will either be discharged to temporary holding tank(s), the contents of which will periodically be tankered off site to a licensed facility or discharged to public sewer in accordance with the necessary temporary

discharge licences issued by UE. The Galway WWTP is operated in accordance with relevant statutory approvals issued by UE. The increase discharge to the Galway WWTP as a result of the Proposed Development is considered to be insignificant in terms of the overall scale of the facility. The increased load does not have the capacity to alter the effluent released from the WWTP to such an extent as to result in likely significant effects on its receiving waters. Therefore, there will be no potential impact on water quality and the WFD status of receiving waterbodies and any Natura 2000 sites associated with discharges from the site.

8.6.2 Operational Phase

As documented in the HRA (Enviroguide, 2025), based on the design of the Proposed Development there is limited potential sources of contamination during the Operational Phase. Furthermore, the proposed attenuation design does not allow for infiltration to ground water. Surface water will be managed in accordance with the principles and objectives of SuDS and the GDSDS to treat and attenuate water prior to discharging offsite. Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the Operational Phase of the Proposed Development.

Foul water during the Operational Phase of the Proposed Development will ultimately discharge via the Galway WWTP to Galway Bay under the appropriate consents from UE. As mentioned above, the Galway WWTP is operated in accordance with relevant statutory approvals issued by UE. Foul water from the site will only be discharged to the UE network under the appropriate consents from UE, and therefore, the proposed development will not cause a potential impact on water quality and the WFD status of receiving waterbodies and any Natura 2000 sites associated with discharges from the site.

8.6.3 Water Framework Directive

The findings of the HRA (Enviroguide, 2025) included in Appendix 8.1 of this EIAR, identified that in the absence of any mitigation and avoidance measures there could be a potential impact on the water quality within receiving water bodies associated with the Proposed Development, specifically within the Clare-Corrib GWB, the Terryland_10 and the Corrib_020 river waterbodies, the Corrib Estuary transitional waterbody and the Inner Galway Bay North coastal waterbody. There is no identified potential impact to the Inner Galway Bay South and Outer Galway Bay coastal waterbodies attributed to the separation distances and anticipated assimilation capacity of the receiving water bodies taking account of the existing baseline conditions and WFD Status.

The mitigation measures as outline above, including the implementation of a robust CEMP during the Construction Phase and the incorporation of SuDS in the design of the Proposed Development, will prevent any impact on the receiving groundwater and surface water environment. Hence, the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

The HRA (Enviroguide, 2025) concludes that the Proposed Development will not cause a deterioration in the status of waterbodies hydraulically connected with the Proposed

Development, taking account of design avoidance and mitigation measures that will be implemented. The Proposed Development will not jeopardise the objective to achieve 'good' surface water status or good ecological potential.

There will be no impact to the existing WFD status of water bodies associated with the Proposed Development including the Terryland_10, Corrib_020, the Corrib Estuary, the Inner Galway Bay North, the Inner Galway Bay Sout, the Outer Galway Bay and the Clare-Corrib GWB as a result of the Proposed Development taking account of design avoidance and mitigation measures (Enviroguide, 2025).

8.6.4 "Worst Case" Scenario

During the Construction Phase and Operational Phase of the Proposed Development, in a worst-case scenario, such as a fuel spill or accidental unmitigated release of other hazardous compounds occurring, and in the absence of any mitigation measures it is considered that there would be a potential 'negative', 'significant', ' medium term' impact on the quality of the underlying aquifer. The groundwater within the Clare-Corrib GWB would also likely be impacted and taking account of the limited attenuation within the aquifer, it is considered that there is an indirect risk to the downstream receiving waterbodies (i.e., Corrib River, the Corrib Estuary, Galway Bay and Natura 2000 sites). However, this worst-case scenario is deemed to be unlikely scenario taking account of the embedded design avoidance measures and mitigation measures.

8.7 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

The predicted impacts of the Construction and Operational Phases are described in Table 8-9 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

There will be no significant adverse residual impacts on the receiving hydrological and hydrogeological environment associated with the Proposed Development.

There will be no impact to the existing WFD Status of water bodies associated with the Proposed Development including the Terryland Stream, the Corrib River, the Corrib Estuary and the Clare-Corrib GWB as a result of the Proposed Development taking account of design avoidance and mitigation measures where required.

Table 8-9: Summary of Residual Impacts

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Accidental release of deleterious materials including fuel and other materials being used on-site.	Water quality / WFD Status	Potential for impact on Clare-Corrib GWB exacerbated by potential karstic flow pathways within aquifer, affecting the receiving Corrib River and Estuary.	Negative	Significant	Medium Term	Direct / Worst Case	Appropriate mitigation measures to prevent the worst-case scenario occurring will be implemented during the Construction Phase.	Imperceptible
Introduction of contaminants to karstic flow paths	Water quality / WFD Status	Potential for impact on Clare-Corrib GWB exacerbated by potential karstic flow pathways within aquifer, affecting the receiving Corrib River and Estuary.	Negative	Significant	Medium Term	Direct / Worst Case	Surface water runoff management will be implemented to prevent runoff entering excavations during construction.	Imperceptible
Introduction of contaminants during piling	Water quality / WFD Status	Potential for contaminants used during construction, such as grout or other materials, to infiltrate quickly into the groundwater through existing conduits, fractures, or dissolution features created by the piling process affecting the Clare-Corrib GWB, Terryland Stream, the Corrib River and the Corrib Estuary.	Negative	Significant	Medium Term	Direct / Worst Case	The piling method and risk assessment will include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation.	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Discharge of Entrained Sediment or Other Contaminants in Surface Runoff	Water quality / WFD Status	During the Construction Phase of the Proposed Development, there is a potential risk of runoff with contaminants migrating offsite via existing surface water drainage within the site and impacting water quality of the Terryland Stream, the Corrib River and downstream waterbodies	Negative	Moderate	Medium Term	Direct	Appropriate mitigation measures to manage surface water runoff will be undertaken during the Construction Phase.	Imperceptible
Mobilise existing contaminants in the underlying soils and groundwater	Water quality / WFD Status	Potential for existing contaminants within soil and groundwater to be mobilised and impact the Clare-Corrib GWB, Terryland Stream, the Corrib River and the Corrib Estuary.	Negative	Significant	Medium Term	Direct / Worst Case	Appropriate mitigation measures to prevent the worst-case scenario occurring will be implemented during the Construction Phase.	Imperceptible
Flooding of Site During Construction	Water quality / WFD Status	Potential for impact on Clare-Corrib GWB within a localised zone of the aquifer and on the receiving Corrib River and Estuary.	Negative	Significant	Medium Term	Direct / Worst Case	The main contractor will continuously monitor water levels in the River Corrib and Corrib Estuary. The main contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones	Imperceptible
Operational Phase								
There will be no direct or indirect impact on the receiving hydrological and hydrogeological environment associated with the Operational Phase of the Proposed Development.								

8.8 Monitoring

8.8.1 Construction Phase

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Inspections will be undertaken by the main contractor or appointed delegate during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR and the CEMP (AECOM, 2025c) are fully implemented and effective.
- As documented in the CEMP (AECOM, 2025c), the main contractor in consultation with the Project Ecological Clerk of Works (ECoW), will provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the Construction Phase of the Proposed Development. The frequency of monitoring and the monitoring parameters (e.g., dust, noise limits) will be in line with best practice and guidance and will be agreed with GCC prior to commencement of the works.
- Sondes will be put in place in the Terryland Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.
- Discharges to surface water / foul sewers will be monitored where required in accordance with statutory consents (i.e., discharge licence).
- The main contractor will employ a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) to undertake co-ordination for monitoring of the works' impacts and implementation of the main contractor's proposal, in respect of all environmental requirements (AECOM, 2025c). The CEMPC will be present onsite for the duration of the Construction Phase of the Proposed Development. The CEMPC will prepare, implement, manage, review and revise the CEMP with the sole purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction.
- Routine monitoring and inspections will be undertaken by the main contractor or appointed delegate during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.

8.8.2 Operational Phase

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be undertaken throughout the lifetime of the Operational Phase of the Proposed Development.

8.9 Interactions

8.9.1 Population and Human Health

An assessment of the potential impact of the Proposed Development on human health is included in Chapter 5 of this EIAR. Site specific information on contaminative status is discussed at section 8.3.4.2 with reference to contaminants present in soils. Low level contamination was reported for a number of determinants which may present a short term risk to site workers.

Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase of the Proposed Development that will be protective of site workers.

The Proposed Development will increase the amount of people in close proximity to flood-prone areas. This increased population density could heighten the potential for flood-related health impacts, particularly during construction. Residual risk will be mitigated by monitoring weather forecasts to optimize construction planning.

8.9.2 Land, Soil, Geology and Hydrogeology

An assessment of the potential impact of the Proposed Development on the Land and Soils is included in Chapter 7 of this EIAR. During the construction earthworks, heavy rainfall events have the potential to mobilise contaminated run-off and impact on the usability of materials stored onsite. This could therefore require the importation of additional material from external sources. Mitigation measures to reduce the risk of damage of construction materials from heavy rainfall and flood events is outlined in Chapter 8 above.

8.9.3 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the site, with emphasis on habitats, flora and fauna which may be impacted as a result of the excavation and importation of materials to the site are included in Chapter 6 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

8.9.4 Material Assets

An assessment of the potential impact on the Proposed Development on the material assets – utilities including built services and infrastructure has been set out in Chapter 15 of this EIAR.

There is a risk of excess silts from construction runoff accumulating in the existing drainage network, potentially compromising its capacity. To mitigate this, standard pollution control measures will be employed to manage contaminated runoff and preserve the integrity of drainage channels during construction.

8.10 Difficulties Encountered When Compiling

There were no difficulties encountered when compiling the Hydrology Chapter of this EIAR.

8.11 References

AECOM, 2025a. Phase 1 - Corrib Causeway - Dyke Road Infrastructure Report.

AECOM, 2025b. Phase 1 - Corrib Causeway - Dyke Road Site-Specific Flood Risk Assessment.

AECOM, 2025c. Phase 1 - Corrib Causeway - Dyke Road Outline Construction Environmental Management Plan.

AECOM, 2025. Dyke Road Residential Development Outline Resource and Waste Management Plan.

ARUP, 2025. Phase 1 - Corrib Causeway - Dyke Road Hydraulic Model Assessment of Proposed Development.

Construction Industry Research and Information Association, 2015. Environmental good practice on site guide (CIRIA -C741).

CIRIA (Construction Industry Research and Information Association), 2001. Control of water pollution from construction sites – guide to good practice, (CIRIA 532)

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.

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9 NOISE AND VIBRATION

9.1 Introduction

This chapter presents the noise and vibration assessment of the Proposed Development as outlined in Section 3.3 in Chapter 3 Description of Development.

In terms of potential noise and vibration impacts, the Proposed Development has the potential to give rise to noise and vibration impacts during the Construction Phase. During the Operational Phase, there is the potential for noise impact due to road traffic movements and associated plant and equipment. There is also the potential for an inward noise impact on future residents within the Proposed Development due to future predicted traffic volumes on the surrounding road network.

9.1.1 Quality Assurance and Competency of Experts

This Noise and Vibration Impact Assessment has been prepared by Mervyn Keegan of AONA Environmental Consulting Ltd. Mervyn Keegan is a director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in noise control and acoustics and air quality and odour consultancy, including impact assessment and mitigation design. Mervyn Keegan has over 25 years of environmental consultancy experience. Mervyn is a member of the Institute of Acoustics, a member of the Institute of Environmental Sciences and a member of the Institute of Air Quality Management with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control. AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of fifty noise and vibration and air quality and climate impact assessments annually for infrastructure, transport, industry, commercial and quarry developments in the Republic of Ireland, Northern Ireland and the UK in the last 20 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practise in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings.

9.2 Study Methodology

9.2.1 Relevant Guidelines and Standards – Construction Phase

BS5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open site – Part 1: Noise'

There is no published statutory Irish guidance regarding construction noise. BS5228-1:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open site – Part 1: Noise'*, provides guidance on assessing the potential significance of noise effects from construction activities in Annex E. In relation to Construction Noise Limits, BS 5228-1:2009+A1: 2014 '*Noise and Vibration Control on Construction and Open Sites Part 1: Noise'* details the 'ABC method', which recommends a construction noise limit based on the existing ambient noise level. General and short-term construction noise impacts that are deemed typical of any construction site noise sources, including activities such as ground preparation, site clearance, demolition, foundation earthworks, roadway construction, erection of new buildings, etc. are assessed in accordance with the 'ABC method' defined in BS 5228. The ambient noise levels have been determined through the baseline noise survey near the

nearest residential properties and then rounded to the nearest 5dB to determine the appropriate category (A, B or C) and subsequent threshold value. A potential significant effect is indicated if the construction noise level exceeds the appropriate category threshold value at each location. If the existing ambient level exceeds the threshold category threshold values, then a potential significant impact is indicated if the total noise level, including both the ambient noise and the various contributions of construction noise, is greater than the ambient noise level by more than 3dB. Table 9-1, reproduced from BS 5228, demonstrates the criteria for selection of a noise limit for a specific receptor location.

Table 9-1 Construction noise threshold levels based on the BS 5228 'ABC' method.

Assessment Category and Threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A (A)	Category B (B)	Category C (C)
Night time (23.00 to 07.00)	45	50	55
Evening and weekends (D)	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 - 13.00)	65	70	75

Notes:

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

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

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

D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

BS5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open site – Part 1: Vibration

There is no published Irish statutory guidance limits regarding construction vibration. BS 5228-2:2009+A1:2014 outlines that human perception and disturbance caused by instantaneous levels of vibration can be assessed in terms of peak particle velocity (PPV). Criteria and guidance for evaluation can be found in '*BS 5228-2:2009: Code of practice for noise and vibration control on construction and open sites Part 2'*. The relevant criteria are reproduced in Table 9-2.

Table 9-2 Guidance on effects of vibration levels in terms of peak particle velocity (PPV) (reproduced from BS 5228-2:2009, Table B.1)

Vibration level	Effect
0.14 mm·s^{-1}	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm·s^{-1}	Vibration might be just perceptible in residential environments.
1 mm·s^{-1}	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.

10 mm·s^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure.

BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration considers the potential effects of vibration upon buildings. For residential buildings, the limit for cosmetic damage varies with frequency; 14 mm/s at 4 Hz rising to 20 mm/s at 15 Hz and 50mm/s above 40 Hz. These limits apply to all three orthogonal directions individually.

Table 9-3 Transient vibration guide values for cosmetic damage (reproduced from BS 7385, Table 1)

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

It is highly likely that occupants would complain long before vibration levels reached this the levels in Table 9-3. It is common for a conservative approach to be taken when setting criteria for cosmetic damage and a lower vibration limit is often specified. The Transport Infrastructure Ireland Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) identify limits which provide for protection against vibration nuisance and is comfortably within BS 7385 limits for potential cosmetic damage, as follows;

- 8 mm/s (vibration frequency <10Hz)
- 12.5 mm/s (vibration frequency 10 to 50Hz)
- 20 mm/s (vibration frequency >50 Hz).

9.2.2 Relevant Guidelines and Standards – Operational Phase

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development (May 2017) (UK)

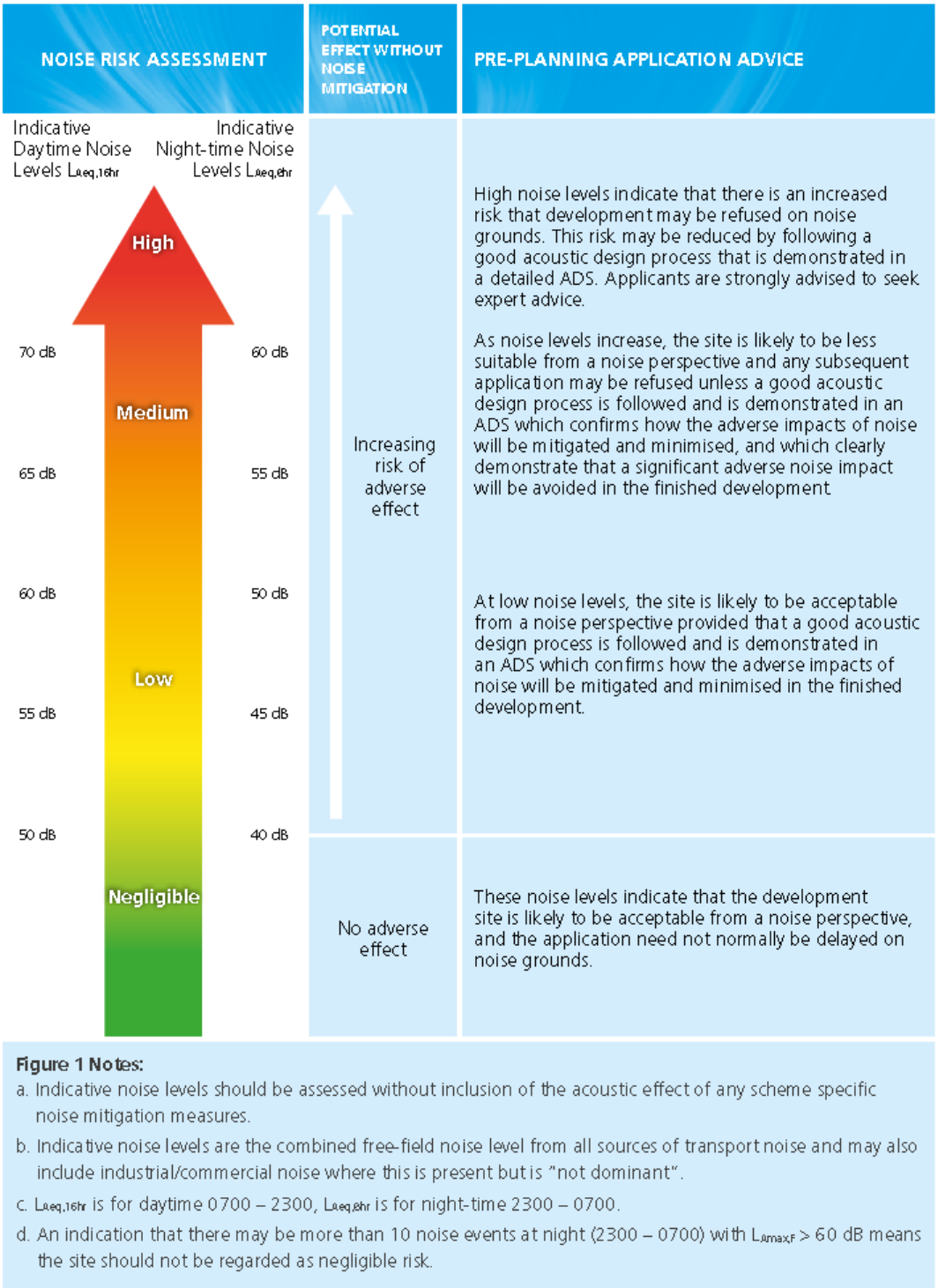
The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

Figure 9-1 summarises the Stage 1 Initial Site Noise Risk Assessment. The figure illustrates how an initial noise risk assessment is linked with an increasing risk of adverse effect from noise and how this in turn is broadly associated with indicative noise levels derived from current guidance and experience. The indicative noise levels are intended to provide a sense

of the noise challenge at a potential residential development site and should be interpreted flexibly having regard to the locality, the project and the wider context. In the final column, the initial noise risk assessment is aligned with pre-planning application guidance that highlights the increasing importance of good acoustic design as the noise risk increases.

Figure 9-2 Stage 1 Initial Site Risk Assessment.



Stage 2 – a systematic consideration of four key elements;

Stage 2 of the recommended approach contains four key elements to be undertaken in parallel and each is considered in turn below in the following sub-sections.

- Stage 2: Element 1 – Good Acoustic Design Process
- Stage 2: Element 2 – Internal Noise Level Guidelines
- Stage 2: Element 3 – External Amenity Area Noise Assessment
- Stage 2: Element 4 – Assessment of Other Relevant Issues

Stage 2: Element 1 – Good Acoustic Design Process

Following a good acoustic design process is an implicit part of achieving good design as required by Government planning and noise policy. It is imperative that acoustic design is considered at an early stage of the development control process. A good acoustic design process takes a multi-faceted and integrated approach to achieve optimal acoustic conditions, both internally (inside noise-sensitive parts of the building(s)) and externally (in spaces to be used for amenity purposes).

Stage 2: Element 2 – Internal Noise Level Guidelines

The second element of Stage 2 is to seek to achieve recommended noise levels inside noise sensitive rooms in new residential development. It is considered that suitable guidance on internal noise levels can be found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”.

Stage 2: Element 3 – External Amenity Area Noise Assessment

The third element of Stage 2 is a noise assessment of external amenity areas. The term “assessment” is deliberately used because this element concerns more than just the level of noise outside. BS8233:2014 states that “*the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB* $L_{Aeq,16hr}$”. The standard continues… “*These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited*.”

Stage 2: Element 4 – Assessment of Other Relevant Issues

The fourth and final element of Stage 2 is an assessment of other relevant issues. This element seeks to build upon relevant national and local planning and noise policies (item 4(i)) to provide a systematic list of recommendations for the issues that should be considered before making a judgement about the noise aspects of a particular planning proposal for new residential development. Full details of the assessment of other relevant issues should be included in an Acoustic Design Statement (ADS).

An ADS should provide sufficient evidence that the ProPG Stage 1 and Stage 2 Elements 1 to 4 have been followed. An ADS should be proportional to the scale of the development and to the degree of noise risk at the proposed development site. An ADS should not normally be

necessary where the noise risk has been properly assessed as negligible during Stage 1. The level of detail provided in an ADS should increase with increasing level of risk.

Figure 9-2 Information to be included in an Acoustic Design Statement (ADS)

TYPICAL ISSUES FOR LOW NOISE RISK SITES	ADDITIONAL ISSUES FOR MEDIUM/HIGH NOISE RISK SITES
Relevant noise sources identified	Multiple source contributions carefully quantified
Assess extent of noise risk for unmitigated site (current and foreseeable future, 15 years ahead)	Greater coverage across the site (all buildings, all relevant heights)
	Alternative site layouts considered
	Adequate non-sensitive use for screening
Opportunities to mitigate the noise source within the site	Opportunities to mitigate the noise source outside owned land Physical mitigation, operational management
Maximise separation	Existing topographical advantages Change site level
Noise barriers – screening opportunities	Barriers inside and outside the site
Site layout – protecting residential units	Design external amenity spaces (e.g. balconies) to reduce noise entering sensitive rooms
Site layout – protecting external amenity space	Access to quiet open space on or off-site
Non-sensitive elements as screens	Non-sensitive elements designed as screens
Building layout to self-screen sensitive rooms	Orientation of noise sensitive rooms away from the source of noise exposure i.e. quiet facades
Building treatment to screen openings	Consideration of alternative acoustic options
Window location & size on affected facades	Innovative facade and window designs e.g. plenum windows
	Façade insulation design
Ventilation – natural, from quiet facade	Acoustic performance of ventilation, thermal comfort
	Complete Acoustic Design Process throughout

Following the ProPG approach will lead to the choice of one of four possible recommendations from the noise practitioner to the decision maker:

A. Planning consent may be granted without any need for noise conditions;

B. Planning consent may be granted subject to the inclusion of suitable noise conditions;

C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or

D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

BS8233: 2014 Guidance on Sound Insulation and Noise Reduction for Buildings:

British Standard 8233: 2014 Guidance on Sound Insulation and noise reduction for buildings, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. Noise from common sources in the environment such as road traffic is dealt with in detail in BS8233: 2014. The standard states that for steady external noise sources such as road traffic it is desirable that the internal ambient noise level does not exceed the guideline values for living and dining rooms for daytime use and bedrooms for night time as outlined in Table 9-4.

Table 9-4 BS8233: 2014 indoor ambient noise levels for dwellings.

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq, 16\ hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16\ hour}$	30 dB $L_{Aeq, 8\ hour}$

IEMA Guidelines for Noise Impact Assessment (2014)

The Guidelines for Noise Impact Assessment (October 2014) produced by the Institute of Environmental Management and Assessment (IEMA) address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines state that the noise level threshold and significance should be determined, based upon the specific evidence and likely subjective response to noise. The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level. An impact scale offered by the IEMA guidelines is shown in Table 9-5.

Table 9-5 IEMA Impact from the Change in Sound Levels

Long-term impact classification	Short-term impact classification	Sound Level Change LpAeqT (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	>0 dB and <1 dB
	Minor	>1 dB and <3 dB
Minor	Moderate	>3 dB and <5 dB
Moderate	Major	>5 dB and <10 dB
Major		>10 dB

To determine the overall noise impact, the magnitude and sensitivity to changes in noise levels, the Noise Effects Descriptors presented in Table 9-6 are offered by the IEMA

guidelines.

Table 9-6 IEMA Impact from the Change in Sound Levels

Level of Impact	Description
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9 dB LAeq change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in a sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 2.9 dB L_{Aeq} change in a sound level at a receptor of some sensitivity
None/not significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

Table 9-7 Relationship between Noise Impact, Effect and Significance (IEMA)

Magnitude (Nature of Impact)		Description of Effect (on a specific sensitive receptor)	Significance
Beneficial	Substantial	Receptor Perception = Marked Change Causes a material change in behaviour and/ or attitude, e.g. individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect)
	Moderate	Receptor Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g. turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	
	Slight	Receptor Perception = Just Noticeable Improvement Noise impact can be heard, but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	(Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) Less Likely to be Significant
-	Negligible	N/A = no discernible effect on receptor	Not Significant
Adverse	Slight	Receptor Perception = Non-intrusive Noise impact can be heard, but does not	Less Likely to be Significant

Magnitude (Nature of Impact)		Description of Effect (on a specific sensitive receptor)	Significance
		cause change in behaviour or attitude, e.g. turning up volume of television, speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect)
	Moderate	Receptor Perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awaking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	
	Substantial	Receptor perception = Disruptive Causes material change in behaviour and /or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) More Likely to be Significant
	Severe	Receptor Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g. regular sleep deprivation / awakening ; loss of appetite, significant , medically definable harm, e.g. auditory and non-auditory.	Significant

9.2.3 Noise Survey Methodology

A continuous 24-hour daytime and night-time continuous baseline noise monitoring survey was undertaken from 11th – 12th June 2024 to record existing noise levels at the site of the Proposed Development (NML 1). In accordance with noise impact assessment best practise and relevant project experience, the 24-hour continuous baseline noise monitoring survey location has been selected to allow for a representative noise level due to the main noise sources in the area and at the future building location to be assessed.

A short-term daytime noise survey was also undertaken on 12th June 2024 to record existing noise levels along the eastern boundary of the site to assess if the existing cinema and commercial / retail buildings cause a discernible noise impact in proximity to the proposed

apartments and outdoor amenity area (NML 2).

This allowed for existing noise levels to be assessed for potential impact on the future residents of the proposed apartments within the development. During the noise survey, the sound level meter was orientated towards the dominant noise source, i.e. traffic noise on the Headford Road and Dyke Road. The traffic flow on the site is directly impacted by the passing traffic on the Headford Road and Dyke Road during daytime and night-time.

The noise measurements were conducted according to international standard ISO 1996-1:2016 Description and Measurement of Environmental Noise using a Norsonic Nor 140 Sound Level Analyser fitted with a suitable weather kit. The microphone of the sound level meter was placed at a height of 3m above ground level directly exposed to traffic noise, at the approximate height of the first-floor window of the proposed apartments within the development.

A wind shield was used on the microphone throughout the survey and the sound level meter was calibrated before and after the survey period, with drift noted to be less than 0.1 dB. The Time Weighting used was Fast and the Frequency Weighting was A-weighted. Each measurement period duration throughout the noise monitoring survey was of a 15-minute duration during daytime and night-time.

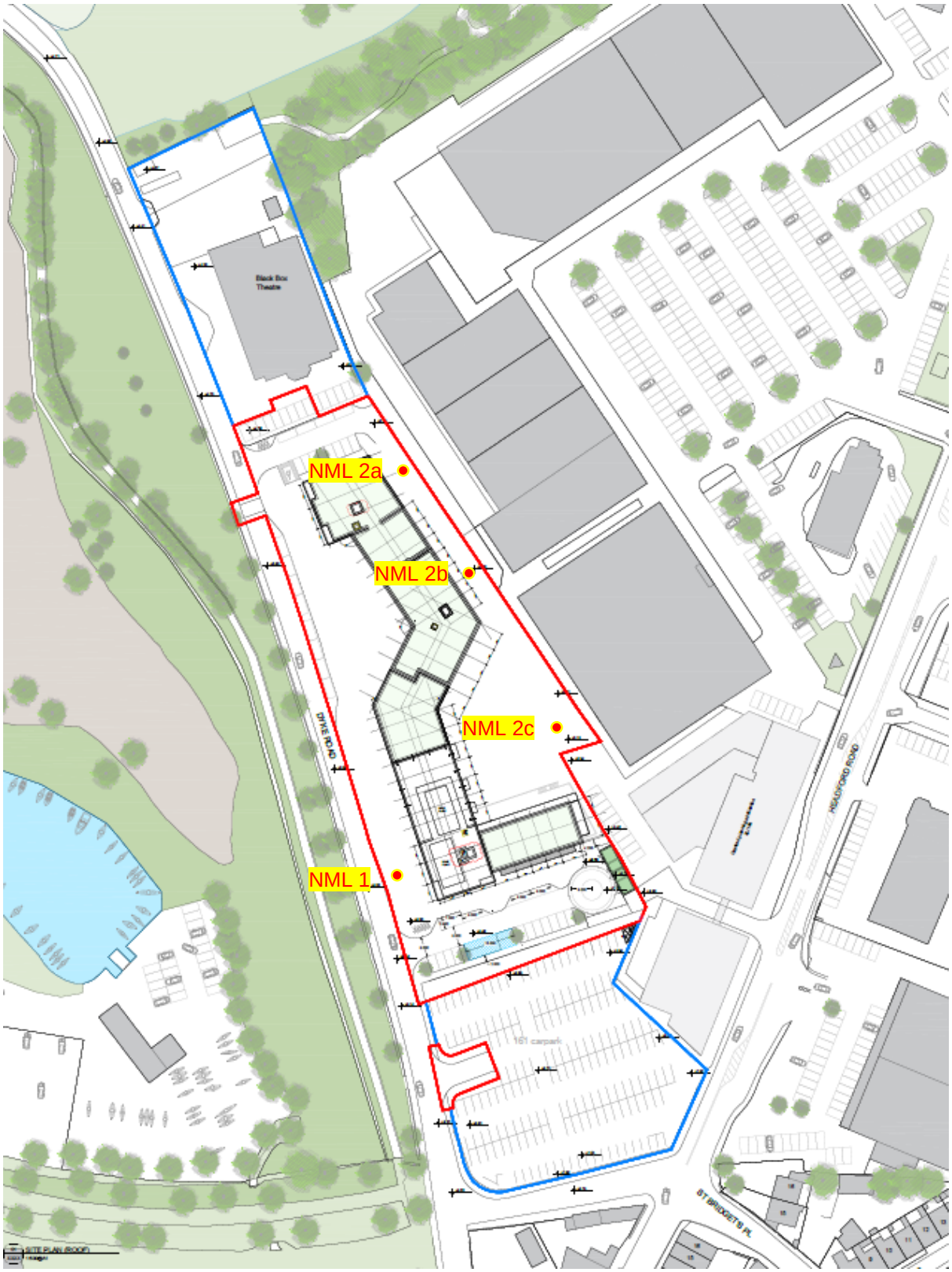
The measurement parameters recorded and reported during the baseline noise survey are defined as follows:

- A-weighted Decibel dB(A): Decibels measured on a sound level meter incorporating a frequency weighting (A Weighting) which differentiates between sound of different frequency (pitch) in a similar way to the human ear. This takes account of the fact that the human ear has different sensitivities to sound at different frequencies.

- L_{Aeq} is the A-weighted equivalent continuous steady sound level during the sample period.
- L_{AMax} is the maximum A-weighted sound level recorded during the sample period.
- L_{AMin} is the minimum A-weighted sound level recorded during the sample period.
- L_{A10} is the A-weighted sound level that is exceeded for 10% of the sample period and is generally used to quantify traffic noise.
- L_{A90} is the A-weighted sound level that is exceeded for 90% of the sample period and is generally used to quantify background noise.

The meteorological conditions during the noise survey consisted of calm and dry conditions with no periods of rainfall and/or elevated wind speeds.

Figure 9-3 Noise Monitoring Locations.



9.2.4 Noise Prediction Methodology

Road traffic noise impact predictions were undertaken using the CadnaA noise prediction modelling software. This approach allows for predicted noise levels at each floor level on each façade of the proposed apartments and houses within the development in proximity to the surrounding road network.

This noise prediction model incorporates the calculation methodologies outlined in the Calculation of Road Traffic Noise (CRTN) produced by the UK Department of Transport (Welsh Office) and the methodology outlined within Method A of the Transport Infrastructure Ireland Guidelines to allow for L_{den}, L_{day} and L_{night} predicted noise levels. The CadnaA computational model develops a visual and mathematical representation of the predicted noise environment at the selected noise sensitive receptor locations. The term "Noise Sensitive Receiver", often abbreviated as NSR, refers to premises that is used for purposes sensitive to noise and requires protection. Examples of noise sensitive receivers are domestic premises, hotels and hostels, educational institutions and hospitals and clinics. The selected noise sensitive receptor locations are representative of the future residents of the proposed development, with noise sensitive receptor locations selected on each building façade and at each floor level.

Traffic data, horizontal and vertical alignments of the development and local topography were used to predict the traffic noise impact at the selected noise sensitive receptor locations at each floor level on each façade of the proposed apartment development.

The surrounding road network was digitised within the CadnaA noise model. The traffic flows on the surrounding road network for the assumed year of opening (2024) were input into the CadnaA noise model.

The CadnaA noise prediction software allows for a prediction of noise levels at a number of selected noise sensitive receptor locations which may be affected by traffic noise from the surrounding road network. The predicted noise levels have been compared to the design goal criteria as stipulated in the ProPG and BS8223 to determine the extent of noise attenuation measures required.

The screening effects of building, embankments, bunds and walls along the surrounding road network alignment have been incorporated into the noise prediction model using mapping and elevation details provided by the project architects.

A ‘Building Evaluation’ for each floor level on each façade of the proposed apartment development has been assessed, which provides a distribution of receivers and noise levels at each façade. The ‘Building Evaluation’ has been used to deliver individual building noise maps showing noise levels along all facades. This information can be further used at detailed design stage to determine the level of noise attenuation that will be required for specific window noise attenuation requirements on each building façade. Table 9-8 outlines the parameters, sources, settings and assumptions that have been incorporated into the model.

Table 9-8 Noise Prediction Modelling Parameters, Sources and Assumptions

Parameter	Source	Details
Horizontal distances – Proposed Development and	Project Architects	Scaled development drawings in AutoCad format.

surrounding area		
Proposed Development Dimensions and Phases	Project Architects	Scaled development drawings in AutoCad format.
Receptor Locations	AONA Environmental	At building facades using the 'Building Evaluation' parameter in the CadnaA noise model.

The AADT (Annual Average Daily Traffic) traffic data on the Headford Road and Dyke Road to assess the future predicted traffic noise level at each floor level on each façade of the proposed apartment development is outlined in Tables 9-9 and 9-10. Traffic flow data used in the noise prediction modelling was based on the traffic flows on the Headford Road and Dyke Road. The Design Year 2043 24-hour AADT flows were converted to hourly flows according to a realistic Transport Infrastructure Ireland (TII) diurnal profile for car and heavy goods vehicle (HGV) traffic for the Headford Road and Dyke Road. Worst-case traffic speeds on the surrounding road network were represented at 50 Kph as per local traffic speed limits.

Table 9-9 Dyke Road - Predicted AADT traffic flows. 1. Baseline scenario, 2. Future traffic flow scenario taking account of the reduction in public car parking provision.

Dyke Road AADT Traffic Flow scenarios	Baseline 2023		Opening Year 2028		Design Year 2043	
	AADT	%HGV	AADT	%HGV	AADT	%HGV
1. Do Nothing - Baseline scenario	8,300	0.70%	9,000	0.72%	10,500	0.81%
2. Do Something - Assessment scenario 1	N/A		9,200	0.69%	10,600	0.79%

Table 9-10 Headford Road - Predicted AADT traffic flows. 1. Baseline scenario, 2. Future traffic flow scenario taking account of the reduction in public car parking provision.

Headford Road AADT Traffic Flow scenarios	Baseline 2023		Opening Year 2028		Design Year 2043	
	AADT	%HGV	AADT	%HGV	AADT	%HGV
1. Do Nothing - Baseline scenario	12,600	1.98%	13,700	2.03%	16,000	2.28%
2. Do Something - Assessment scenario 1	N/A		13,900	1.98%	16,100	2.26%

9.3 The Existing and Receiving Environment (Baseline Situation)

The noise environment in the area is predominantly influenced by traffic noise on the Headford Road and Dyke Road during daytime and night-time. The existing car park traffic movements also influence noise levels in the immediate area of the site. The results of the continuous 24-hour daytime and night-time baseline noise monitoring survey at NML 1 are outlined in Table 9-11.

Table 9-11 Results of the continuous daytime and night-time baseline noise monitoring survey at NML 1 undertaken from 11th – 12th June 2024 at the site.

Period	$L_{Aeq, T}$	L_{AMax}	L_{AMin}	$L_{A10, T}$	$L_{A90, T}$
Daytime (16 Hour) – 0700-2300	61.8	72.9	48.0	65.7	51.5
Daytime (12 Hour) – 0700-1900	62.7	73.1	48.3	66.6	52.2
Evening (4 Hour) – 1900-2300	58.9	72.3	46.9	62.9	49.4
Night-time (8 Hour) – 2300-0700	49.0	63.3	40.2	50.2	42.1

During the daytime the sound pressure levels recorded is ~63 dB $L_{Aeq, 12\ Hour}$. During the evening the sound pressure levels recorded is ~59 dB $L_{Aeq, 4\ Hour}$. During the night-time the sound pressure levels recorded is ~49 dB $L_{Aeq, 8\ Hour}$.

To put changes in traffic noise levels into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB(A), while an increase or decrease of more than 25%, in traffic flow represents a change of 1 dB(A) in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds). An additional 'uncertainty' adjustment of plus 1 dB(A) was added to the measured daytime and night-time sound pressure levels to cover for any 'uncertainty' at the time of the survey. This additional adjustment was added to ensure a thorough design recommendation in terms of the future proposed façade/glazing specifications.

Based on the ProPG recommended Noise Risk Categories for new developments near existing noise sources as outlined in Figure 9-1 and the measured noise levels outlined in Table 9-11 and in Charts 1 - 5, the noise level recorded at NML 1, the location representative of the proposed façade of the residential apartment development facing the Headford Road and Dyke Road, indicates the following;

- Daytime (~63 + 1) = 64 dB $L_{Aeq, 16\ Hour}$ => the site is in the Low-Medium Risk Category.
- Night-time (~52 + 1) = 53 dB $L_{Aeq, 8\ Hour}$ => the site is in the Low-Medium Risk Category.

ProPG also states that "*at night (2300 - 0700 hrs) a significant effect on sleep disturbance e.g. behavioural awakening, is likely to occur where the maximum sound level at the façade of a building with partially open windows is above:*

- *85 dB $L_{Amax,F}$ (where the number of events exceeding this value is ≤ 20); or*
- *80 dB $L_{Amax,F}$ (where the number of events exceeding this value is > 20)."*

During the continuous noise survey, there were no L_{Amax} noise levels recorded in excess of 80 dB(A). Therefore, with appropriate glazing installed, there are unlikely to be significant impacts on sleep due to intermittent maximum noise levels during night-time.

Chart 1: Sound Pressure Level dB(A) recorded at continuous noise monitoring location from 17:15 6th June 2024 - 17:40 7th June 2024.

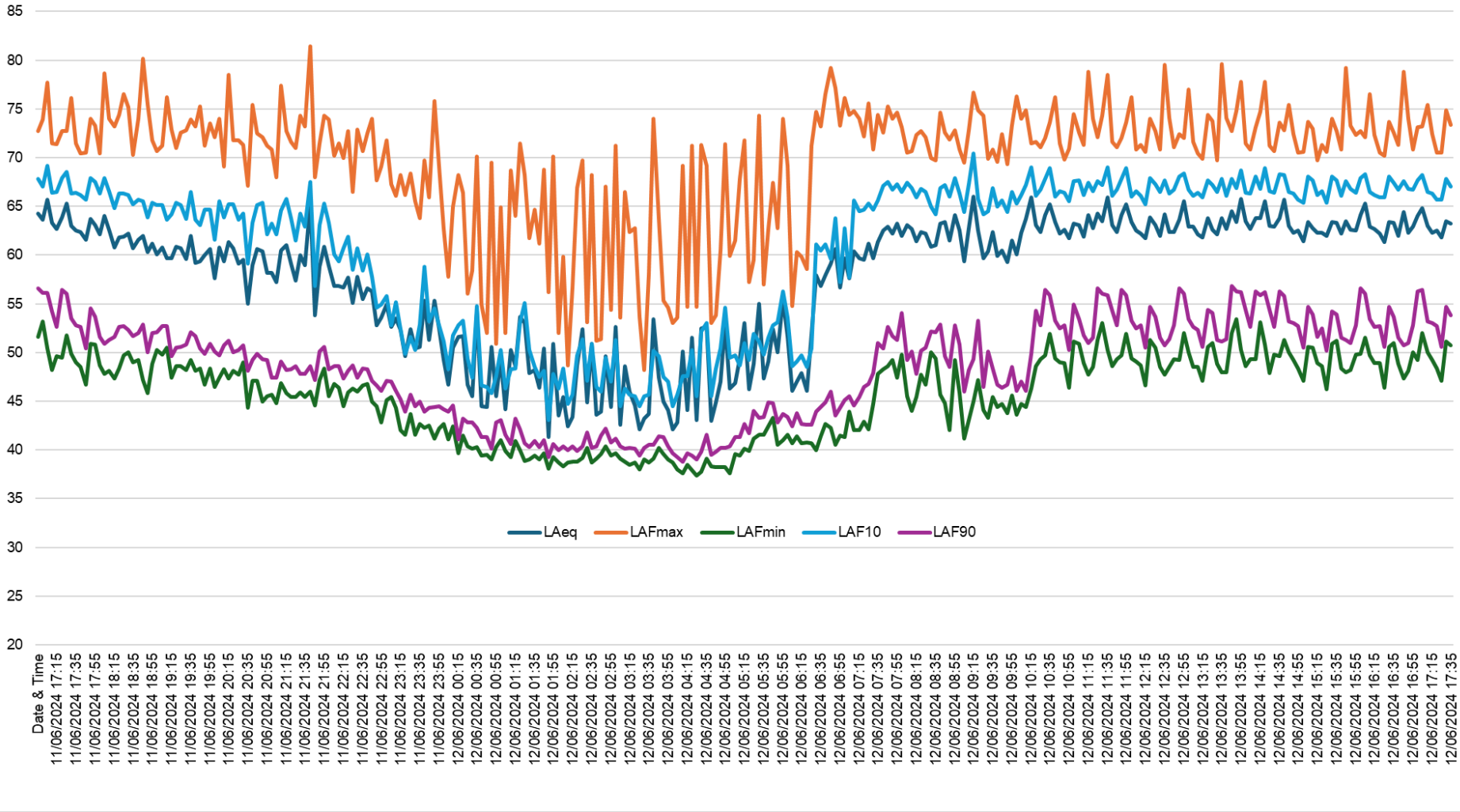


Chart 2: The frequency distribution of LAeq,5min values during daytime.

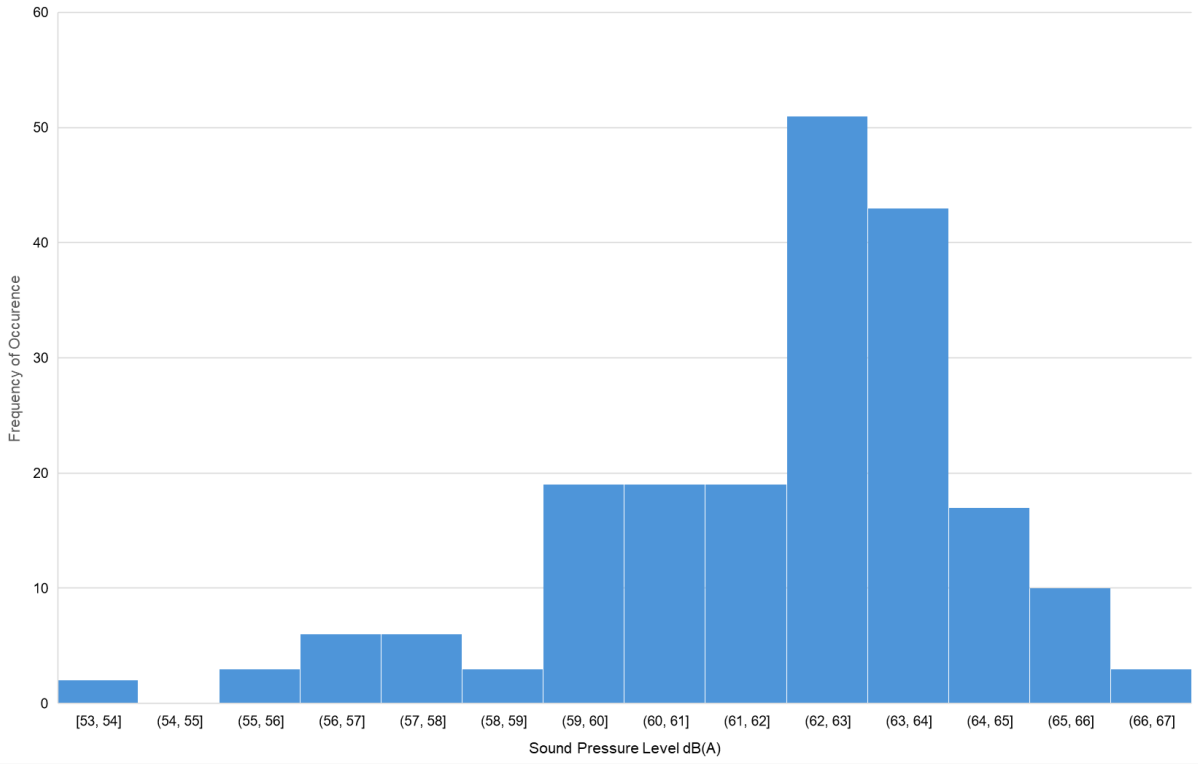


Chart 3: The frequency distribution of LAMax,5min values during daytime.

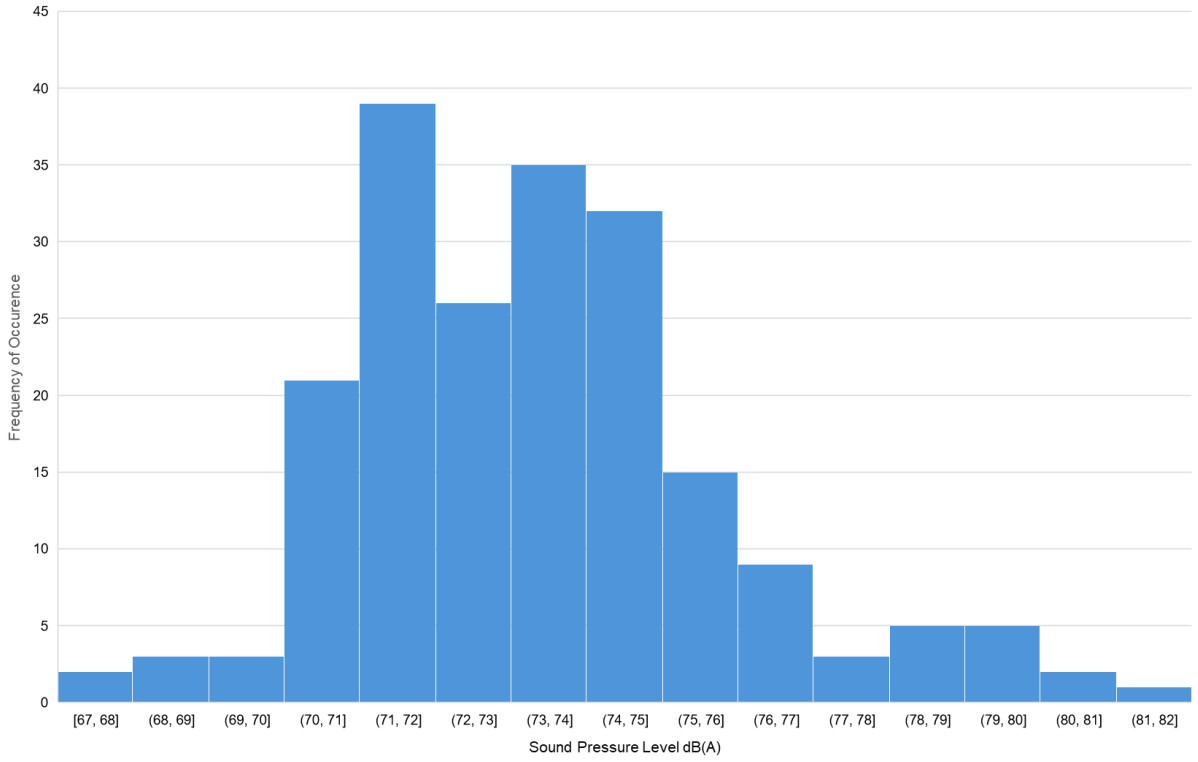


Chart 4: The frequency distribution of LAeq,5min values during night-time.

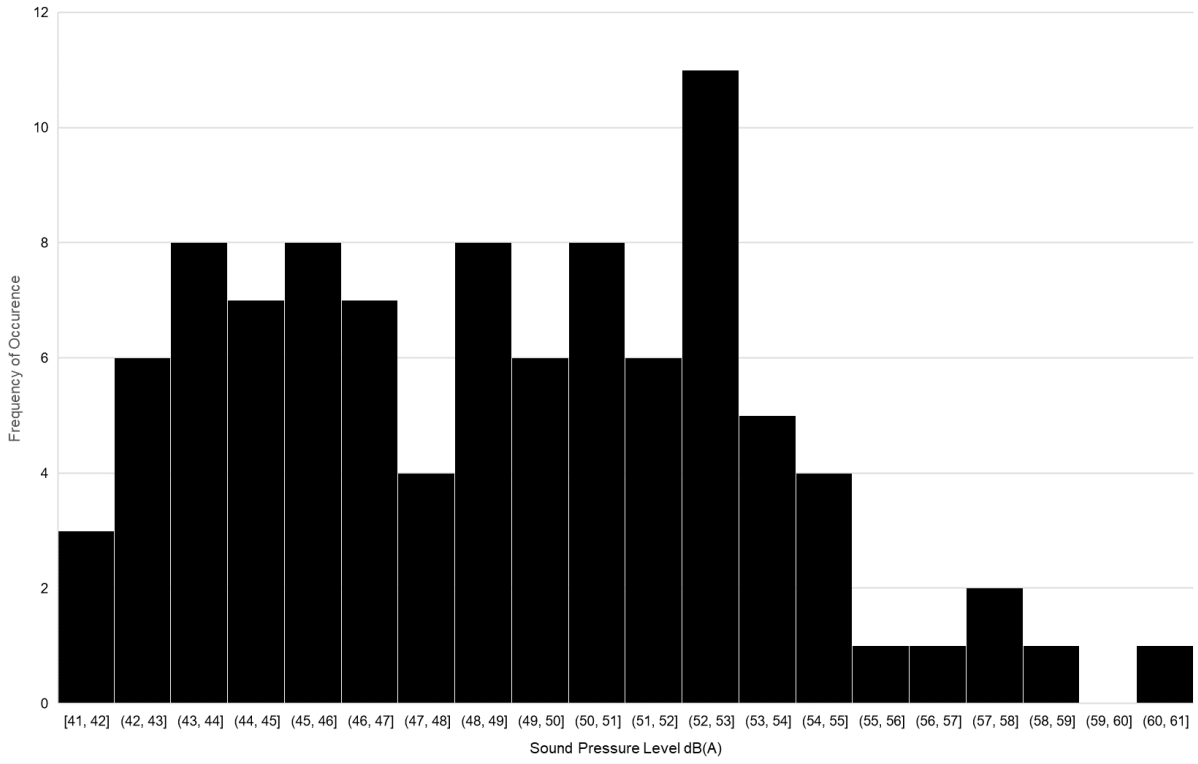
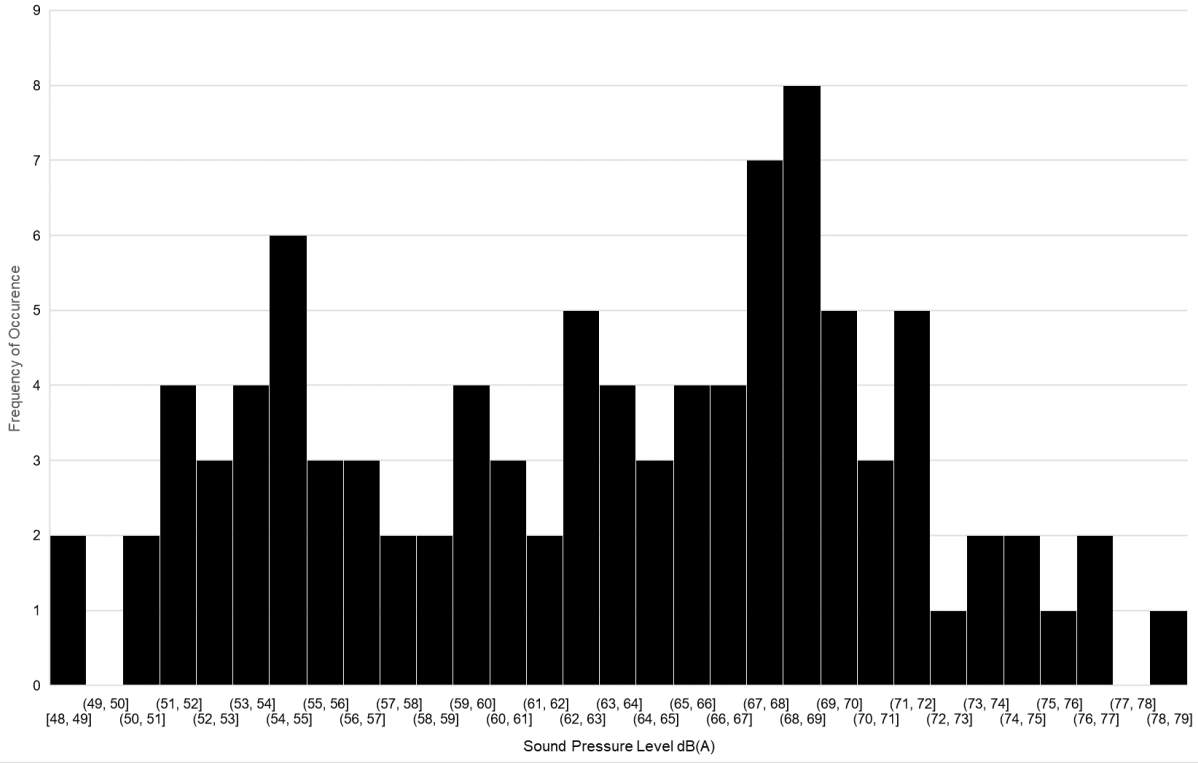


Chart 5: The frequency distribution of LAMax,5min values during night-time.



The results of the short-term daytime baseline noise monitoring survey at NML 2 are outlined in Table 9-12. This indicates that there is no significant existing noise impact from the existing cinema and commercial / retail buildings along the eastern boundary of the site. The noise levels at NML 2a, NML 2b and NML 2c were all dominated by traffic noise on the Dyke Road and Headford Road with occasional car movements in the existing car park area. These locations only required a short term noise survey as they are further removed from the surrounding road network than NML 1, a quieter traffic noise level, and they were used to assess the potential for noise impact from the commercial / retail buildings along the eastern boundary of the site.

No tonal impact was noted in the noise survey data. The existing cinema and commercial / retail buildings do not cause a discernible existing noise impact in proximity to the proposed apartments and outdoor amenity area.

Table 9-12 Results of the short-term daytime baseline noise monitoring survey at NML 2

Location	Time	Duration	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{AFMin} (dB)	L_{AF10} (dB)	L_{AF90} (dB)
NML 2a	09:45	00:30:00	52.7	63.1	40.8	57.3	42.7
NML 2b	10:18	00:30:00	51.3	61.6	42.3	55.8	43.8
NML 2c	10:51	00:30:00	54.4	67.9	40.1	58.6	42.7

9.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

9.5 Potential Impact of the Proposed Development

9.5.1 Construction Phase - Noise

The potential construction noise effects at the nearest residential receptors during the construction phase will include;

- Site clearance works such as demolition, excavations, foundation works and spoil movements associated with the construction of the proposed apartment building, and
- Construction traffic movements associated with excavation and construction works as well as those associated with the delivery of plant, equipment and materials.

The nearest existing residential premises to the construction site boundary is located approximately 130m south-east at the junction of the Headford Road and St. Bridgets Place. Existing road traffic noise dominates the noise climate at this residential location and construction noise is unlikely to be a significant issue at this location due to the significant buffer distance and prevailing daytime noise climate at this location.

The existing commercial/retail properties along the boundary of the proposed development are not considered to be sensitive to construction noise levels during daytime construction activities. The orientation of the existing commercial/retail properties along the boundary of the proposed development also ensures that ‘noise break-in’ from construction noise sources will be prevented.

There is likely to be temporary and intermittent increases in noise levels during the construction phase.

The measured ambient noise level (rounded to the nearest 5 dB) at NML 1 in proximity to the site is in the range of 60 - 65 dB $L_{Aeq,12\ Hour}$ during daytime. Therefore, all noise sensitive receptors fall into Category A of the 'ABC' assessment methodology. Hence, daytime construction noise will be subject to a limit of 65 dB $L_{Aeq,12\ Hour}$. No night-time or evening construction works is expected to take place.

The construction programme will create typical construction activity related noise on the site. During the construction phase, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, concrete batching plant, compressors and generators.

The main sources of noise due to construction of the proposed development will be from activities such as truck movements of excavated and construction materials as well as building, concreting, steel works, crane and excavator/loader noise sources. During the construction phase, the proposed development will generate HGV movements. The construction of the Proposed Development will include associated construction site traffic, comprising of contractors' vehicles and cars. The noise impact of construction activities and passing HGVs will be short-term at receiver locations in the area.

Construction noise can be assessed in terms of the equivalent continuous sound level and/or in terms of the maximum level. The level of sound that arises from a construction site depends on a number of factors and the estimation procedures need to take into account the following significant factors.

- the sound power outputs of processes and plant;
- the periods of operation of processes and plant;
- the distances from sources to receptor;
- the presence of screening by barriers;
- the reflection of sound;
- ground attenuation
- meteorological conditions (particularly wind speed and direction), and
- atmospheric absorption

Typical noise levels from construction works likely to take place during construction phase of the Proposed Development are outlined in Table 9-13.

Table 9-13 Typical Noise Levels from Construction Works likely to take place during the construction phase of Proposed Development (Ref: BS 5228, Update of Noise Database for the Prediction of Noise on Construction and Open sites).

Activity	Plant	$L_{Aeq,1\ Hr}$ at 10m	$L_{Aeq,1\ Hr}$ at 20m	$L_{Aeq,1\ Hr}$ at 40m	$L_{Aeq,1\ Hr}$ at 80m	$L_{Aeq,1\ Hr}$ at 160m
Site Preparation; clearance and excavation	Dump Truck (drive by) (C4.2)	70 dB	67 dB	64 dB	61 dB	55 dB
	Wheeled Loader Lorry (D3.1)	67 dB	61 dB	56 dB	48 dB	42 dB
	Tracked Excavator (C2.22)	64 dB	58 dB	52 dB	46 dB	40 dB
Foundations	Tracked Excavator (C3.24)	74 dB	68 dB	62 dB	56 dB	50 dB
	Concrete Pump (C3.25)	78 dB	72 dB	66 dB	60 dB	54 dB

Activity	Plant	$L_{Aeq,1\ Hr}$ at 10m	$L_{Aeq,1\ Hr}$ at 20m	$L_{Aeq,1\ Hr}$ at 40m	$L_{Aeq,1\ Hr}$ at 80m	$L_{Aeq,1\ Hr}$ at 160m
	Poker Vibrator (C4.33)	78 dB	72 dB	66 dB	60 dB	54 dB
	Compressor (D7.6)	77 dB	71 dB	65 dB	59 dB	53 dB
Infilling / Levelling	Dump truck	82 dB	76 dB	68 dB	62 dB	56 dB
	Wheeled excavator/ Loader	76 dB	70 dB	64 dB	58 dB	52 dB
General Construction	Tower Crane (C4.48)	76 dB	70 dB	64 dB	58 dB	52 dB
	Internal fit – out	~70 dB	~64 dB	~58 dB	~52 dB	~46 dB
Road works / landscaping	Surfacing/rolling	76 - 86 dB	70 - 80 dB	64 - 74 dB	58 - 68 dB	52 - 62 dB

Worst-case construction noise levels at noise sensitive receptors in the area of the Proposed Development have been predicted as outlined in Table 9-13. The predicted noise levels indicative and are intended to demonstrate that it will be possible to comply with current best practice guidance and suggested construction noise limits. The predicted worst-case noise levels are expected to occur for only short periods of time. Once consideration is given to the mitigation measures discussed in Section 9.7, construction noise levels will be lower than these levels for the majority of the time at the majority of properties in the vicinity of the Proposed Development.

The closest residential noise sensitive receptors at the junction of the Headford Road and St. Bridgets Place are approximately 130m from the nearest main construction areas on the development site. The nearby commercial premises back on to the site, but there are no sensitive receivers to the construction noise sources along this façade.

Table 9 13 Typical Noise Levels from Construction Works likely to take place during the construction phase of Proposed Development indicates a worst case assessment of construction noise at varying distances from the Proposed Development and indicates that there will be no exceedance of the daytime construction noise limit of 65 dB $L_{Aeq,T}$ at the noise sensitive receptors in the area. It will be incumbent on the contractor to ensure that construction works are undertaken with particular sensitivity to ensure no significant construction noise impact. As stated, all construction works will take place during daytime hours and so the relative construction noise impact will not be significant.

9.5.2 Construction Phase - Vibration

During site preparation, ground breaking and foundation works in the excavation phase, there is also potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be significantly below the vibration criteria for building damage based on experience from other similar sites. Any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Tables 9-2 and 9-3 during all activities. Mitigation and management of these works are discussed in Section 9.6.1.

9.5.3 Operational Phase - Noise

9.5.3.1 Predicted Change in Road Network Traffic Noise Levels

The traffic flows on the surrounding road network and car park area will continue to dominate the noise climate in the area of the Proposed Development and the existing residential properties adjacent to the site. The site boundary is approximately 130m from the nearest residential properties at the Headford Road and St. Brigids Place junction.

On the basis of the predicted changes in traffic flows on the Headford Road and Dyke Road outlined in Tables 9-9 and 9-10, the Proposed Development will increase the existing AADT flow near the site by no more than a 2% increase in AADT volumes. It requires a doubling or halving of traffic flows to result in a +/- 3 dB(A) change in noise levels from traffic. As there will be no significant increase in the number of cars on the surrounding road network, entering and exiting the site, there will be a negligible change in traffic noise levels from moving cars and vehicles in comparison to the existing scenario.

The relative traffic noise impact due to the Proposed Development at the existing residential properties adjacent to the site will be <1 dB(A) increase due to the predicted traffic flow increase during the daytime, evening and night-time period.

In terms of the assessment of changes in traffic noise level with the Proposed Development in operation, it can be determined using the IEMA impact scale shown in Table 9-5, that the development will have a 'negligible' long-term traffic noise impact, with the Proposed Development in operation.

9.5.3.2 ProPG: Planning and Noise Assessment

Stage 1 – Initial Site Risk Assessment

Noise Prediction Results:

The results of the 'Building Evaluation' noise prediction model presented in the CadnaA noise prediction model Figures 9-4 and 9-5, indicate the following at the façade of the proposed apartment building;

- the western façade of the proposed apartment building adjacent to the Dyke Road, will experience a worst-case future daytime noise level of 69 dB $L_{Aeq,\ 16\ Hour}$ and night-time noise level of 59 dB $L_{Aeq,\ 8\ Hour}$.
- the southern façade of the proposed apartment building adjacent to the Headford Road, will experience a worst-case future daytime noise level of 62 dB $L_{Aeq,\ 16\ Hour}$ and night-time noise level of 54 dB $L_{Aeq,\ 8\ Hour}$.

In terms of the ProPG guidance, these future predicted noise levels indicate that the western façade of the proposed apartment building adjacent to the Dyke Road is in the 'Medium Risk' category. The southern façade of the proposed apartment building adjacent to the Headford Road is in the 'Low - Medium Risk' category.

The daytime and night-time 'Building Evaluation' noise prediction results are presented in the CadnaA noise prediction model Figures 9-4 and 9-5.

The daytime and night-time 'Building Evaluation' noise prediction results presented in the CadnaA noise prediction model Figures 9-4 and 9-5, show that traffic noise levels on the façade of the proposed apartments that do not directly face on to the Dyke Road and Headford Road, will experience a future daytime noise level of <60 dB $L_{Aeq,\ 16\ Hour}$ and night-time noise

level of <50 dB $L_{Aeq, 8\ Hour}$. Therefore, no specific acoustic glazing design is required on these façades. Standard modern double glazing will suffice on these façade locations.

Stage 2 – Full Assessment / Acoustic Design Statement

Impact on future residents from traffic noise 'break-in';

ProPG recommends that an Acoustic Design Statement (ADS) should provide evidence that ProPG Stage 1 and Stage 2 Elements #1 to #4 have been followed. The Acoustic Design Statement (ADS) should include full details of the Stage 1 Initial Risk Assessment and then systematically address the four key elements of Stage 2. However, the level of detail required should increase with increasing level of risk. The ADS has been prepared and considered all information requirements identified in Figure 9 2 Information to be included in an Acoustic Design Statement (ADS). The ADS outlined below has addressed and confirmed how a significant adverse noise impact has been assessed in terms of future predicted traffic flows and how noise impact has been avoided through noise minimisation and mitigation measures. The four key elements in Stage 2 of the recommended approach are outlined below:

- Stage 2: Element 1 – Good Acoustic Design Process
- Stage 2: Element 2 – Internal Noise Level Guidelines

Outlined below are appropriate noise mitigation measures which can be implemented as part of the detailed design stage of the project to ensure compliance with BS8233: 2014 *Guidance on Sound Insulation and noise reduction for buildings*. As outlined in Section 2, BS 8233: 2014 gives guidance on appropriate internal noise levels within dwellings, flats and rooms in residential use when unoccupied. Therefore, it is proposed that the noise impact on the development from the road traffic noise should be mitigated to achieve 30 dB L_{Aeq} in bedrooms at night and 35 dB L_{Aeq} in habitable rooms during the day, in accordance with the guideline levels advised in BS 8233: 2014.

Window Glazing Design:

In terms of noise 'break-in' due to external noise sources it is the windows and ventilation elements in the building which are the 'weak point'. Noise 'break-in' through the block façade and roof will be minimal and insignificant in comparison. AONA Environmental has outlined below a sample specification for the proposed glazing that will achieve the level of sound attenuation required.

As road traffic noise dominates in proximity to the Proposed Development, it has been determined that the windows will require a suitable Sound Reduction Index (R_W). The Sound Reduction Index (R_W) of the windows required in the façade of the proposed residential development can be determined based on the sound transmission via the windows from outside to inside using the following equation;

$$R_W = L_{OUT} - L_{IN} + 10\log S - 10\log A$$

Where;

R_W = Sound Reduction Index of the façade, e.g. a window. *To be determined based on Target Reverberant Sound Level.*

L_{IN} = Reverberant sound level inside a room arising from the transmission of external

noise through the façade, e.g. a bedroom window.

Target Reverberant Sound Level in accordance with BS8233: 2014;

- *inside a bedroom during night-time = 30 dB L_{Aeq} and*
- *inside a living room area during daytime = 35 dB L_{Aeq}.*

L_{OUT} = Measured sound level at the façade of the proposed development during daytime and night-time (See Note 1).

S = Area of individual windows on the façade.

A = Amount of Sound Absorption in the room calculated using Sabine's Formula.

Note 1: To ensure a worst-case assessment and thorough mitigation design, the external noise level has been assessed as follows;

- At proposed apartments facing Dyke Road - daytime noise level of 69 dB $L_{Aeq, 16\ Hour}$ and night-time noise level of 59 dB $L_{Aeq, 8\ Hour}$.
- At proposed apartments facing Headford Road - daytime noise level of 62 dB $L_{Aeq, 16\ Hour}$ and night-time noise level of 54 dB $L_{Aeq, 8\ Hour}$.

The use of the above equation has allowed for the recommendation of a suitable Sound Reduction Index for the windows, i.e. the acoustic 'weak points', of the proposed apartments facing on to Dyke Road and Headford Road.

The Sound Reduction Index (R_W) is the weighted sound reduction, in decibels, which incorporates a correction for the human ear response. C and C_{tr} are spectrum adjustments, which are values added to R_W to take account of the characteristics of particular sound spectra. C is an adjustment to the R_W scale that could be used for selecting a product to reduce noise from sources such as high speed traffic which tends to include medium to high frequencies. C_{tr} is an adjustment to the R_W scale that could be used for selecting a product to reduce noise from sources such as urban road traffic with a large component of low frequencies. As the noise from the traffic flows in the area dominates the prevailing noise climate in proximity to the Proposed Development, it is recommended that a specific glazing installation is used on this development to ensure appropriate noise insulation is provided.

The Sound Reduction Index calculations reported in Table 9-14 have been undertaken for representative ground floor living space areas and bedrooms within the apartment development facing towards Dyke Road and Headford Road.

The calculations are based on worst-case future traffic noise level predictions and an appropriate glazing specification requirement has been recommended on all windows within the proposed apartment development directly facing on to Dyke Road. Table 9-14 outlines the recommended glazing specification to be installed on the façade of apartments facing directly on to the Dyke Road.

Table 9-14 Calculated minimum sound reduction (R_W) required for windows in the proposed residential apartments facing directly on to Dyke Road and Headford Road to comply with BS 8233: 2014 internal noise levels.

Façade	Period	Ground Floor Apartments - Living Area Spaces	Ground Floor Apartments - Bedrooms
Dyke Road	Daytime	29.8 dB R_w	
	Night-time	-	23.1 dB R_w
Headford Road	Daytime	22.8 dB R_w	
	Night-time	-	18.1 dB R_w

The calculated minimum sound reduction (R_W) values presented in Table 9-14 indicate that the windows in the proposed residential apartments facing directly on to Dyke Road will require a slightly higher than standard double-glazing specification. The apartments facing directly on to Headford Road will require a standard double-glazing specification.

The glazing recommendation in Table 9-15 will ensure a high level of acoustic comfort within the living rooms and bedrooms on the façade of the apartments facing directly on to the Dyke Road.

Table 9-15 Suitable glazing option in the proposed residential apartments facing directly on to Dyke Road (Proposed Double Insulating Glass Unit – 4mm float glass -14mm cavity -6mm float glass or similar)

Glass Type	Acoustic Performance Data				Total Thickness (mm)
	R_W	C	C_{tr}	*Rw (C; Ctr)*	
4 mm – 14 mm – 6 mm	**35**	-1	-5	**30**	24

R_w represents weighted sound reduction index or a value that indicates how much dB is reduced when noise passes through the window. C and C_{tr} are correction factors, namely C for the medium frequency range (e.g. speech) and C_{tr} for the low frequency range (e.g. traffic). The sound reduction value (R_w + C_{tr}) of the window to the road traffic is therefore 30 dB (35-5 dB).

Ventilation Design:

It is generally accepted that a partially tilted open window for ventilation purposes provides approximately 15 dB(A) attenuation from external noise sources with the WHO Guidelines for Community Noise suggesting 15 dB(A). The DEFRA report NANR116: Open/Closed Window Research (2007) suggests it to be between 12 and 18 dB for road and rail traffic. BS 8233: 2014 states that *'if partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB'*.

During the night-time period a sound pressure level of up to 59 dB $L_{Aeq,\ 8\ Hour}$ has been predicted on the façade of the apartments facing Dyke Road and a sound pressure level of up to 54 dB $L_{Aeq,\ 8\ Hour}$ has been predicted on the façade of the apartments facing Headford Road [See night-time 'Building Evaluation' noise prediction results in Figure 9-5]

Therefore, a partially open window cannot be relied upon for ventilation purposes and acoustically attenuated ventilation will be required on the façade facing directly onto Dyke Road and Headford Road.

BS8233: 2014 states that '*The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound*

attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice. Alternatively, acoustic ventilation units are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans'.

The selected ventilation system should be fitted in the bedrooms on the facades of the Proposed Development with a view directly towards Dyke Road and Headford Road. The selected ventilation system will need to provide a level of noise attenuation similar to that achieved by the windows, i.e. 30 dB R_W. Due to levels of the road traffic noise, it is recommended that a passive ventilation system such as the Renson Invisivent® EVO AK High (*or of the same standard from another supplier*) is used on the façades of the development facing directly towards Dyke Road and Headford Road to ensure appropriate sound insulation is provided.

Table 9-16 Suitable Ventilation system option (Renson Invisivent® EVO AK High ventilation system or similar).

Sound reduction $D_{n,e,w}$ (C;C_{tr})	**Invisivent® *EVO* AK High**
Sound reduction $D_{n,e,w}$ (C;Ctr) – In Open Position	39 (0;-1) dB
Sound reduction $D_{n,e,w}$ (C;Ctr) – In Closed Position	62 (-2;-6) dB

Note Re: outlined Glazing & Ventilation designs for residential spaces;

- *This recommendation is based on a requirement to exhibit for planning application purposes that a suitable internal living environment can be provided within the development.*
- *It is the developer's prerogative to investigate design options and suppliers, in accordance with the suggested level of sound attenuation required.*
- *The frames of the overall window fittings must be selected so that they at least match the performance of the glazing to be fitted within the frames, i.e. the combined performance must comply with the requirements in the Table above.*
- *During the detailed design stage of the building the window and ventilation supplier must ensure that the window (glazing and frames) and ventilation system complies with the required sound reduction performance.*

Stage 2: Element #3 - undertaking an "External Amenity Area Noise Assessment".

External amenity space will be provided within the Proposed Development.

These external amenity spaces will take the form of ~8 - 10m^2 external balconies on some of the apartments which will have a direct view of Dyke Road and Headford Road.

Also, open space (approx. 2,308 sqm) is proposed in the form of (a) public open space (approx. 1,000 sqm) to the west of the proposed building fronting on to Dyke Road accommodating outdoor seating, planting, a sunken garden and pedestrian pathways and connections; and (b) communal open space (approx. 1,308 sqm) to the east of the proposed building in the form of a courtyard including outdoor seating, planting, a children's play area and outdoor sports equipment.

The building orientation will reduce noise levels in the ground level external communal areas. CadnaA noise prediction model Figure 9-4 indicates that the external daytime noise level in the public open space to the east of the proposed building fronting on to Dyke Road will be 47 dB $L_{Aeq,\ 1\ Hour}$.

BS8233:2014 states that external amenity area noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$ but that these guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, the development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.

Therefore, on the external balcony amenity spaces provided within the layout on the proposed façade of the development facing Dyke Road and Headford Road, traffic noise will be mitigated by the presence of the proposed solid glass balustrade with no gaps which will shield residents using the amenity spaces from surrounding traffic noise sources and provide approximately 10 dB(A) of noise attenuation to the receiver when sitting in such an external balcony amenity spaces. The recommended WHO external amenity space noise level of 50-55 dB(A) as outlined in BS8233: 2014 during amenity hours will be achieved in the balcony space on the proposed façade of the development facing Dyke Road and Headford Road.

Stage 2: Element #4 - Assessment of "Other Relevant Issues"

The occupants of the residential development will not be a significant source of noise in terms of the existing noise climate in the area. It is not envisaged that there will be any impact due to noise break-out from the proposed residential spaces of the development. No other relevant noise issue is foreseen.

Mechanical Plant and Services

The Proposed Development includes a variety of electrical and mechanical plant to service the development, which will be housed both internally and on the roof of the building. Most of this plant will be capable of generating some level of noise and some of this plant may operate 24 hours a day, and hence may be most noticeable during quieter periods, such as at night-time. Noisy plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest impact. Plant contained within plantrooms has the least potential for impact once consideration is given to appropriate design of the space and suitable noise attenuation.

BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound is the standard used to set operational noise limits relating to plant and equipment in terms of attenuating potential impact at noise sensitive receivers. The methodology in BS 4142 uses the existing outdoor sound levels to assess the likely effects of sound on noise sensitive receivers who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The building services plant items required to serve the Proposed Development will be designed and suitably located so that there is no negative impact on sensitive receivers within the development itself or on nearby sensitive receptors. The cumulative operational noise level from building services plant at the nearest noise sensitive locations external to the development will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods provided in Table 9-17. The criteria have been selected so that the noise from items of plant does not exceed the measured background noise levels during the daytime and night-time. As per the guidance outlined in BS4142 "this is an indication of the specific sound source having a low impact".

Table 9-17 Proposed Noise Limit Criteria for Plant Noise - maximum Rated noise level L_r externally at receiver location.

Day, dB $L_{Aeq,1\ hour}$	Night, dB $L_{Aeq,15\ min}$
42 dB(A) L_r Note 1	35 dB(A) L_r Note 2

Note 1: Based on daytime background L_{A90} noise level recorded at NML 2 – See Table 9-12.

Note 2: Based on a night-time plant and equipment noise level at external receiver location, that will not cause a noise impact on future residents during night-time.

9.5.4 Potential Cumulative Impacts

1. Baseline Scenario.

The ambient noise levels in the surrounding area will continue to be dominated by road traffic on Dyke Road and Headford Road as well as from occasional car movements on the existing adjacent car park area primarily during daytime. Therefore, the ambient noise levels will remain unchanged to that presented in Section 9.3 Existing Environment (Baseline Situation).

2. Assessment Scenario 1 (the Proposed Development).

The future predicted traffic flows on Dyke Road and Headford Road due to the Proposed Development in future years, 2028 and 2043, include for the cumulative impact of other proposed developments in the area. Due to the relatively small additional traffic volume predicted to be generated due to the Proposed Development, including other proposed developments in the area (using the list compiled by Enviroguide and outlined further below), there will be a negligible change in future operational traffic noise levels as predicted. Therefore, the cumulative operational noise impact of any permitted developments and the Proposed Development are predicted to cause an insignificant noise impact during the operational phase in the short term and long term.

Potentially, the most significant cumulative impact may occur if the construction phase of various proposed projects overlap with other developments in the area. However, should the construction phase of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction noise and vibration mitigations are put in place during construction, construction noise and vibration impacts will not be significant.

In relation to the in-combination construction and/or operational impact of the Proposed Development, with existing and approved developments in the area, the list of existing and approved developments supplied by Enviroguide has been reviewed.

A list of projects within 500m from the Proposed Development were considered:

ABP- 314597-22 Galway City Council, at University Road to Dublin Road, Galway City: The development proposal includes for the BusConnects Galway Cross-City Link Scheme, located 0.2km to the south of the Proposed Development. The aim of the Proposed Scheme is to provide improved walking, cycling and bus infrastructure on this key access corridor in Galway City.

The Construction Phase of the Proposed Scheme will involve predominately utility diversions, road widening works, road excavation works (where required), road and junction reconfiguration and resurfacing works, public realm improvements including landscaping, pavement works including bus lanes, cycle tracks, bus terminals, and movement of machinery and materials along the Proposed Scheme. If the construction period of this Proposed Scheme is to overlap with the Proposed Development, there is a potential to generate a construction

noise impact in the area. As with the Proposed Development, this Proposed Scheme will be required to make suitable provision for construction noise and vibration mitigation measures in accordance with its own planning conditions.

GCC planning ref. 20184 (Amended by ref. 22259) Cleverson Ltd, at Headford Road, Townparks, Galway, located directly adjacent of the Proposed Development. Permission was granted 12/07/2021 for the demolition of an ESB enclosure and construction of a seven/eight storey development comprising 4 retail units, a gymnasium and student accommodation 7 storeys in height (272 beds). Construction has not commenced on this project. If the construction period of this project is to overlap with the Proposed Development, there is a potential to construction noise impact in the area. As with the Proposed Development, this Proposed Scheme will be required to make suitable provision for construction noise and vibration mitigation measures in accordance with its own planning conditions. If this project is constructed it will have the effect of reducing Headford Road traffic noise at the Proposed Development by acting as a massive 'noise barrier' between Headford Road and the Proposed Development, thereby further reducing traffic noise impact at the Proposed Development.

GCC planning ref. 1847 (amended by ref. 20235) K. King Construction Claregalway Ltd, at 33-35 Saint Brendan's Avenue, Woodquay, Galway, 0.3km south of the Proposed Development. Permission was granted 14/12/2020 for the construction of 27 no. duplex / apartments including 3 to 6 storey apartment block and all associated site development works and services. It is uncertain if construction on this development has started. This development will not result in a significant construction and / or operational cumulative noise impact because it is too remote from the proposed development site.

GC planning ref. 19107 Irish Water at Dyke Road, Terryland, Galway, 0.5km northwest of the Proposed Development. Permission was granted 24/02/2020 for the development which comprises of a new raw water intake works located on the east bank of the River Corrib, 100m downstream of Quincentenary Bridge to supply the Terryland Water Treatment Plant. Work has been completed on this project, therefore there is no additional cumulative impact from construction. This development will not result in a significant construction and / or operational cumulative noise impact because it is too remote from the proposed development site.

Galway City Council with Failte Ireland, project at Woodquay Park, Terryland, Galway, 0.3km southwest of the Proposed Development. Planning permission will be requested for Woodquay Park Landscape Upgrade: Included in the plans is the creation of accessible, public, green space, with biodiversity-friendly planting, age and mobility-friendly pathways, sheltered seating niches and spaces for play and for rest. The project will also involve traffic calming upgrades and improved pedestrian facilities to the surrounding streets. Planning permission is intended for lodging in 2024 with construction works anticipated to commence in early 2025 subject to grant of permission. This development will not result in a significant construction and / or operational cumulative noise impact because it is too remote from the proposed development site.

Galway City Council, project across the River Corrib, adjacent to Dyke Road, 0.2km southwest of the Proposed Development. Planning permission will be requested for the construction of a pedestrian and cycle bridge which will span the River Corrib connecting the University of Galway (UG) campus to the City Centre via Riverside and Woodquay. This development will not result in a significant construction and / or operational cumulative noise impact because it is too remote from the proposed development site to cause a significant cumulative noise

impact.

3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

Similar to Assessment scenario 1, it is anticipated that the most significant cumulative impact is the potential for the construction phase to overlap with other developments in the area. Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction noise and vibration mitigations are put in place during construction, construction noise and vibration impacts will not be significant.

4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes.

Similar to Assessment scenario 1, it is anticipated that the most significant cumulative impact is the potential for the construction phase to overlap with other developments in the area. Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction noise and vibration mitigations are put in place during construction, construction noise and vibration impacts will not be significant. This development will not result in a significant construction and / or operational cumulative noise impact because it is too remote from the proposed development site to cause a significant cumulative noise impact.

Future projects of a large scale would need to conduct an EIAR to ensure that no significant construction and/or operational noise and vibration impacts will occur as a result of those developments.

9.5.5 Summary of effects

Table 9-38 Summary of Likely Significant Effects (Ref. EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, (EPA, May 2022)).

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase - Noise								
Site Clearance	~130m to SE at junction of Headford Road and St. Brigids Place Commercial/retail properties along the northern and eastern site boundary.	<65dB(A) $L_{eq, 12\ Hr}$	Negative	Slight	Short-term	Direct	Standard Construction Phase Mitigation Measures to be implemented in accordance with CEMP	Insignificant effect
Foundations		<65dB(A) $L_{eq, 12\ Hr}$	Negative	Slight	Short-term	Direct		Insignificant effect
Building Construction		<65dB(A) $L_{eq, 12\ Hr}$	Negative	Slight	Short-term	Direct		Insignificant effect
Construction Traffic		<65dB(A) $L_{eq, 12\ Hr}$	Negative	Slight	Short-term	Direct		Insignificant effect
Construction Phase - Vibration								
Site Clearance	~130m to SE at junction of Headford Road and St. Brigids Place. Commercial/retail properties along the northern and eastern site boundary.	Less than perceptible	Negative	Not Significant	Short-term	Direct	Standard Construction Phase Mitigation Measures to be implemented in accordance with CEMP	Insignificant effect
Foundations		Less than perceptible	Negative	Not Significant	Short-term	Direct		Insignificant effect
Building Construction		Less than perceptible	Negative	Not Significant	Short-term	Direct		Insignificant effect
Construction Traffic		Less than perceptible	Negative	Not Significant	Short-term	Direct		Insignificant effect
Operational Phase								
Inward Noise Impact	Future residents of Proposed Development.	Predicted façade and outdoor area noise levels due to traffic on road network.	Negative	Not Significant	Long-term	Residual	Glazing and Ventilation Mitigation as appropriate to	Insignificant effect

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
							each façade	
Outward Noise Impact	Future residents of Proposed Development. Residents ~130m to SE at junction of Headford Road and St. Brigids Place	Plant noise limits in accordance with BS4142	Neutral	Not Significant	Long-term	Residual	Plant designed and located in accordance with BS4142	Insignificant effect
Operational Traffic		Less than perceptible change	Negative	Not Significant	Long-term	Residual	N/A	Insignificant effect

9.5.6 "Do Nothing" Impact

In the absence of the Proposed Development being constructed, the noise environment at the nearest noise sensitive locations and across the development site itself will remain unchanged. The noise levels measured during the baseline noise survey are representative of the Do Nothing scenario. The Do-Nothing scenario is therefore considered a 'neutral impact'.

9.6 Avoidance, Remedial and Mitigation Measures

9.6.1 Construction Phase

To avoid significant construction noise impacts during the construction phase, the following mitigation measures will be adopted.

- To protect residential amenity, construction hours during site construction operations will be restricted to daytime hours as outlined;
  - 0700 hours – 1900 hours - Monday – Friday
  - 0800 hours – 1300 hours - Saturdays
- An on-site speed limit will be enforced for all traffic.
- The use of quiet working methods will be selected and the most suitable plant will be selected for each activity, having due regard to the need for noise control.
- Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228. Operators will use "noise reduced" plant and/or will modify their construction methods so that noisy plant is unnecessary.
- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use.
- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness.
- If required, compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers.
- In all cases, engine and/or machinery covers should be closed whenever the machines or engines are in use.
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable all mechanical static plant will be enclosed by acoustic sheds or screens.
- Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
- The proper use and maintenance of tools and equipment
- The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receptors
- Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment
- The use and maintenance of sound reduction equipment fitted to power pressure tools and machines
- It is recommended that should complaints be received from nearby residential properties periodic noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receptors. Based on the findings of

such noise monitoring, appropriate noise mitigation measures will be implemented to reduce noise impacts. Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary screening of the nearest receptor to on-site activities.

- Responsible Person - It is recommended that the Contractor will appoint a responsible and trained person who will be present on site and who will be willing to answer and act upon complaints and queries from the local public.
- To protect residential amenity, the cumulative noise level from construction activities on the development site (including plant and equipment) shall not exceed 65dB $L_{Aeq,\ 12\ hour}$ at residential properties closest to the site boundary.

The applicant will adhere to the following typical conditions often attached to such a planning permission, if granted.

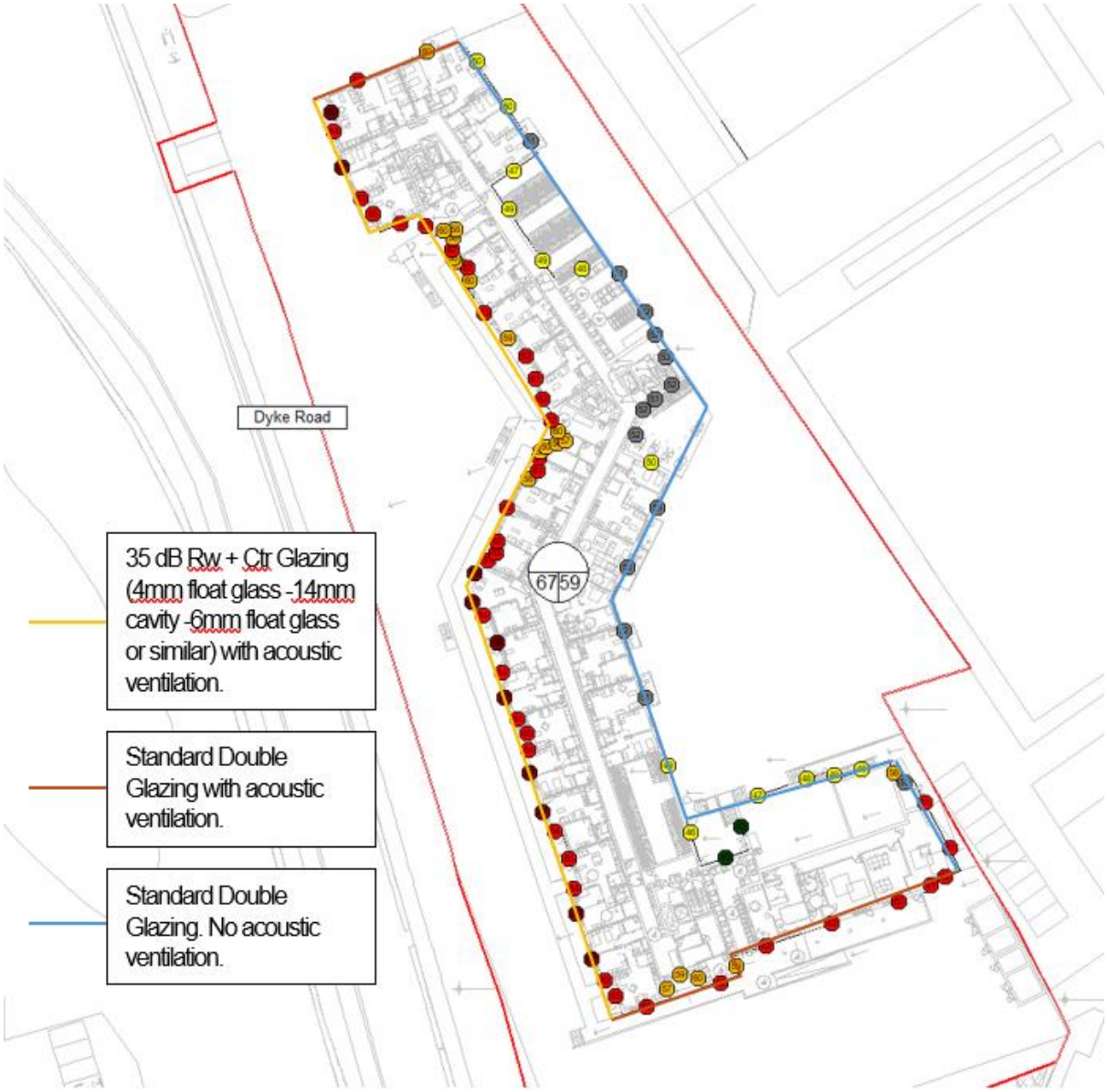
- Construction, demolition, engineering works and works should be carried out using the best practicable means available so as to minimize the impact of noise generated by such activities on the nearest noise sensitive dwellings.
- Where such activities are to be carried out, consideration should be given to control measures by way of noise generating activities, which are audible at the nearest noise sensitive dwellings.
- Noise from construction activities shall not exceed 65 dB $L_{Aeq,\ 12\ hour}$ between 07.00 hours and 19.00 hours on Monday to Fridays, or 65 dB $L_{Aeq,\ 5\ hour}$ between 08.00 hours and 13.00 on Saturdays, when measured at any point 1 metre from any façade of any residential accommodation, and
- b. not exceed 55 dB $L_{Aeq,\ 1hr}$ between 19.00 hours and 22.00 hours on Monday to Fridays, or 13.00 hours to 22.00 hours on Saturdays when measured at any point 1 metre from any façade of any residential accommodation, and
- c. not be audible between 22.00 hours and 07.00 hours on Monday to Fridays, before 08.00 hours or after 22:00 hours on Saturdays, or at any time on Sundays, at the boundary of any residential accommodation. (As a guide the total level (ambient plus construction) shall not exceed the pre-construction ambient level by more than 1 dB(A). This will not allow substantial noise producing construction activities, but other “quiet” activities may be possible). Routine construction and demolition work which is likely to produce noise sufficient to cause annoyance will not normally be permitted between 22.00 hours and 07.00 hours.”

9.6.2 Operational Phase

Operational Phase – Inward Noise

ProPG recommends that an Acoustic Design Statement (ADS) should provide evidence that ProPG Stage 1 and Stage 2 Elements #1 to #4 have been followed. The Acoustic Design Statement (ADS) has included full details of the Stage 1 Initial Risk Assessment and then systematically addressed the four key elements of Stage 2. The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. The acoustic attenuation requirements at each façade of the proposed apartment building are outlined in Figure 9-6.

Figure 9-6 Acoustic attenuation glazing and ventilation requirements at each façade of the proposed apartment building.



Operational Phase – Mechanical and Electrical Plant

As part of the detailed design of the development, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties, including those within the development itself.

Therefore, by following the ProPG approach, this allows the noise practitioner (author of this noise impact assessment) to recommend to the decision maker that *"Planning consent may be granted subject to the inclusion of suitable noise conditions".*

9.6.3 "Worst Case" Scenario

A worst-case scenario has been assessed in terms of potential construction and operational noise impacts. The noise mitigation measures outlined above are based on a worst-case

assessment in terms of potential construction and operational noise impacts.

9.7 Residual Impacts

The degree of environmental change in terms of noise and vibration that will occur after the proposed mitigation measures have taken effect will be insignificant on the future residents of the proposed development and the existing residential receivers located approximately 130m to southeast at junction of Headford Road and St. Brigid's Place.

9.8 Monitoring

9.8.1 Construction Phase

It is unlikely that the proposed construction processes will cause significant noise and vibration impact. However, if likely or possible to occur, the contractor should undertake noise and vibration monitoring at the site boundary to ensure that the suggested limits in accordance with BS5228, Annex E are not exceeded.

The measured ambient noise level (rounded to the nearest 5 dB) in proximity to the development site is in the range of 60 - 65 dB $L_{Aeq,12\ Hour}$ during daytime. Therefore, all noise sensitive receptors fall into Category A of the 'ABC' assessment methodology. Hence, daytime construction noise will be subject to a limit of 65 dB $L_{Aeq,12\ Hour}$.

9.8.2 Operational Phase

No operational noise monitoring is required.

9.9 Interactions

In compiling this impact assessment, reference has been made to the project description provided by the EIAR co-ordinator, project drawings provided by the project architects and traffic flow projections associated with the development provided by the traffic consultants.

The most significant interaction is between human beings (future residents) and predicted noise levels at the Proposed Development. The mitigation measures that will be put in place at the Proposed Development will ensure that the future residents will experience noise levels that are in accordance with recommended guidelines in terms of internal living space and external amenity space noise levels.

9.10 Difficulties Encountered When Compiling

There were no difficulties encountered when compiling this assessment.

9.11 References

British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise.

British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 2: Vibration.

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

British Standard BS8233: 2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014)

IEMA Guidelines for Noise Impact Assessment (2014)

ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise, Part 1: Basic quantities and assessment procedures.

ProPG: Planning & Noise. Professional Practice Guidance on Planning & Noise. New Residential Development (May 2017)

British Standard BS 4142: 2014+A1:2019: Methods for Rating and Assessing Industrial and Commercial Sound.

Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988.

ISO 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors (2024)

EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, (EPA, May 2022).

10 AIR QUALITY

10.1 Introduction

This chapter presents the air quality assessment of the Proposed Development.

In terms of potential air quality impacts, the Proposed Development has the potential to give rise to construction dust impact during the construction stage. During the operation of the Proposed Development, there is the potential for air quality impact due to associated road traffic movements and space heating emissions.

10.1.1 Quality Assurance and Competency of Experts

This Air Quality Impact Assessment has been prepared by Olivia Maguire, a senior consultant with AONA Environmental Consulting Ltd. Olivia's areas of professional expertise are in air quality and odour impact assessment and mitigation design as well as Health and Safety consultancy. Olivia is a Member of Institute of Environmental Management and Assessment (IEMA) and a Member of Occupational Hygiene Society of Ireland with a B.Sc. Occupational Safety and Health, M.Sc. Environmental Science, B.Sc. (Hons) Geography, and is a qualified ISO 14001: Lead Environmental Auditor. Olivia has in excess of 20 years of professional expertise in environmental consultancy.

This Air Quality Impact Assessment has been reviewed by Mervyn Keegan of AONA Environmental Consulting Ltd. Mervyn Keegan is a director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in noise control and acoustics and air quality and odour consultancy, including impact assessment and mitigation design. Mervyn Keegan has in excess of 25 years of environmental consultancy experience. Mervyn is a member of the Institute of Acoustics, a member of the Institute of Environmental Sciences and a member of the Institute of Air Quality Management with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control. AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of fifty noise and vibration and air quality and Climate impact assessments annually for infrastructure, transport, industry, commercial and quarry developments in the Republic of Ireland, Northern Ireland and the UK in the last 20 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practice in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings.

10.2 Study Methodology

An overview of the methodological approach undertaken for this air quality assessment is outlined below:

- A review of available published ambient air monitoring data relevant to the wider area in proximity to the Proposed Development has been undertaken, which includes reference to the EPA monitoring station on Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10} and $PM_{2.5}$) background concentrations from the EPA Air Quality monitoring station on the Eyre Square, Galway (Station 105, 53.2740°N, -9.0485°E),

located approximately 600m south-south-west of the Proposed Development site. Automatic, provisional results are available here for Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10} and $PM_{2.5}$)

- A review of the most applicable standards and guidelines has been reviewed in order to define the air quality significance criteria for the Construction and Operational Phases of the Proposed Development;
- An assessment of the likely Construction Phase air quality impacts has been undertaken at the nearest sensitive locations to the proposed construction work areas associated with the Proposed Development.
- An assessment of the likely Operation Phase air quality impacts associated with any altered traffic flows due to the Proposed Development for the future residents of the Proposed Development and at the most sensitive nearest locations; and
- A recommendation of appropriate mitigation measures has been outlined where required, to reduce Construction Phase and / or Operation Phase air quality impacts, where any identified potential air quality impacts associated with the Proposed Development.

10.2.1 Study Area

The study area, within which the AQA is undertaken, includes all areas where a significant change in pollutant concentration at sensitive receptors may occur due to a significant change in traffic flow, composition and/or road alignments associated with the Proposed Development. The study area for the air quality impact assessment includes all sensitive receptors within a distance either side of the Proposed Development up to a maximum distance of 250m during the Construction Phase, and 200m during the Operational Phase, in accordance with relevant Transport Infrastructure Ireland (TII) and Institute of Air Quality Management (IAQM 2024) guidance as detailed below.

In terms of sensitive receptors, according to the IAQM, highly sensitive air quality receptors include residential properties, hospitals, schools and residential care homes, whilst commercial and workplace properties are generally viewed as being of medium sensitivity (IAQM 2024). According to TII, sensitive receptor locations include residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present (TII 2022). According to TII, designated ecologically sensitive areas of conservation (either Irish or European designation) are also considered sensitive air quality receptors (TII, 2022).

For the Construction Phase, the air quality impact assessment focuses on air quality sensitive receptors adjacent to the areas of proposed works, e.g. demolition, excavation, construction and haul road activities. For the Construction Phase, the extent of the overall study area is typically up to a maximum of 250m from a specific area of construction work, as per the relevant IAQM Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024).

Also as per the IAQM Guidance (Box 1, IAQM, 2024) the potential for construction phase dust impacts have been focussed on receptors sensitive to ecological effects within a study area of 50m from the Proposed Development boundary and/or 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance. Receptors sensitive to ecological effects can be high, medium or low. High sensitivity receptor can be locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particular dust sensitive species such as vascular species included in the Red Data List For Great Britain. Medium sensitivity receptor can be locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition. Low sensitivity receptor can be locations with a local designation where the features may be affected by dust deposition.

For the Operation Phase traffic assessment, the air quality assessment focuses on the change in distribution of road vehicles and the likely effects of these changes on local air quality which is predicted to occur in the study area due to altered traffic flows on account of the operation of the Proposed Development. Potential impacts to air quality relate to alterations to traffic patterns, with particular attention focused on areas where the Proposed Development will result in increased traffic flows in proximity to sensitive air quality receptors. For the Operation Phase traffic assessment, the focus is on air quality receptors within an overall study area of 200m from the Proposed Development, as per TII Guidance Air Quality Assessment of Specified Infrastructure Projects - Overarching Technical Document (TII PE-ENV-01106, Dec 2022) and Air Quality Assessment of Proposed National Roads - Standard (TII PE-ENV-01107, Dec 2022).

10.2.2 Relevant Legislation, Policy and Guidelines

10.2.2.1 Legislation

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). The Directive (2004/107/EC) was transposed into Irish legislation by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

The EU air quality standards and objectives set out in the ambient air quality directives 2004/107/EC and 2008/50/EC https://environment.ec.europa.eu/topics/air/air-quality_en - lawhave been revised in the Directive 2024/2881 of the European Parliament and of the Council of 23rd October 2024 on ambient air quality and cleaner air for Europe (recast).

The revised Ambient Air Quality Directive which entered into force on 10th December 2024, tightens restrictions on a number of key air pollutants which have been demonstrated to be harmful to human health. Directive 2024/2881 brings the limit on harmful pollutants closer to those recommended by the World Health Organization (2021).

This directive has to be implemented in national regulation on 11th December 2026, at the latest and member states must meet the new air quality standards by 2030.

The Commission will adopt secondary legislation (implementing acts) to complement the new rules and assist with their application. In the interim period, before 2030, the 2008 limit and target values will continue to apply and member States are permitted to introduce more stringent requirements.

The revised ambient air quality directive updates air quality standards, lowering the allowable levels for twelve air pollutants: particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2) and nitrogen oxides (NOx), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide, benzene, benzo(a)pyrene, arsenic, cadmium, nickel, and lead. The new Directive cuts the allowed annual limit value for the main air pollutant – fine particulate matter ($PM_{2.5}$) by more than half. **Error! Reference source not found.** sets out the relevant limit values specified by the Air Quality Regulations (Source: Annex 1 Section 1 of Directive 2024/2881 and the WHO 2021 Air Quality Guidelines).

Error! Reference source not found. includes the World Health Organisation Air Quality Guidelines which are evidence-based recommendations of limit values for specific air pollutants developed to help countries achieve air quality that protects public health. The first release of the guidelines was in 1987. Since then, several updated versions have appeared and the latest version was published in 2021. WHO updates the Air Quality Guidelines on a regular basis so as to assure their continued relevance and to support a broad range of policy options for air-quality management in various parts of the world, especially taking into account the breadth of new health studies that have been published in the meanwhile. The 2021 update of the WHO air quality guidelines is in response to the real and continued threat of air pollution to public health.

The Environmental Protection Agency (EPA) is the competent authority for the purpose of Directive 2008/50/EC and these Regulations. These Regulations also provide for the dissemination of public information, including information on any exceedances of the target values, the reasons for the exceedances, the area(s) in which they occurred and appropriate information regarding effects on health and impact on the environment.

Table 10-1: National, EU & WHO Air Quality Limit Values for the Protection of Human Health

Pollutant	Averaging Period	Air Quality Limit Values (µg/m^3)		
		Current EU 2008 Limit Values (µg/m^3)	EU 2024 Limit Values (µg/m^3) (Limit values for the protection of human health to be attained by 1st January 2030)	WHO 2021 Air Quality Guidelines (µg/m^3)
Nitrogen Dioxide (NO_2)	Annual Mean	40 µg/m^3	20 µg/m^3	10 µg/m^3
	Daily Mean	-	50 µg/m^3 (not to be exceeded >18 times per calendar year)	-
	One Hour	200 µg/m^3 (not to be exceeded >18 times per calendar year)	200 µg/m^3 (not to be exceeded >3 times per calendar year)	-
Particulate	Annual Mean	40 µg/m^3	20 µg/m^3	5 µg/m^3

Pollutant	Averaging Period	Air Quality Limit Values (µg/m³)		
		Current EU 2008 Limit Values (µg/m³)	EU 2024 Limit Values (µg/m³) (Limit values for the protection of human health to be attained by 1st January 2030)	WHO 2021 Air Quality Guidelines (µg/m³)
Matter (PM_{10})	Daily Mean	50 µg/m³ (allowed to be exceeded 35 times per year)	45 µg/m³ (not to be exceeded >18 times per calendar year)	45 µg/m³
Particulate Matter ($PM_{2.5}$)	Annual Mean	25 µg/m³	10 µg/m³	10 µg/m³
	Daily Mean	-	25 µg/m³ (not to be exceeded >18 times per calendar year)	15 µg/m³
Sulphur Dioxide (SO_2)	Annual Mean	-	20 µg/m³	-
	Daily Mean	125 µg/m³ (not to be exceeded >3 times per calendar year)	50 µg/m³ (not to be exceeded >18 times per calendar year)	40 µg/m³
	One Hour	350 µg/m³ (not to be exceeded >24 times per calendar year)	350 µg/m³ (not to be exceeded >3 times per calendar year)	-
Benzene	Annual Mean	5 µg/m³	3.4 µg/m³	1.7 µg/m³
Carbon Monoxide (CO)	Maximum daily 8-hour mean	10 µg/m³	10 µg/m³	10 µg/m³
	Daily Mean	-	4 µg/m³ (not to be exceeded >18 times per calendar year)	4 µg/m³
Ozone (O_3)	Daily Mean	120 µg/m³ (not to be exceeded >18 times per calendar year)	100 µg/m³ (not to be exceeded >3 times per calendar year)	60 µg/m³
Lead (Pb)	Annual Mean	0.5 µg/m³	0.5 µg/m³	0.5 µg/m³
Arsenic (As)	Annual Mean	6 ng/m³	6 ng/m³	-
Cadmium (Cd)	Annual Mean	5 ng/m³	5 ng/m³	-

10.2.2.2 Policy

In May 2021, the European Commission (EC) adopted the EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil' (EC, 2021), as a key deliverable of the European Green Deal (EC, 2019). The EU Action Plan sets out the zero pollution vision for 2050; *'a healthy planet for all'*, where air, water and soil pollution is reduced to levels no longer considered harmful to health and natural ecosystems and that respect the boundaries our planet can cope with, thus creating a toxic-free environment. To steer the EU towards the 2050 vision, the EU Action Plan sets out key 2030 targets to speed up pollution reduction. Relevant to air quality, the EU

should reduce by 2030, more than 55% the health impacts (premature deaths) of air pollution. The main objective of the EU Action Plan is to provide a compass for including pollution prevention in all relevant EU policies. Although the Action Plan states that the EU has a robust regulatory framework in place to cap ambient air pollution, the number of premature deaths and other diseases attributed to air pollution remains high. This can be attributed to the fact that some EU standards are still less stringent than the guidelines set by the World Health Organisation (WHO) in 2005. The Action Plan sets out that the EU plans to adopt limits that are more closely in line with WHO guidance for air quality in 2022. This was scheduled for 2022 to allow for an anticipated WHO update to its air quality guidance. In September 2021 WHO updated their air quality guidelines based on the latest scientific evidence for the protection of human health and the environment (WHO, 2021). The guidelines are more stringent than the current Limit Values (2008). As presented in Section 10.2.1, the new revised EU Ambient Air Quality Directive 2024/2881 brings the limit on harmful pollutants closer to those recommended by WHO (2021).

10.2.2.3 Guidelines

The air quality impact assessment has been undertaken with reference to the most relevant and current guidance documents relating to this Chapter of the EIAR as follows:

- Institute of Air Quality Management (IAQM) – Land-Use Planning & Development Control: Planning For Air Quality (January 2017)
- Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction (IAQM) January 2024 (Version 2.2)
- DMRB Sustainability & Environment. Appraisal *LA 105 Air quality*. DMRB LA105 Air quality (formerly HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15), (Highways Agency, 2024); and
- Department for Environment, Food and Rural Affairs (DEFRA) Air Quality Management Technical Guidance LAQM.TG (22) (August 2022).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022);
- Transport Infrastructure Ireland, Air Quality Assessment of Specified Infrastructure Projects Overarching Technical Guidance, PE-ENV-01106 (Dec. 2022).
- Institute of Air Quality Management, A guide to the assessment of air quality impacts on designated nature conservation sites (2020)

10.2.2.3.1 Construction Dust Impact & Assessment Guidelines

As prescribed within Environmental Protection UK and the Institute of Air Quality Management, Land-use Planning & Development Control: Planning For Air Quality (January 2017) the Proposed Development has been assessed in accordance to the “Guidance on the Assessment of Dust from Demolition and Construction ((IAQM) January 2024 (Version 2.2). This guidance has been referenced to assess the potential impact of the vehicle movements and the earthworks phase of the proposed works. Good practice construction mitigation

measures are recommended to be implemented to minimise emission quantities during construction.

The type of activities that could cause fugitive dust emissions are earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site. The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects.

Dust particles can be classified into those that are easily deposited and those that remain suspended in the air for long periods. This division is useful as deposited dust is usually the coarse fraction of particulates that causes dust annoyance, whereas suspended particulate matter is implicated more in exposure impacts. Airborne particles have a large range of diameters, from nanoparticles and ultrafine particles (diameters less than 0.1µm) to the very large particles with diameters up towards 100µm. There is no clear dividing line between the sizes of suspended particulates and deposited particulates, although particles with diameters >50µm tend to be deposited quickly and particles of diameter <10µm (PM_{10}) have an extremely low deposition rate in comparison. Therefore, the size of suspended and deposited dust particles affects their distribution and as such requires two very different approaches to sampling these fractions. PM_{10} is the fraction of airborne (suspended) particulates which contains particles of diameter less than 10µm. $PM_{2.5}$ is the fraction of airborne (suspended) particulates which contains particles of diameter less than 2.5µm. PM_{10} and $PM_{2.5}$ particles can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders. Total Suspended Particles (TSP) is the term used when referring to larger particles which do not have a specified size limit. It is common for TSP to be measured alongside PM_{10} and $PM_{2.5}$ particularly at industrial sites when dust monitoring is undertaken.

Particulate matter can emanate from natural and anthropogenic sources. Natural sources include sea salt, forest fires, pollen and moulds. Natural sources are unregulated and harder to control. Anthropogenic sources can be regulated and understanding the sources of particulate matter is very important. PM_{10} is most commonly associated with road dust and construction activities. Wear and tear of brakes and tyres on vehicles and crushing activities at construction sites can all contribute to a rise in PM_{10}. $PM_{2.5}$ is associated with fuel burning, industrial combustion processes and vehicle emissions. Larger particles (100µm diameter) are likely to settle within 5-10m of their source under a typical mean wind speed of 4-5 m/s, and particles between 30-100µm diameter are likely to settle within 100m of the source. Smaller particles, particularly those <10µm in diameter, i.e. PM_{10}, have a greater potential to have their settling rate impeded by atmospheric turbulence and to be transported further from their source. Dust emissions are exacerbated by dry weather and high wind speeds. The impact of dust, therefore, also depends on the wind direction and the relative location of the dust source and receptor.

Currently no Irish statutory standards or limits exist for the assessment of dust deposition and its tendency for causing nuisance. Similarly, no official air quality criterion has been set at a European or World Health Organisation (WHO) level.

The Quarries and Ancillary Activities, Guidelines for Planning Authorities (2004) states that following with regard to the control of dust;

"There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral/aggregate dust. (See, however, the Air Quality Standards Regulations 2011 for measurement standards). There are a number of methods to measure dust deposition (such as the Frisbee method) but only the German TA Luft Air Quality Standard relates a specific method (i.e. Bergerhoff) of measuring dust deposition with dust nuisance. On this basis it is recommended that the following TA Luft dust deposition limit value be adopted at site boundaries near quarry developments:

Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).

Best practice dust control measures should be proposed by the applicant".

The German TA Luft Regulations, "Technical Instructions on Air Quality Control" state that total dust deposition (soluble and insoluble, measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2119) should not exceed a dust deposition rate of 350 mg/m^2/day (when averaged over a 30+/- 2-day period). The use of this limit value is appropriate to minimise the impact of airborne dust levels on the receiving environment beyond the site boundary. The German TA Luft criteria for '*possible nuisance'* and *'very likely nuisance'* are 350 mg/m^2/day and 650 mg/m^2/day, respectively.

In 2005, the UK Highways Agency released an Interim Advice Note 61/05 *'Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs'* as a supplement to the Design Manual for Roads and Bridges (DMRB) Guidelines. This interim guidance states that dust or particles falling onto plants can physically smother the leaves affecting photosynthesis, respiration and transpiration. The literature suggests that the most sensitive species appear to be affected by dust deposition at levels above 1,000 mg/m^2/day which is considerably greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. As such, once dust deposition rates are maintained within the guidelines for human nuisance the impact of dust deposition on sensitive ecosystems is considered negligible. Therefore, the following dust deposition limits are typically recommended;

- Dust Deposition Rate limit = 350 mg/m^2/day (averaged over a 30+/-2 day period using Bergerhoff Gauge Method).
- Dust Deposition Rate limit affecting sensitive ecological receptors = 1,000 mg/m^2/day
- PM_{10} 24 Hour Mean concentration limit = 50 µg/m^3 not to be exceeded more than 35 times a calendar year
- PM_{10} Annual Mean concentration limit = 40 µg/m^3
- $PM_{2.5}$ Annual Mean concentration limit = 25 µg/m^3

10.2.3 Appraisal Method for the Assessment of Impacts

The air quality impact of the Proposed Development has been assessed for the each of the two distinct phases of the Proposed Project:

- Construction Phase; and
- Operational Phase

The methods used to assess the air quality impacts during each phase is discussed in the following sections

10.2.3.1 Construction Phase

The most significant potential impact on air quality during the Construction Phase is from construction dust emissions, including PM_{10} and $PM_{2.5}$ emissions and the potential for nuisance dust deposition on human and ecological receptors. A Construction Dust Impact Assessment has been carried out to assess the risk to sensitive receptors as a result of dust soiling, health impacts and ecology impacts in accordance with the Guidance on the Assessment of Dust from Demolition and Construction (IAQM) January 2024 (Version 2.2) to predict the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is "not significant".

Activities on construction sites have been divided into four types:

- Demolition
- Earthworks
- Construction; and
- Trackout (movement of heavy vehicles)

The potential for dust emissions is assessed for each activity that is likely to take place. Obviously, if an activity is not taking place, e.g. demolition, then it does not need to be assessed. The risk assessment categories assume that the most basic project controls are applied to every project.

The assessment methodology considers three separate dust impacts:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM_{10}; and
- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant effect.

The IAQM's Guidance outlines a step-wise process as follows;

- Step 1: Screening the Need for a Detailed Assessment
- Step 2: Assess the Risk of Dust Impacts, including;
    - Step 2A: Define the Potential Dust Emission Magnitude,
    - Step 2B: Define the Sensitivity of the Area,

- Step 2C: Define the Risk of Impacts,

- Step 3: Site-Specific Mitigation, and
- Step 4: Determine Significant Effects.

10.2.3.1.1 Step 1: Screening the need for a detailed assessment

A Construction Dust Impact Assessment will normally be required where there is:

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

10.2.3.1.2 Step 2: Assess the risk of dust impacts

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

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

These two factors are combined in STEP 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction and trackout). More than one of these activities may occur on a site at any one time. Where appropriate, the site can be divided into 'zones' for the dust risk assessment.

Step 2A: Define the Potential Dust Emission Magnitude

Demolition, earthworks, construction and trackout will occur during the construction phase of the Proposed Development. Table 10-2 describes the potential dust emission class criteria for each outlined construction activity.

Table 10-2: Criteria Used in the Determination of Dust Emission Class

Activity	Criteria used to Determine Dust Emission Class		
	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 level during wetter months	• Total building volume 12,000 m^3 - 75,000m^3 • Potentially dusty construction material. • Demolition activities 6-12 m above ground level	• Total building volume >75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening, • Demolition activities >12m above ground level
Earthworks	• Total site area <18,000m^2 • soil type with large grain size (e.g. sand), • <5 heavy moving earth vehicles active at any one time • formation of bunds <3 m in height	• Total site area 18,000 – 110,000m^2 • Moderately dusty soil type (e.g. silt) • 5-10 heavy moving earth moving vehicles active at any one time. • formation of bunds 3 m - 6 m in height	• Total site area >110,000m^2 • potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • formation of bunds >6 m in height
Construction	• Total building volume <12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)	• Total building volume 12,000 – 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume >75,000m^3 • On-site concrete batching • Sandblasting
Trackout	• <20 outward HDV trips in any one day • surface material with low potential for dust release, • unpaved road length <50m	• 20 - 50 outward HDV trips in any one day • moderately dusty surface material (e.g. high clay content), • unpaved road length 50-100m	• >50 outward HDV trips in any one day • potentially dusty surface material (e.g. high clay content • unpaved road length >100m

Step 2B: Define the Sensitivity of the Area

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

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

Receptor sensitivity can be described as follows with respect to nuisance dust as per the IAQM guidance (IAQM 2024):

- High sensitivity receptor with respect to dust nuisance – surrounding land where:

- Users can reasonably expect enjoyment of a high level of amenity;
- The appearance, aesthetics or value of their property would be diminished by soiling;
- The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land;
- Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.

- Medium sensitivity receptor with respect to dust nuisance – surrounding land where:

- Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
- The appearance, aesthetics or value of their property could be diminished by soiling;
- The people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land;
- Indicative examples include parks and places of work.

- Low sensitivity receptor with respect to dust nuisance – surrounding land where:

- The enjoyment of amenity would not reasonably be expected; or
- Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling;
- There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land;
- Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

Receptor sensitivity can be described as follows with respect to human health as per the IAQM guidance (IAQM 2024):

- High sensitivity receptor with respect to human health – surrounding land where:

- Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); and
- Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.

- Medium sensitivity receptor with respect to human health – surrounding land where:

- Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); and
- Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.

- Low sensitivity receptor with respect to human health – surrounding land where:

- Locations where human exposure is transient; and
- Indicative examples include public footpaths, playing fields, parks and shopping streets.

The IAQM guidance (IAQM 2024) also outline the criteria for assessing the human health impact from PM_{10} emissions from construction activities based on the current annual mean PM_{10} concentration, receptor sensitivity as detailed above and the number of receptors affected. Where the number of receptors is not clear i.e., for an apartment building, conservative sensitivities can be assumed. In addition, when calculating the sensitivity with respect to human health, the background concentrations of particulates was reviewed. The background air quality in the area of the project is discussed in Section 10.3.

The IAQM guidance, Box 6 Box 7 and Box 8 (IAQM 2024) outlines the criteria for determining the sensitivity of receptors. This is detailed in **Error! Reference source not found.**.

Table 10-3: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Sensitivities of People to Dust Soiling Effects	Sensitivities of People to theHealth Effects of PM_{10}	Sensitivities of Receptors to Ecological Effects
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	Locations with an international or national designation and the designated features may be affected by dust soiling; e.g Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}	Locations with a national designation and the designated features may be affected by dust soiling; e.g Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Locations with a local designation and the designated features may be affected by dust soiling; e.g local Nature Reserve with dust sensitive features.

The criteria detailed in Table 10-4 , Table 10-5 and Table 10-6 (pertaining to Tables 2, 3 and 4 in the IAQM guidance 2024) were used to determine the sensitivity of the Proposed Development area to dust soiling effects, human health impacts and ecological impacts respectively. The criteria are set out below.

Table 10-4: Sensitivity of the Area to Dust Soiling Effects on People and Property (Table 2 IAQM Guidance)

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20m	<50m	<100m	<250m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 10-5: Sensitivity of the Area to Human Health Impacts (Table 3 IAQM Guidance)

Receptor Sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from Source (m)			
			<20m	<50m	<100m	<250m
High	>32 µg/m^3	>100	High	High	High	Low
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table 10-6: Sensitivity of the Ecological Impacts (Table 4 IAQM Guidance)

Receptor Sensitivity	Criteria for Determining Sensitivity	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

10.2.3.2 Operation Phase

10.2.3.2.1 Air Quality Impact due to Traffic Emissions

The assessment methodology involved air dispersion modelling using the UK Design Manual for Roads and Bridges Screening Model (UK Highways Agency 2007) (Version 1.03c, July 2007), the NOx to NO_2 Conversion Spreadsheet (UK Department for Environment, Food and Rural Affairs, 2020) (Version 8.1) and the following guidance issued by Transport Infrastructure Ireland; Transport Infrastructure Ireland, Air Quality Assessment of Specified Infrastructure Projects Overarching Technical Guidance, PE-ENV-01106 (Dec. 2022).

The DMRB Screening Method can be run to predict pollutant concentrations at receptor locations near to roads. It can be used to predict annual mean concentrations of nitrogen dioxide (NO_2) and PM_{10}, as well as oxides of nitrogen (NO_x), carbon monoxide, benzene and 1,3-butadiene. It also predicts the number of exceedances of 50 µg/m^3 as a 24-hour mean PM_{10} concentration. The model requires input data on Annual Average Daily Traffic flow (AADT), annual average speeds, the proportion of different vehicle types, the type of road, and the distance from the centre of the road to the receptor location. The DMRB Screening Method is referred to as an appropriate assessment methodology within the Local Air Quality Management Technical Guidance document TG(22).

LA105 (2024) Air Quality states the following in relation to "*Choice of air quality model*.

2.28 The most appropriate air quality model shall be used to complete the air quality assessment.

2.28.1 The DMRB air quality spreadsheet, which is available from the Overseeing Organisation, may be used for early option appraisal and simple air quality assessments".

UK National Highways has updated the DMRB Screening Model but it is not on public release and is being evaluated to determine whether it can be used for assessing air quality for Local Air Quality Management (LAQM) purposes. DAERA has stated that "*whilst the previous Screening Model v1.03c has been withdrawn by National Highways, v1.03c can still provide for a useful way to screen road traffic emissions to decide whether more detailed dispersion modelling needs to be undertaken. Results should however be treated with caution, particularly where predicted concentrations are close to the relevant Air Quality Objectives*".

Therefore, the DMRB Screening Model (v1.03c) has been used to assess the 'relative air quality impact' of the additional traffic flows on the surrounding road network as a result of the proposed development and assess if the predicted air pollutant concentrations due to traffic

emissions associated with the proposed development are below the relevant Air Quality Objectives. Therefore, it was appropriate to use the DMRB Screening Model as a screening tool to assess local air quality impacts due to the site related traffic emissions.

The method to convert roadside NO_x to NO_2 within the DMRB model was based on measurements made between 1999 and 2001. Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased. This means that the relationship between NO_x and NO_2 at the roadside has changed from that currently used in the DMRB model. An updated NO_x to NO_2 calculator is available from the DEFRA website (version 9.1, August 2024). The calculator applies to all road types and can also be used to estimate roadside NO_x from roadside NO_2 measurements. The use of the DMRB model has been adapted to use the new calculator in accordance with the relevant instructions.

DMRB model validation work carried out by the Highways Agency has indicated that the model may significantly under-predict concentrations of nitrogen dioxide alongside urban city-centre roads classified as 'street canyons'. In this context, a street canyon may be defined as a relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road. It has been decided that on review of the streetscapes in proximity to the site that a street canyon effect is unlikely to occur as there are relatively open areas in close proximity to the site.

DEFRA has stated that if the annual mean objectives are not exceeded, it may be confidently assumed that the short-term (1-hour) objectives will also be met. However, if this approach is used, then care must be taken to include relevant locations where the hourly objectives might apply. If the annual mean nitrogen dioxide concentration is greater than 60 µg/m^3, then there is a risk that the 1-hour objective may also be exceeded

The air quality impact assessment due to changes in traffic flows is based on assessing existing and predicted traffic flows for the surrounding road network due to the operation of the Proposed Development. The traffic flows for the base year 2023, the proposed year of opening 2028 and the design year, 2043 for the 'do nothing – without the Proposed Development' and 'do something – with the Proposed Development' assessment scenario are shown in **Error! Reference source not found.** and **Error! Reference source not found.**, as supplied by Punch Engineers who prepared the traffic and transport chapter of this EIAR. The DMRB model traffic input data includes the following for Dyke Road and Headford Road:

- Traffic flows as Annual Average Daily Traffic (AADT);
- Average vehicle speed; and
- Fleet composition including at least the split between LDVs and HDVs (generally provided as %HDVs within the total traffic flows)

Table 10-7: Dyke Road - Predicted AADT traffic flows. 1. Baseline scenario, and 2. Future traffic flow scenario taking account of the reduction in public car parking provision.

Dyke Road AADT Traffic Flow scenarios	Baseline 2023		Opening Year 2028		Design Year 2043	
	AADT	%HGV	AADT	%HGV	AADT	%HGV
1. Do Nothing - Baseline scenario	8,300	0.70%	9,000	0.72%	10,500	0.81%
2. Do Something - Assessment scenario 1	N/A		9,200	0.69%	10,600	0.79%

Table 10-8: Headford Road - Predicted AADT traffic flows. 1. Baseline scenario, 2. Future traffic flow scenario taking account of the reduction in public car parking provision.

Headford Road AADT Traffic Flow scenarios	Baseline 2023		Opening Year 2028		Design Year 2043	
	AADT	%HGV	AADT	%HGV	AADT	%HGV
1. Do Nothing - Baseline scenario	12,600	1.98%	13,700	2.03%	16,000	2.28%
2. Do Something - Assessment scenario 1	N/A		13,900	1.98%	16,100	2.26%

The EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality (2017) outlines indicative criteria for requiring an air quality assessment, as shown in **Error! Reference source not found.**.

Table 10-9: Extract from EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality (2017). Table 6.2: Indicative criteria for requiring an air quality assessment.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans 3.5t gross vehicle weight). 2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere. A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans 3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.

The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality (2017) indicative criteria suggests that an air quality impact assessment due to changes in traffic flows is not required for this project. This is due to the change in AADT flows being less than 500

LDVs and less than 100 HDVs. There is only a predicted increase of 200 vehicles between the Do Nothing - Baseline scenario and the Do Something Scenario in the Opening Year 2028. There is only a predicted increase of 100 vehicles between the Do Nothing - Baseline scenario and the Do Something Scenario in the Design Year 2043. Nevertheless, for completeness of assessment, a DMRB Screening Method assessment has been undertaken.

For the DMRB Screening Assessment, the following assumptions have been made;

- For a busy junction, assume that traffic approaching the junction slows to an average of 20kph. These should allow for a junction, which potentially suffers from a lot of congestion and stopping traffic. In general, these speeds are relevant for approach distances of approximately 25m; and
- For other junctions (non-motorway) and roundabouts where some slowing of traffic occurs, assume that the speed is 10kph slower than the average free flowing speed.

[From Part IV of the Environment Act 1995 Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management Technical Guidance (TG22) March 2022]

Therefore, a road speed of 50 kilometres per hour (Kph) has been assumed for Dyke Road and a road speed of 20 Kph has been assumed for Headford Road in the DMRB Screening Assessment.

10.2.3.2.2 Air Quality Impact due to Space Heating Emissions

In terms of space heating, the proposal is expected to utilise electric heating for both hot water and space heating. Therefore, there will be no pollutant emissions to atmosphere such as may occur from traditional fossil fuel combustion sources, such as oil or gas boiler heating systems. Therefore, no further assessment of space heating emissions has been undertaken.

10.2.3.3 Assessment of Significance of Potential Effects

In terms of significance of potential environmental effects, the magnitude (scale of change) has been determined by considering the impacts of the Proposed Development on air quality with reference to the baseline conditions and environmental assessment criteria.

Describing the impact:

The rationale for describing the impact of the Proposed Development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance (EPUK & IAQM) “Land-Use Planning & Development Control: Planning for Air Quality (January 2017).

There is a two-stage process to be followed in the assessment of air quality impacts:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts

The suggested framework for describing the impacts is set out in Table 6.3 of the EPUK &

IAQM guidance document and is shown in Table 10-10. The term Air Quality Assessment Level (AQAL) has been adopted as it covers all pollutants, i.e. those with and without formal standards. AQAL is used to include air quality objectives or limit values where these exist. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short-term impact. The EPUK & IAQM guidance adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect.

Table 10-10: Impact Descriptors for Individual Receptors

Long term average Concentration at Receptor in assessment year	**& Change in concentration relative to Air Quality Assessment Level (AQAL)**			
	1	**2-5**	**6-10**	**>10**
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Moderate
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.

3. The Table is only designed to be used with annual mean concentrations.

4. Descriptors for individual Receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one Receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

10.2.3.4 Assessing Significance

The rationale for the assessment of significance is derived from the EPUK & IAQM Guidance (paragraphs 7.1-7.12 referring to Table 6.3) and relates to Table 10-10.

Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as 'significant' or 'not significant'. An 'impact' is the change in the concentration of an air pollutant, as experienced by a receptor. This may have an 'effect' on the health of a human receptor, depending on the severity of the impact and other factors that may need to be taken into account. The impact descriptors set out in Table 10-10 are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts; and
- other factors may be relevant in individual cases.

10.3 The Existing and Receiving Environment (Baseline Situation)

10.3.1 Baseline Air Quality

No site specific baseline air quality or dust deposition surveys have been undertaken as part of the preliminary assessment for this Proposed Development. The Air Quality Impact Assessment has referenced relevant EPA air quality monitoring data. The need to undertake site specific air quality monitoring depends upon the availability of existing air quality data and the complexity of the Proposed Development. It is considered that the data available from the nearest EPA Air Quality monitoring station on Eyre Square, Galway (Station 105, 53.2740°N, -9.0485°E), located approximately 600m south-south-west of the Proposed Development site is accurate, consistent and is considered the most representative of baseline conditions in the study area due to its close proximity to the Proposed Development site.

TII Guidelines (PE-ENV-01106) states that use should be made of existing quality assured air quality data such as that undertaken by the EPA and/or Local Authorities and that baseline air quality data can be gathered from desktop reviews and/or a monitoring survey set up specifically for the Proposed Development (site specific monitoring). A desktop review should be undertaken using local air quality monitoring data collected as part of national or local government programme. The air quality practitioner should review the data to ensure it is suitable for use. Regard should be given to the quality assurance and quality control (QA/QC) procedures that have been applied to the operation of the monitoring sites. Where the monitoring stations have been operated and or reported on by the EPA, then it may be assumed that adequate procedures have been applied.

TII Guidelines (PE-ENV-01106) states

- the data obtained from measurement systems should be representative of ambient concentrations;
- Measurements must be accurate, precise and traceable;
- Data must be comparable and reproducible; and
- Results must be consistent over time. In order for seasonal or annual averaged air quality pollutant measurements to be meaningful, an appropriate level of data capture is required.

Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10} and $PM_{2.5}$) background concentrations from the nearest EPA Air Quality monitoring station on Eyre Square, Galway have been referenced. The most recent year of data has been summarised and referenced (1st June 2023 – 1st June 2024) in

[Note PM_{10}. and $PM_{2.5}$ were not recorded at this station until 5th December 2023].

Under the Clean Air for Europe Directive, EU member states must designate "Zones" for the purpose of managing air quality. For Ireland, four zones were defined in the Air Quality Standards Regulations (2011). The zones adopted in Ireland are Zone A, the Dublin conurbation; Zone B, the Cork conurbation; Zone C, comprising 21 large towns in Ireland with a population >15,000; and Zone D, the remaining area of Ireland. The background air quality in the area of the Proposed Development is of good quality and the site is located in 'Zone C' as denoted by the EPA.

The Environmental Protection Agency's Air Quality Index for Health (AQIH) is a number from 1 to 10 that identifies the current air quality currently in a region and whether or not this might affect human health. This reading is updated twice a day, once in the morning (by 9.30am) and once in the evening (by 19.30pm). A reading of 10 means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. The AQIH readings are based on five air pollutants which can harm human health: Ozone gas, nitrogen dioxide gas, sulphur dioxide gas, $PM_{2.5}$ particles and PM_{10} particles. The AQIH at the monitoring station at Eyre Square Galway has a current rating of 1, meaning 'Good' air quality [index as of 14.00 hours, Friday, June 7th, 2024] (EPA, 2024).

Table 10-11 shows the average values for Nitrogen Dioxide ($NO_{2,}$) and Particulate Matter (PM_{10} and $PM_{2.5}$) levels for the period 1st June 2023 – 1st June 2024 at the EPA Air Quality monitoring station at Eyre Square, Galway.

Table 10-11: Annual Average Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ concentrations at Eyre Square, Galway, (1st June 2023 – 1st June 2024) in comparison to EU & WHO Air Quality Limit Values

Pollutant	Averaging Period	Measured Concentration (µg/m³) @ Eyre Square, Galway City from 1st June 2023 – 1st June 2024	Air Quality Limit Values (µg/m³)		
			Current EU 2008 Limit Values (µg/m³)	EU 2024 Limit Values (µg/m³) (Limit values for the protection of human health to be attained by 1st January 2030)	WHO 2021 Air Quality Guidelines (µg/m³)
Nitrogen Dioxide (NO_2)	Annual Mean	17.02 ug/m³	40 µg/m³	20 µg/m³	10 µg/m³
	Daily Mean	-	-	50 µg/m³ (not to be exceeded >18 times per calendar year)	-
Particulate Matter (PM_{10})	Annual Mean	14.28 ug/m³ **Note 1**	40 µg/m³	20 µg/m³	5 µg/m³
	Daily Mean	-	50 µg/m³ (allowed to be exceeded 35 times per year)	45 µg/m³ (not to be exceeded >18 times per calendar year)	45 µg/m³
Particulate Matter ($PM_{2.5}$)	Annual Mean	8.53 ug/m³ **Note 1**	25 µg/m³	10 µg/m³	10 µg/m³
	Daily Mean	-	-	25 µg/m³ (not to be exceeded >18 times per calendar year)	15 µg/m³

Note 1: Commenced recording PM_{10} and $PM_{2.5}$ at this station on 5th December 2023.

Table 10-11 shows that the relevant annual mean limit values for Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} & $PM_{2.5}$) have not exceeded the current EU Limit Values or the EU 2024 Limit Values (µg/m³) (Limit values for the protection of human health to be attained by 1st January 2030) for the year period between the 1st June 2023 – 1st June 2024.

The annual mean NO_2 and PM_{10} concentrations at the EPA Air Quality monitoring station on Eyre Square, Galway are above the WHO 2021 Air Quality Guidelines of 10 µg/m³ and 5 µg/m³ respectively. The annual mean $PM_{2.5}$ concentrations at the EPA Air Quality monitoring station on Eyre Square, Galway were in compliance with the WHO 2021 Air Quality Guidelines of 10 µg/m³.

The annual mean Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} & $PM_{2.5}$) background concentrations from the EPA Air Quality monitoring station at Eyre Square have been used in the DMRB Screening air quality impact assessment.

10.3.2 Receptor Locations

In terms of the operational impact of the proposed development, the potential sensitive

receptors are those within 200 m of the 'affected road network' (ARN) and include for example, residential properties, schools and hospitals. The representative sensitive receptors have been selected to ensure that those receptors with the highest potential future pollutant concentrations (closest to the road, junctions, etc.) or anticipated to experience highest level of change (next to existing roads within the ARN) are assessed. There is no need to model and assess all receptors within 200 m, or an excessive number of receptors in the same area, to determine whether there is likely to be any exceedances of air quality limits in the 'Do minimum' or 'Do something' scenarios. Therefore, representative worst case receptors have been selected.

The sensitive residential receptors considered as part of the air quality assessment are the future residents of the Proposed Development. These are considered as a worst case sensitive receptor as they are likely to experience the highest pollutant concentrations (closest to the road, junctions, etc.) as a result of the proposed Development.

The receptor locations assessed in the DMRB traffic emissions screening tool are summarised in Table 10-12 and shown in Figure 10:1.

Table 10-12: Sensitive Residential Receptor locations assessed in the DMRB Screening Method of Traffic Emissions Air Quality Impact Assessment

Receptor Description and Location	Grid Reference	Distance to Road
R1 -Future Residents of Proposed Development	129897, 225887	@ 12m from façade to centre of Dyke Road
		@ 105m from façade to centre of Headford Road

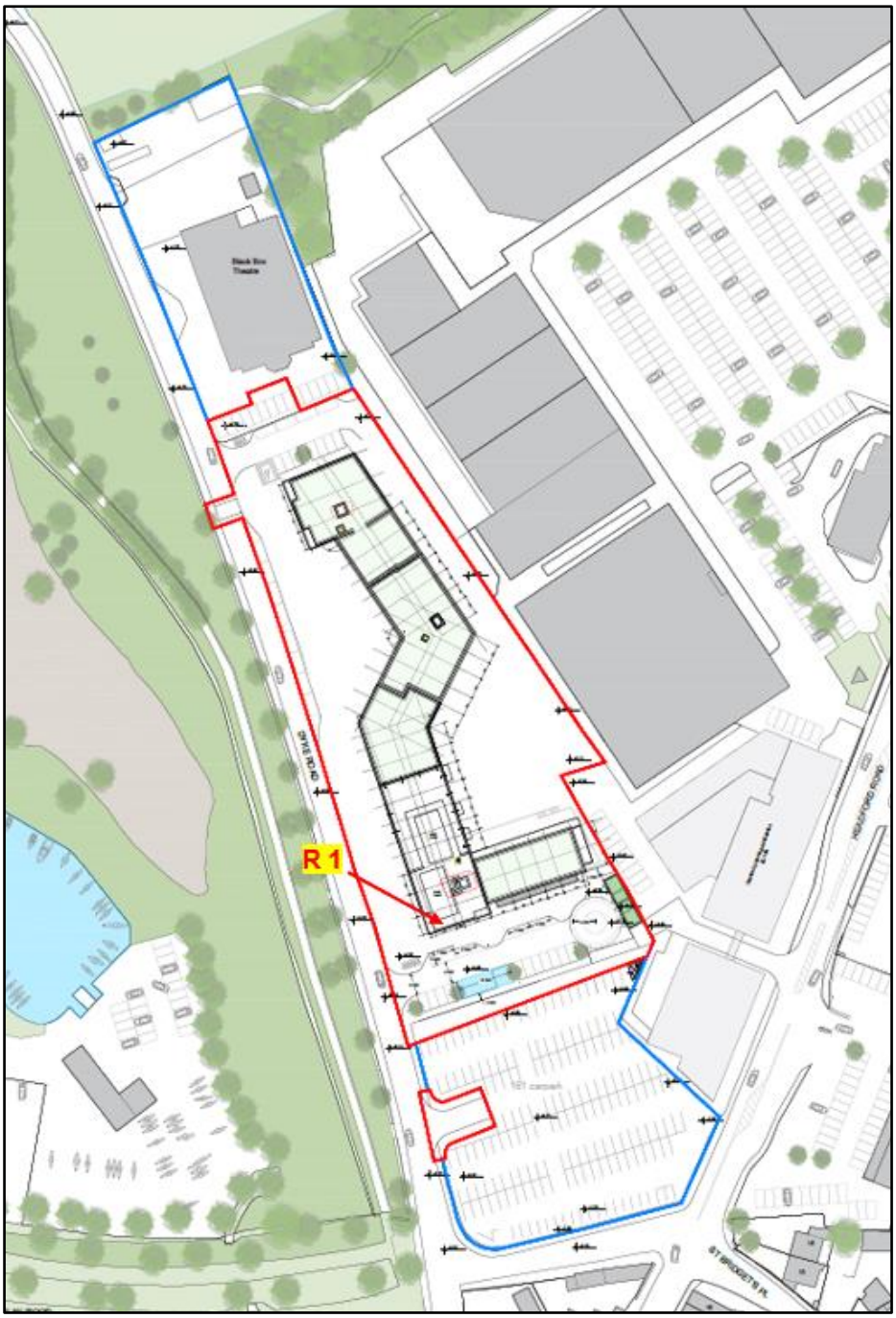


Figure 10:1: Sensitive Residential Receptor location assessed in the DMRB Screening Method of Traffic Emissions Air Quality Impact Assessment

In line with TII (PE-ENV-01106, 2022) and IAQM guidance, consideration of air quality impacts was given to sensitive designated habitats with a national or international designation that are located within 200m from the roads assessed within the study area. Sensitive designated habitats include 'Ramsar' sites, special protection areas, special areas of conservation, sites of special scientific interest, local nature reserves, local wildlife sites, nature improvement areas, ancient woodland and veteran trees.

Nitrogen oxides concentrations are calculated within the designated site, using the DMRB screening model. The results are then compared with the NOx standard for the protection of

vegetation of 30 µg/m^3 and the incremental change due to the Proposed Development identified. Where the Proposed Development is expected to cause an increase in concentrations of more than 2 µg/m^3 and the predicted concentrations (including the background) are close to (within 10% of), or exceed the standard, then the sensitivity of the habitat to NOx concentrations should be assessed by the project ecologist.

Only sites that are sensitive to nitrogen deposition should be included in the assessment. Therefore, it is not necessary to include sites, for example, that have been designated as a geological feature or water course. The nearest designated site, Lough Corrib Special Area of Conservation Interest (SAC) (Site Code 000297), is <20m west of the Proposed Development site.

10.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development.

10.5 Potential Impact of the Proposed Development

The air quality impact of the Proposed Development has been assessed for the each of the two distinct phases:

- Construction Phase; and
- Operational Phase

10.5.1 Construction Phase

10.5.1.1 Construction Dust Impact Assessment

10.5.1.1.1 Step 1: Screening the need for a detailed assessment

A Construction Dust Impact Assessment is deemed to be required because of the following;

- There are ‘human receptors’ within 250 m of the boundary of the site; and
- There is an ‘ecological receptor’ within 50 m of the boundary of the site.

The area surrounding the Proposed Development consist of predominantly commercial, retail and office developments with no residential properties in the immediate proximity to the Proposed Development site.

As detailed in Step 2B, Table 10-13, there are 2 high sensitivity receptors <20m from the site boundary; namely the Black Box Theatre and the car park area adjacent to the site boundary.

The closest residential receptors (medium sensitivity receptors) are ~130m south-east of the site boundary at the junction of Headford Road and St. Bridget’s Place.

The nearest boundary of the Lough Corrib Special Area of Conservation (SAC) is located approximately 18m west of the site boundary. Therefore the need for a detailed assessment is required.

10.5.1.1.2 Step 2: Assess the risk of dust impacts

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. The construction site area has been allocated to a risk category based on the following approach;

- STEP 2A – definition of the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large ;
- STEP 2B – definition of the sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity; and
- STEP 2C – determination of the risk of dust impacts with no mitigation applied.

Step 2A: Define the Potential Dust Emission Magnitude

The Proposed Development will consist of the construction of a new residential development of 219 no. apartment units and a childcare facility (approx. 241 sq m) in the form of 1 no. new residential block (5 - 9 storeys over lower ground floor level) with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.144 ha.

The potential dust emission magnitudes for the Proposed Development were estimated and determined using the criteria detailed in Table 10-2 as follow:

Demolition: includes any activity involved with the removal of an existing structure (or structures). There is no demolition to take place as the site is currently a surface level car park.

Earthworks: Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the site and landscaping. Earthworks involves the removal of the existing car park and landscaping.

- The total site area where earthworks will occur is 1.144ha (11,440 m^2)
- Soil type with large grain size,
- It is assumed that there will be <5 heavy moving earth moving vehicles active at any one time,
- Therefore, the dust emission magnitude for earthworks was defined as **Small**

Construction: includes any activity involved with the provision of a new structure (or structures), its modification or refurbishment. Concrete will be used in building construction, pipeline construction, attenuation tanks, and wastewater pump station (WWPS). Ready-mixed concrete will be brought to the Proposed Development site by truck.

- The total building volume will be ~90,000m^3,
- Potentially dusty construction material (e.g. concrete)
- Therefore, the dust emission magnitude for construction was defined as **Large**

Trackout: includes the transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

- In previous projects, for a development this size, it is assumed that there will be 20-50 outward HDV trips on average / day.,
- Potentially dusty construction material (e.g. high clay content)
- Unpaved road length >100 m.
- Therefore, the dust emission magnitude for trackout was defined as **Large.**

Step 2B: Define the Sensitivity of the Area

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

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

Sensitivity of Receptors

Table 10-13: Cumulative number of sensitive receptors within 20m, 50m, 100m and 250m of the Proposed Development site. outlines the range of number of properties within specific distance bands from the proposed construction activities to determine the sensitivity of the areas to dust soiling effects on people and property.

Table 10-13: Cumulative number of sensitive receptors within 20m, 50m, 100m and 250m of the Proposed Development site.

Receptor Sensitivity	Criteria for Determining Sensitivity			
	<20m	<50m	<100m	<250m
No. of high sensitivity receptors in proximity to Site	2	2	2	>10
No. of medium sensitivity receptors in proximity to Site	~7	>10	>10	>20
Receptor Sensitivity	Medium	Low	Low	Low

Sensitivity of the Proposed Development Area to Dust Soiling Effects on People and Property

- Earthworks and Construction: The area surrounding the Proposed Development consist of predominantly commercial, retail and office developments with no residential properties in the immediate proximity to the Proposed Development site. In accordance with IAQM guidance, Table 10-13indicates there are 2 high sensitivity receptors <20m from the site boundary; namely the Black Box Theatre and the car park area adjacent to the site boundary. The closest residential receptors (medium sensitivity receptors) are ~130m south-east of the site boundary. There is commercial, retail and offices located east of the site and a walking track west of the site <20m from the site boundary. Therefore, in accordance with the assessment methodology in **Error! Reference source not found.**, the sensitivity of the area is **Medium**.
- Trackout: For trackout, the distances should be measured from the side of the roads used by construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road. As shown in **Error! Reference source not found.**, there are 2 high sensitive receptors within 50m from the proposed site. Therefore, Table 10-4 indicates the sensitivity of the area is **Low**; in terms of potential trackout dust impacts.

Sensitivity of the Proposed Development Area to Human Health Impacts

As set out in Table 10-13, there are two high sensitive receptors <20m from the site boundary. Table 10-11 outlines baseline air quality in the local area. The PM_{10} concentration recorded at the EPA Air Quality monitoring station on the Eyre Square, Galway for the period June 2023 - June 2024 is 14.28 µg/m^3. Therefore, using the guidance in Table 10-5, the sensitivity of the Proposed Development Area to Human Health Impacts is **Low**; in terms of potential demolition, earthworks, construction and trackout dust impacts.

Sensitivity of the Proposed Development Area to Ecological Impacts

Dust deposition due to demolition, earthworks, construction and trackout has the potential to affect sensitive habitats and plant communities. Dust can have two types of effect on vegetation: physical and chemical. Direct physical effects include reduced photosynthesis, respiration and transpiration through smothering. Chemical changes to soils or watercourses may lead to a loss of plants or animals for example via changes in acidity. Indirect effects can include increased susceptibility to stresses such as pathogens and air pollution. These changes are likely to occur only as a result of long-term demolition and construction works adjacent to a sensitive habitat. Often impacts will be reversible once the works are completed, and dust emissions cease.

The nearest boundary of the Lough Corrib Special Area of Conservation (SAC) is located approximately 18m west of the site boundary as shown in **Error! Reference source not found.**Figure 10:2 Lough Corrib SAC is designated for its range and quality of habitats, including seven that are listed as priority habitats under Annex I of the Habitats Directive. There is also a number of rare and protected species recorded from the catchment.

Figure 10:2: Location of lough Corrib SAC in relation to the Proposed Development Site

Construction works will take place <20m from Lough Corrib SAC which in accordance with Box 8 of the IAQM Guidance (IAQM, 2024) is considered a high sensitivity receptor. Therefore, the sensitivity of the Area to Ecological Impacts is **High**; in terms of potential earthworks, construction and track out dust impacts.

The sensitivity of the area to dust soiling, human health impacts and ecological impacts for each activity is summarised in Table 10-14.

Table 10-14: Outcome of Defining the Sensitivity of the area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium	Medium	Low
Human Health	N/A	Low	Low	Low
Ecological Impacts	N/A	High	High	High

Step 2C: Define the Risk of Impacts

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

The risk of dust soiling, impact on human health and ecological impact before mitigation in relation to the Proposed Development, is summarised in Table 10-15**Error! Reference source not found.**.

Table 10-15: Summary Dust Risk to Define Site-specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Medium Risk	Low Risk
Human Health	N/A	Negligible	Low Risk	Low Risk
Ecological Impacts	N/A	Low Risk	High Risk	High Risk

Step 3: Site Specific Mitigation

In accordance with the IAQM Guidance (Section 8), for proposed mitigation measures, the highest risk category should be applied. Therefore, the mitigation measures applicable to a **High Risk Site** should be applied as outlined in Section 10.6.1.

Step 4: Determine Significant Effects

Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest sensitive receptors will be controlled to ensure impacts are of negligible significance.

The IAQM Guidance recommends that significance is only assigned to the effect after considering the construction activity with mitigation. Therefore, the detailed mitigation measures have been defined in a form suitable for implementation by way of a planning condition and will be included in a Construction Environmental Management Plan.

The IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the risk of potential impact from dust soiling due to earthworks and trackout is **low risk** and is **medium risk** for construction. The risk of potential impact on human health is **negligible** for earthworks and is **low risk** for construction and trackout. The risk of potential impact on ecological receptors is **low risk** for earthworks and is **high risk** for construction and trackout. However, together with the recommended mitigation measures, the existing low background particulate (PM_{10}) concentrations and the determination of a high risk from dust impacts during the construction phase, the significance of dust impacts at the nearest receptor locations will be negligible.

10.5.2 Operational Phase

10.5.2.1 Air Quality Impact due to Traffic Emissions

The DMRB Screening Method has been used to predict the change in pollutant concentrations due to traffic emissions at the selected sensitive receptors in the baseline year (2023), in the year of opening 2028 and in the design year 2043 without and with the Proposed Development, i.e. the 'Do-minimum' and 'Do-something' scenarios. These predictions are based on the Annual Average Daily Traffic flows in proximity to the Proposed Development as quoted in Table 10-7 and Table 10-8.

The DMRB Screening Method has been undertaken to predict the pollutant concentrations at the future residents of the Proposed Development, identified as receptor location R1 in Table 10-12 and shown in Figure 10:1

The Nitrogen Dioxide (NO_2) concentration of 17.02 µg/m^3 and PM_{10} concentration of 14.28 µg/m^3 as recorded at the EPA monitoring station on Eyre Square (between 01/06/2023 – 01/06/2024) have been used as background concentrations in the screening model assessment to predict the future NO_2 and PM_{10} concentrations at the receptor location, R1.

The predicted NOx and PM_{10} concentrations at the receptor location R1 is presented in Table 10-16 to Table 10-18.

Table 10-16: DMRB Screening Method predicted NOx and PM_{10} concentrations at the receptor location R1 in the baseline year 2023 (µg/m^3).

Location	DMRB Predicted Annual Mean NOx (µg/m^3) at R1.	DMRB Predicted Annual Mean PM_{10} (µg/m^3) at R1.
@ R1	4.70	14.89

Table 10-17: DMRB Screening Method predicted NOx and PM_{10} concentrations at the receptor location R1 in the Year of Opening 2028, Without and With Development (µg/m^3).

Location	DMRB Predicted Annual Mean NOx (µg/m^3) at R1.	DMRB Predicted Annual Mean PM_{10} (µg/m^3) at R1.
@ R1 Without Development	4.56	14.89
@ R1 With Development	4.64	14.90

Table 10-18: DMRB Screening Method predicted NOx and PM_{10} concentrations at the receptor location R1 in the Design Year 2043, Without and With Development (µg/m^3).

Location	DMRB Predicted Annual Mean NOx (µg/m^3) at R1.	DMRB Predicted Annual Mean PM_{10} (µg/m^3) at R1.
@ R1 Without Development	5.34	14.99
@ R1 With Development	5.37	15.00

The Transport Infrastructure Ireland "*Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106*" (TII, 2022) guideline states the recommended method for the conversion of NOx to NO_2 is the UK DEFRA NOx to NO_2 calculator (UK DEFRA, 2020, version 8.1). The NOx to NO_2 calculator accounts for the predicted availability of O_3 and proportion of NOx emitted as NO for each Local Authority across the UK. O_3 is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO_2 or PM_{10}. The NOx to NO_2 calculator was designed for local authorities in the UK. To use the calculator for modelling assessments in Ireland, Transport Infrastructure Ireland guidance recommends using the Northern Ireland local authority 'Armagh, Banbridge and Craigavon' for the NOx to NO_2 calculator. The choice of Armagh, Banbridge and Craigavon provides the most suitable relationship between NOx to NO_2 for the Republic of Ireland. The 'All other Urban UK Traffic' traffic mix option was used. This is considered the relevant traffic mix option comparative to the Proposed Development site which is located in the centre of Galway city.

Using the NO_x to NO_2 calculator, the DMRB Screening Method predicted NO_x concentrations have been used to predict the NO_2 concentrations at the receptor location R1 at the façade of the Proposed Development. The annual mean NO_2 concentration of 17.02 µg/m^3 has been used in the NO_x to NO_2 calculator to predict the NO_2 concentration at the receptor location R1.

The predicted NO_2 and PM_{10} concentrations at the receptor location in the Year of Opening and in the Future Year are presented in Table 10-19 and Table 10-20**Error! Reference source not found.**.

Table 10-19: Predicted Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) concentrations at the receptor location R1 in the Year of Opening 2028, Without and With Development (µg/m^3).

Location and Scenario	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)
@ R1 Without Development	19.42	14.89
@ R1 With Development	19.46	14.90

Table 10-20: Predicted Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) concentrations at the receptor location R1 in the Design Year 2043, Without and With Development (µg/m^3).

Location and Scenario	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)
@ R1 Without Development	19.8	14.99
@ R1 With Development	19.82	15.00

The predicted NO_2 and PM_{10} concentrations have been compared with the relevant Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) (See Table 10-1). The results of the DMRB Screening Method and subsequent Air Quality Impact Assessment for NO_2 and PM_{10} indicate that there will not be an exceedance of the relevant Air Quality Limit Values for NO_2 and PM_{10} at the Proposed Development.

Table 10-21: Predicted Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) concentrations at the receptor location R1 in the Design Year 2043, Without and With Development (µg/m³). in comparison to EU & WHO Air Quality Limit Values

Pollutant and Scenario Annual Mean (µg/m³)	Annual Mean (µg/m³)	Air Quality Limit Values (µg/m³)		
		Current EU 2008 Limit Values (µg/m³)	EU 2024 Limit Values (µg/m³) (Limit values for the protection of human health to be attained by 1st January 2030)	WHO 2021 Air Quality Guidelines (µg/m³)
NO_2 @ R1 Without Development	19.8 ug/m³	40 µg/m³	20 µg/m³	10 µg/m³
NO_2 @ R1 With Development	19.82 ug/m³			
PM_{10} @ R1 Without Development	14.99 ug/m³	40 µg/m³	20 µg/m³	5 µg/m³
PM_{10} @ R1 Without Development	15.00 ug/m³			

It is noted that for both the Without Development and with Development scenarios, the NO_2 concentrations are predicted to remain below the current statutory limits for the protection of human health and the EU 2024 Limit Values (µg/m³) (Limit values for the protection of human health to be attained by 1st January 2030).

Table 10-22 and Table 10-23 summarise the description of magnitude of impact on NO_2 and PM_{10} concentrations at the receptor locations in the year of opening 2028 and in the design year 2043 respectively, in accordance with the rationale for describing the impact of the proposal derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance (EPUK & IAQM) Land-Use Planning & Development Control: Planning for Air Quality (January 2017).

Table 10-22: Description of magnitude of impact in terms of NO_2 and PM_{10} concentrations at the receptor location R1 in the year of opening 2028.

Location and Scenario	Absolute Change in 2028	Relative Change in % of AQAL	Percentage predicted concentration relative to AQAL	Predicted Impact
NO_2 @ R1 – With Dev.	0.04	0.10%	48.65%	Negligible
PM_{10} @ R1 – With Dev.	0.01	0.02%	37.25%	Negligible

Table 10-23: Description of magnitude of impact in terms of NO_2 and PM_{10} concentrations at the receptor location R1 in the design 2043.

Location and Scenario	Absolute Change in 2028	Relative Change in % of AQAL	Percentage predicted concentration relative to AQAL	Predicted Impact
NO_2 @ R1 – With Dev.	0.02	0.05%	49.55%	Negligible
PM_{10} @ R1 – With Dev.	0.01	0.02%	37.50%	Negligible

As outlined in *Section 7 Assessing Significance* of the EPUK & IAQM guidance document a judgment of significance should be made by a competent professional. The results of the DMRB Screening Method and subsequent Air Quality Impact Assessment indicate that there will be a negligible impact on air quality in the vicinity of the Proposed Development from associated traffic flows. Future residents of the Proposed Development will not experience a significant air quality impact. A detailed atmospheric dispersion model of traffic emissions is not required based on the existing air quality and the future predicted air quality impact due to traffic flows in the area of the Proposed Development.

In terms of annual mean NO_2 and PM_{10} concentrations from road traffic emissions, as impact descriptors for individual receptors as outlined in **Error! Reference source not found.**, there will be a negligible impact. The long-term average concentration at receptors will be less than 75% of the relevant Air Quality Assessment Level (AQAL) and the percentage change in concentration will be <1% of the AQAL.

Impacts on Sensitive Designated Habitats

The potential for air quality impact during the operational phase on a sensitive designated habitat is highest within 200m of a proposed project and within 200m of roads where significant changes in AADT (>5% AADT increase) occur. While the TII Guidelines (PE-ENV-01106, 2022) were developed for road schemes they are relevant and regularly used for developments which have impacts on road traffic or alignment. The following assessment criteria is used to determine whether an assessment for nitrogen deposition should be conducted:

- There is a designated area of conservation within 200m of the Proposed Development; and
- There is a significant change i.e. a >5% increase in AADT flows.

Lough Corrib Special Area of Conservation (SAC) is located approximately 18m west of the redline site boundary as shown in Figure 10:2**Error! Reference source not found.**. The TII guidelines (2022) state that if the potential impact of a development is limited to a local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>5%) and the designated / ecologically sensitive site is located within 200m of the road centre line.

As evident from Table 10-7 and Table 10-8, the predicted AADT traffic flows on Dyke Road and the Headford Road with the Proposed Development do not increase by more than 5%.

There are no qualifying interests of the Lough Corrib SAC, i.e. specific locations that are sensitive to nitrogen within 200m of the Proposed Development. Therefore, an assessment of traffic emissions on the designated / ecologically sensitive site is not required.

10.5.3 Potential Cumulative Impacts

1. Baseline Scenario

The air quality in the surrounding area will continue to be dominated by road traffic emissions on Dyke Road and Headford Road as well as from occasional car movements on the existing car park area primarily during daytime. Therefore, the air quality will remain unchanged to that presented in Section 10.3 Existing Environment (Baseline Situation).

2. Assessment Scenario 1 (the Proposed Development)

The future predicted traffic flows on Dyke Road and Headford Road due to the Proposed Development in future years, 2028 and 2043, include for the cumulative impact of other proposed developments in the area. Due to the relatively small additional traffic volume predicted to be generated due to the Proposed Development, including other proposed developments in the area, there will be a negligible change in air quality as predicted. Therefore, the cumulative operational air quality impact of any permitted developments and the Proposed Development are predicted to cause an insignificant air quality impact during the operational phase in the short term and long term.

Potentially, the most significant cumulative impact may occur if the construction phase of the Proposed Development overlaps with other developments in the area. However, should the construction phase of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction mitigations are put in place during construction, construction air quality and dust impacts will not be significant.

In relation to the in-combination construction and/or operational impact of the Proposed Development, with existing and approved projects in the area, the list of existing and approved projects supplied by Enviroguide has been reviewed.

A list of projects within 500m from the site were considered.

In section 10.6.1 Mitigation Measures it states:

If applicable, 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. (IAQM Guidance on the assessment of dust from demolition and construction, 2024)

ABP- 314597-22 Galway City Council, at University Road to Dublin Road, Galway City: The development proposal includes for the BusConnects Galway Cross-City Link Scheme, located 0.2km to the south of the Proposed Development. The aim of the Proposed Scheme is to provide improved walking, cycling and bus infrastructure on this key access corridor in Galway City.

The Construction Phase of this proposed scheme will involve predominately utility diversions, road widening works, road excavation works (where required), road and junction

reconfiguration and resurfacing works, public realm improvements including landscaping, pavement works including bus lanes, cycle tracks, bus terminals, and movement of machinery and materials along the proposed scheme. If the construction period of this proposed scheme is to overlap with the Proposed Development, there is a potential to impact on air quality in the area. This proposed scheme could be considered a high-risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This proposed scheme will be required to make suitable provision for dust minimisation during construction works in accordance with its own planning conditions.

GCC planning ref. 20184 (Amended by ref. 22259) Cleverson Ltd, at Headford Road, Townparks, Galway, located directly adjacent to the Proposed Development. Permission was granted 12th July 2021 for the demolition of an ESB enclosure and construction of a seven/eight storey development comprising 4 retail units, a gymnasium and student accommodation 7 storeys in height (272 beds). It is believed construction has not started on this project. If the construction period of this project is to overlap with the Proposed Development, there is a potential to impact on air quality in the area. This project could be considered a medium/high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works, in accordance with its own planning conditions.

GCC planning ref. 1847 (amended by ref. 20235) K. King Construction Claregalway Ltd, at 33-35 Saint Brendan's Avenue, Woodquay, Galway, 0.3km south of the Proposed Development. Permission was granted 14/12/2020. Permission was granted for the construction of 27 no. duplex / apartments including 3 to 6 storey apartment block and all associated site development works and services. It is uncertain if construction on this development has started but it is not considered a high-risk construction site and will not result in any significant additional construction/operational air quality cumulative impact.

Galway City Council with Failte Ireland, project at Woodquay Park, Terryland, Galway, 0.3km southwest of the Proposed Development. Planning permission has been requested. This is a Part 10 application with planning permission being sought directly from An Bord Pleanála, for Woodquay Park Landscape Upgrade: Included in the plans is the creation of accessible, public, green space, with biodiversity-friendly planting, age and mobility-friendly pathways, sheltered seating niches and spaces for play and for rest. The project will also involve traffic calming upgrades and improved pedestrian facilities to the surrounding streets. This development is not considered a high risk construction site and will not result in any significant additional construction phase or operational phase air quality cumulative impacts.

Galway City Council, project across the River Corrib, adjacent to Dyke Road, 0.2km southwest of the Proposed Development. Planning permission will be requested for the construction of a pedestrian and cycle bridge which will span the River Corrib connecting the University of Galway (UG) campus to the City Centre via Riverside and Woodquay. This development is not considered a high risk construction site and will not result in any significant additional construction/operational air quality cumulative impact.

3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus

Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction mitigations are put in place during construction, construction air quality impacts will not be significant.

4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

Similar to assessment scenario 1, it is anticipated that the most significant cumulative impact is the potential for the construction phase to overlap with other developments in the area. Should the construction phases of the Proposed Development and other permitted developments coincide, it is predicted that once appropriate construction mitigations are put in place during construction, construction air quality impacts will not be significant.

Future projects of a large scale would need to conduct an EIAR to ensure that no significant construction and/or operational air quality impacts will occur as a result of those developments.

10.5.4 Summary of effects

Table 10-24: Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Preparation of the land (e.g. land clearing, and earth moving), and during construction.	High Sensitivity Receptors – Black Box Theatre and the car park area adjacent to the site boundary	Temporary (short-term) generation of dust and PM: impact of fugitive dust emissions generated by earthworks on amenity and human health at high sensitivity receptors within 250m of these activities.	Potential Negative Adverse Effects	Slight Effects	Short-term Effects	Direct Effect	Mitigation measures for high risk site, in accordance with the CEMP	Not Significant**.** All actions to avoid or reduce the environmental effects are an inherent part of the Proposed Development. Residual impacts are negligible.
Construction Traffic	High Sensitivity Receptor - Lough Corrib SAC	High sensitivity ecological receptor sensitive to nitrogen or ammonia deposition within 200m of roads used during operational phase (impacts from NOx and NH_3)	Potential Negative Adverse Effects	Slight Effects	Short-term	Indirect Effects	Mitigation measures for high risk site, in accordance with the CEMP	Not Significant**.** All actions to avoid or reduce the environmental effects are an inherent part of the Proposed Development. Residual impacts are negligible.
Potential of construction phase overlapping with other developments in the area	High Sensitivity Receptors in area – Black Box Theatre and the car park area adjacent to the site boundary. Residents ~130m to SE at junction of	Temporary (short-term) generation of dust and PM: impact of fugitive dust emissions generated by earthworks on amenity and human health at high sensitivity receptors within 250m of these activities.	Potential Negative Adverse Effects	Slight Effects	Short-term	Cumulative Effects	Mitigation measures for high risk site, in accordance with the CEMP and measures inherent as part of the proposed developments planning conditions	Not Significant**.** All actions to avoid or reduce the environmental effects are an inherent part of the Proposed Development. Residual impacts are negligible.

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
	Headford Road and St. Brigids Place.							
Potential of construction phase overlapping with other developments in the area	High sensitivity ecological receptors sensitive to nitrogen or ammonia deposition within 200m of roads used during operational phase (impacts from NOx and NH_3)	Temporary (short-term) air quality effects at high-sensitivity ecological receptors	Potential Negative Adverse Effects	Slight Effects	Short-term Effects	Cumulative Effects	Mitigation measures for high risk sites and Measures inherent as part of the proposed developments	Not Significant**.** All actions to avoid or reduce the environmental effects are an inherent part of the Proposed Development. Residual impacts are negligible.
Operational Phase								
Operational Traffic	High Sensitivity Receptor - Future Residents of Proposed Development	No significant operational effects can reasonably be expected to occur because the Proposed Scheme will be implemented in accordance with the Project Description	Neutral Effect.	Imperceptible	Long-term	Direct Effect	No Mitigation measures needed	Not Significant**.**
Operational Traffic	High Sensitivity Receptor - Lough Corrib SAC	High sensitivity ecological receptor sensitive to nitrogen or ammonia deposition within 200m of roads used during operational phase (impacts from NOx and NH_3)	Neutral Effect.	Imperceptible	Long-term	Direct Effect	No Mitigation measures needed	Not Significant**.**

10.5.5 "Do Nothing" Impact

The Do-Nothing scenario includes retention of the current site without the Proposed Development in place. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The Do-Nothing scenario is therefore considered a 'neutral impact'.

10.6 Avoidance, Remedial and Mitigation Measures

10.6.1 Construction Phase

Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest sensitive receptors will be controlled to ensure impacts are of negligible significance.

The IAQM Guidance recommends that significance is only assigned to the effect after considering the construction activity with mitigation. Therefore, the detailed mitigation measures have been defined in a form suitable for implementation by way of a planning condition and will be included in a Construction Environmental Management Plan.

The IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the risk of potential impact from dust soiling due to earthworks and trackout is low risk and is medium risk for construction. The risk of potential impact on human health is negligible for earthworks and is low risk for construction and trackout. The risk of potential impact on ecological receptors is low risk for earthworks and is high risk for construction and trackout.

In accordance with the IAQM Guidance, the highest risk category should be applied when determining proposed mitigation measures. Therefore, the mitigation measures applicable to a **high risk site** will be applied:

<u>General Measures</u>

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.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 logbook.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, 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.

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.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or

battery powered equipment where practicable.

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas.

- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

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

- Avoid bonfires and burning of waste materials.

The IAQM Guidance Mitigation Measures applicable to the specific works undertaken are as follows:

Measures specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.

- Only remove the cover in small areas during work and not all at once.

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 power 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 logbook.

- 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.

10.6.2 Operational Phase

There is no requirement for mitigation measures relating to the operational phase. The development has been shown to be not significant in terms of air quality impacts. Future proposed engine improvements and a transition to electric vehicles will result in continued improvement in urban air quality into the future.

10.6.3 "Worst Case" Scenario

A worst case scenario has been assessed in terms of potential construction and operational air quality impacts. Worst case sensitive receptors were chosen in the assessment and air quality mitigation measures outlined above are based on a worst-case assessment in terms of potential construction and operational air quality impacts.

10.7 Residual Impacts

When the dust minimisation measures detailed in the mitigation section of this Chapter are implemented, residual fugitive emissions of dust from the Proposed Development Site will be insignificant and pose no nuisance at nearby receptors.

In relation to air quality during operational phase of the Proposed Development, compliance will be maintained with all relevant ambient air quality standards and guideline values.

The results of the DMRB Air Quality Screening assessment indicate that the residual impacts of the Proposed Development on air quality are predicted to be imperceptible for all parameters with respect to the operational phase local air quality assessment for the long and short term with a negligible impact with regard to all pollutants at receptors in the long term.

The degree of environmental change in terms of air quality that will occur will be insignificant on the future residents of the Proposed Development and the existing residential receptors located approximately 130m to the southeast of the site at junction of Headford Road and St. Brigid's Place.

10.8 Monitoring

10.8.1 Construction Phase

Monitoring of air quality and dust related impacts will be required during the construction stage only of the Proposed Development. The monitoring activities are to:

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

10.8.2 Operational Phase

No operational air quality monitoring is required.

10.9 Interactions

Reference has been made to the project description provided by the EIAR co-ordinator, project drawings provided by the project architects and traffic flow projections associated with the development provided by the traffic consultants.

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between human beings and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the Proposed Development will ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings.

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 considered to be imperceptible.

Additional traffic as a result of the Proposed Development is predicted to cause an increase in NOx concentrations within Lough Corrib SAC. However, this increase is below the assessment criteria stipulated in the TII and DMRB guidance and therefore is not considered significant.

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

10.10 Difficulties Encountered When Compiling

There were no difficulties encountered when compiling this assessment.

10.11 References

DEFRA (2016). Part IV of the Environment Act 1995: Local Air Quality Management Policy Guidance (PG16)

DEFRA (2022). Part IV of the Environment Act 1995: Local Air Quality Management Technical Guidance (TG22)

DEFRA (2023). UK DEFRA Emission Factor Toolkit (EFT) Version 12.0

DEFRA (2020), NOX to NO2 Calculator Version 8.1, available online from https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/

DEHLG (2004). Quarries and Ancillary Activities, Guidelines for Planning Authorities

DEHLG (2010). Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities

EPA (2022). Guidelines on Information to Be Contained in Environmental Impact Statements

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EPUK & IAQM (2017) Land-Use Planning & Development Control: Planning For Air Quality

IAQM (2020). A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites

IAQM (2024). Guidance on the Assessment of Dust from Demolition and Construction

TII (2022), Air Quality Assessment of Specified Infrastructure Projects Overarching Technical Guidance, PE-ENV-01106

UK Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet)

UKHA (2011). Design Manual for Roads and Bridges – LA 114 Climate.

UKHA (2019). Design Manual for Roads and Bridges – LA 105 Air Quality.

WHO (2021). Air Quality Guidelines

Directives and Legislation

Council Directive 2024/2881 of the European Parliament and of the Council of 23rd October 2024 on ambient air quality and cleaner air for Europe (recast).

Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air

Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management and daughter directives

Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air

Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

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

Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

S.I. No. 180 of 2011 Air Quality Standards Regulations 2011

11 MICROCLIMATE

11.1 Introduction

IES Consulting have undertaken an analysis to study the impact from wind around the proposed residential development located near Dyke Road, Galway. The Proposed Development is part of an overall three phased Development Framework which will deliver a residential-led, mixed-use development. Phase 2, an existing car park south of the site, is intended to be redeveloped for civic, commercial and cultural uses. Should the existing Black Box theatre situated to the north be relocated, the site may be repurposed into an additional residential block, designated as Phase 3. Please refer to full development description in Section 3.3 in Chapter 3 Description of Development.

Presence of green spaces within a myriad of building structures makes it tricky to ensure usability of the space throughout the year. It becomes necessary to understand the suitability of external comfort to ensure green spaces are optimally designed and located to maximise their function throughout the year, which includes alleviating the effects of flow around nearby high-rise buildings.

There are two typical cases of acceleration of air as it moves through a built environment. First, when the wind impinges on the face of the building, it slows down and the pressure increases. This high-pressure air will tend to move towards low pressure areas which exist at the base of the building and at the top of the building. This sudden acceleration of air produces downwash and upwash, which could lead to uncomfortable conditions for the pedestrians near the foot of the building as well as occupants on the high-level balconies and terraces.

Further, the effect can be compounded by the second effect, which is the acceleration in the space between the buildings. When the air moves from an open environment and enters a built area, the area available for flow reduces. Consequently, the air speed increases to compensate. This can also lead to gusts, which are primarily experienced by pedestrians walking in between the buildings.

11.1.1 Quality Assurance and Competency of Experts

This Chapter has been prepared by IES (Harshad Joshi, BE (Mech.) MS (Mech. and Aerospace), CFD Consultancy Manager).

This Chapter has been reviewed by IES (Colin Rees, BE (Environmental Engineering) Low Carbon Energy Assessor Level 3, 5 and 5, Low Carbon Consultant and LEED Approved Professional), Associate Director)

11.2 Study Methodology

11.2.1 Lawson Pedestrian Comfort/Safety Criteria

The assessment has been carried out in reference to the Lawson's Pedestrian Comfort and Safety Criterion. This is the most widely used reference for assessment of pedestrian comfort. It considers the air speed at the location as well as the frequency of the occurrence of this air speed. It consists of two assessment criteria:

- The first criteria assess whether the air movement will be comfortable for the pedestrian for different types of activities (Table 11.1).
- The second criteria assess the feeling of safety or distress by the pedestrian at higher air speeds (Table 11.2).

Following table gives the values for the Lawson's pedestrian comfort assessment criteria for various activities.

Category	Pedestrian Activity	Threshold mean hourly wind speed not to be exceeded for more than 5% of the time (m/s)
C1	Business Walking	10
C2	Leisurely Walking	8
C3	Standing	6
C4	Sitting	4

Table 11.1: Lawson's Pedestrian Comfort Assessment Criteria

Following table gives the values for Lawson's Pedestrian Safety Assessment criteria.

Category	Pedestrian Type	Threshold mean hourly wind speed not to be exceeded more than once per annum[2](m/s)
S1	Typical Pedestrian	20
S2	Sensitive Pedestrian	15

Table 11.2: Lawson's Pedestrian Safety Assessment Criteria

[1]*T. V. Lawson (2001) Building Aerodynamics, Imperial College Press, London.*

[2]*Once per annum means the safety threshold is not be exceeded 0.01% of the year.*

11.2.2 Simulation methodology

The methodology for the analysis was as follows:

- The annual mean wind speed was determined from the 'IRL_NW_Galway.039640_TMYx' (epw) weather file.
- 8 steady state CFD simulations were performed corresponding to the 8 directions – SW, W, NW, N, NE, E, SE and S respectively.
- The local air speed at various designated locations around the site was recorded for each of the simulations.
- This value was compared to the meteorological wind speed used and the magnification factor at that location for the corresponding wind direction was determined.
- The magnification factor was used to determine the air speed at the designated locations for the various recorded values of the wind speed and direction in the weather file, thus generating the local air speeds at designated locations for a year.
- These recorded values were compared to the Lawson Pedestrian Comfort/Safety Criteria.

11.2.3 Model Geometry: Phase 1

Figure 11.1 to **Figure 11.12** show the geometry as modelled.

Figure 11.1: Plan view of the site: Phase 1

Figure 11.2: View of the site from the south: Phase 1

Figure 11.3: View of the site from the west: Phase 1

Figure 11.4: View of the site from the north: Phase 1

Figure 11.5: View of the site from the east: Phase 1

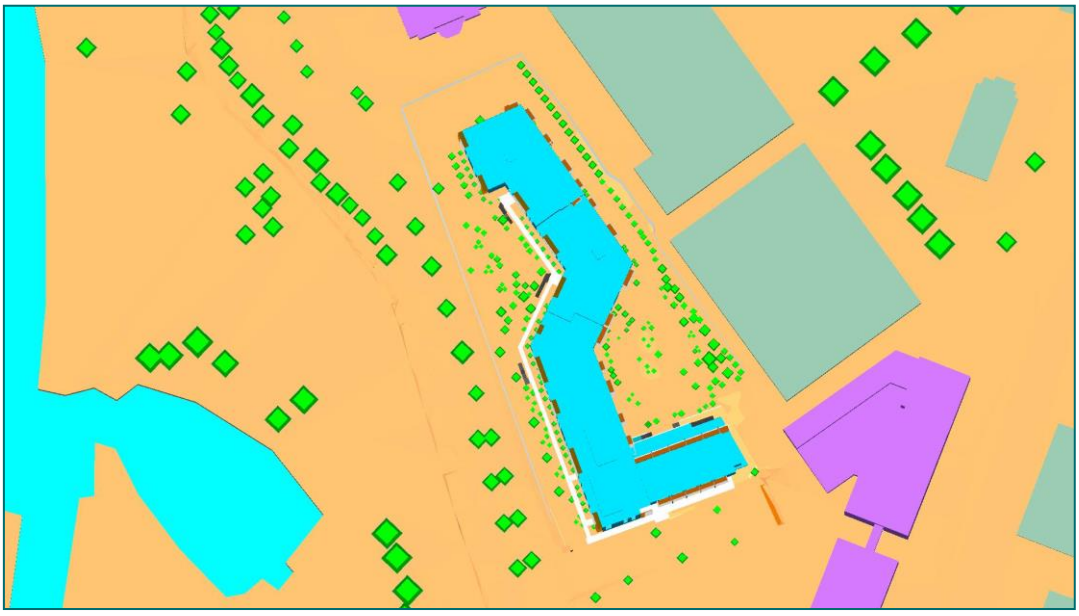

Figure 11.6: Closer view of the main block from the top: Phase 1

Figure 11.7: Closer view of the main block from the south: Phase 1

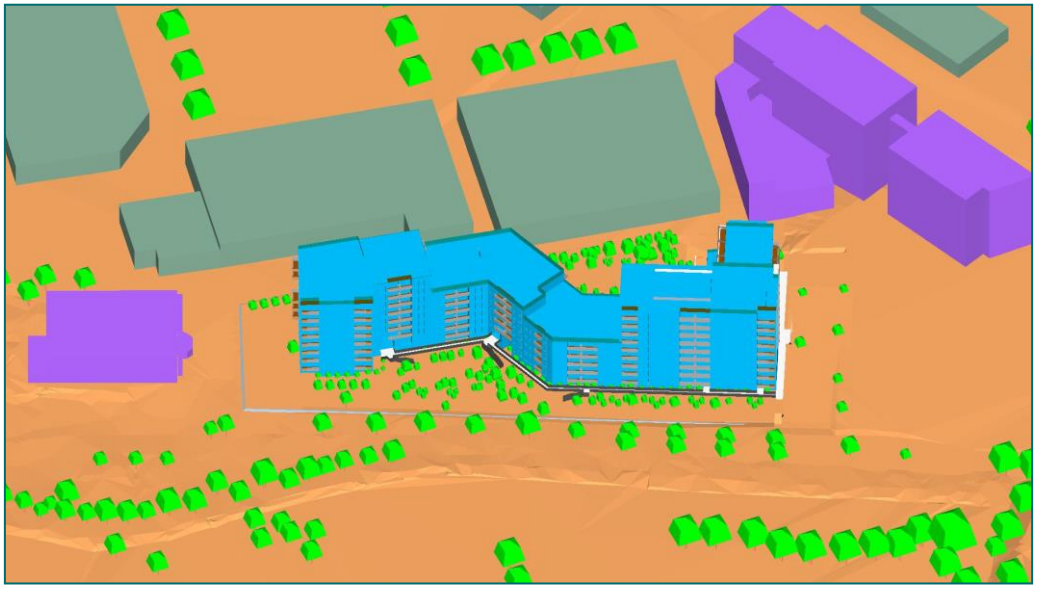

Figure 11.8 Closer view of the main block from the west: Phase 1

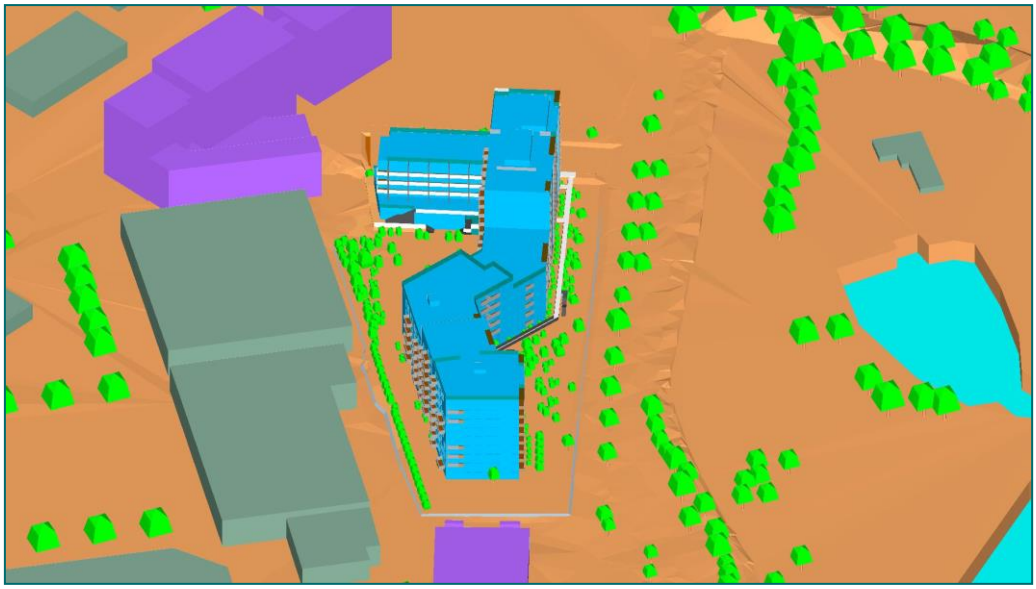

Figure 11.9: Closer view of the main block from the north: Phase 1

Figure 11.10: Closer view of the main block from the east: Phase 1

Figure 11.11: Closer view of the courtyard: Phase 1

Figure 11.12: Closer view of the Boardwalk: Phase 1

11.3 The Existing and Receiving Environment (Baseline Situation)

11.3.1 Weather Data

The analysis is based on the 'IRL_NW_Galway.039640_TMYx' weather file. The variation of wind speed recorded in the weather file is shown in **Figure 11.13** below. **Figure 11.14** shows the wind direction variation and **Figure 11.15** shows the wind rose.

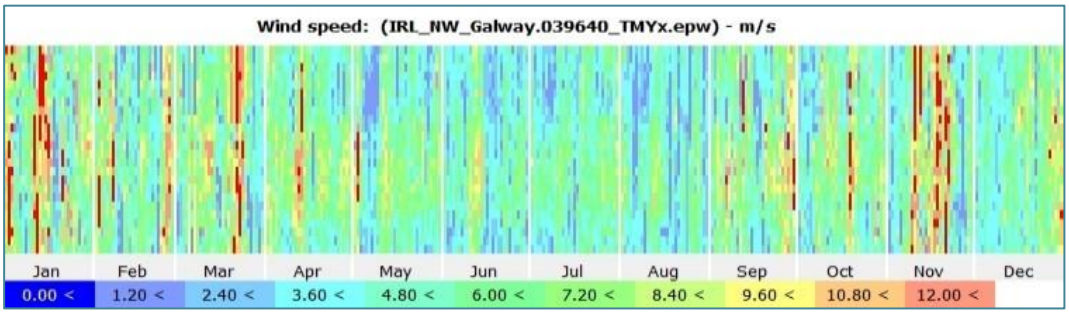

Figure 11.13: Wind speed variation as per IRL_NW_Galway.039640_TMYx.epw

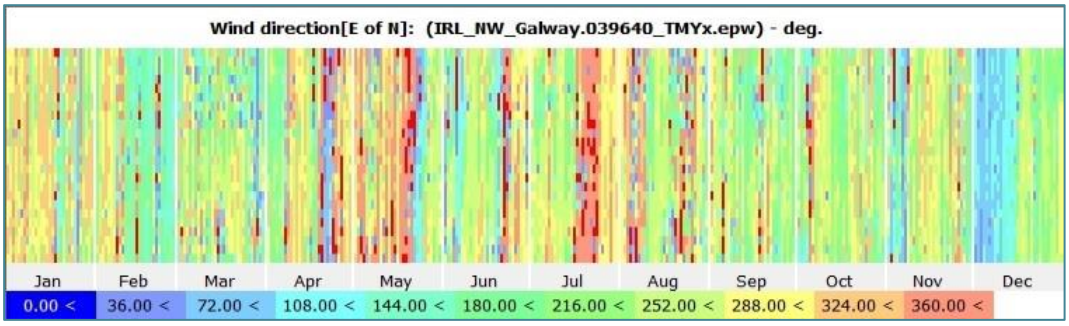

Figure 11.14: Wind direction variation as per IRL_NW_Galway.039640_TMYx.epw

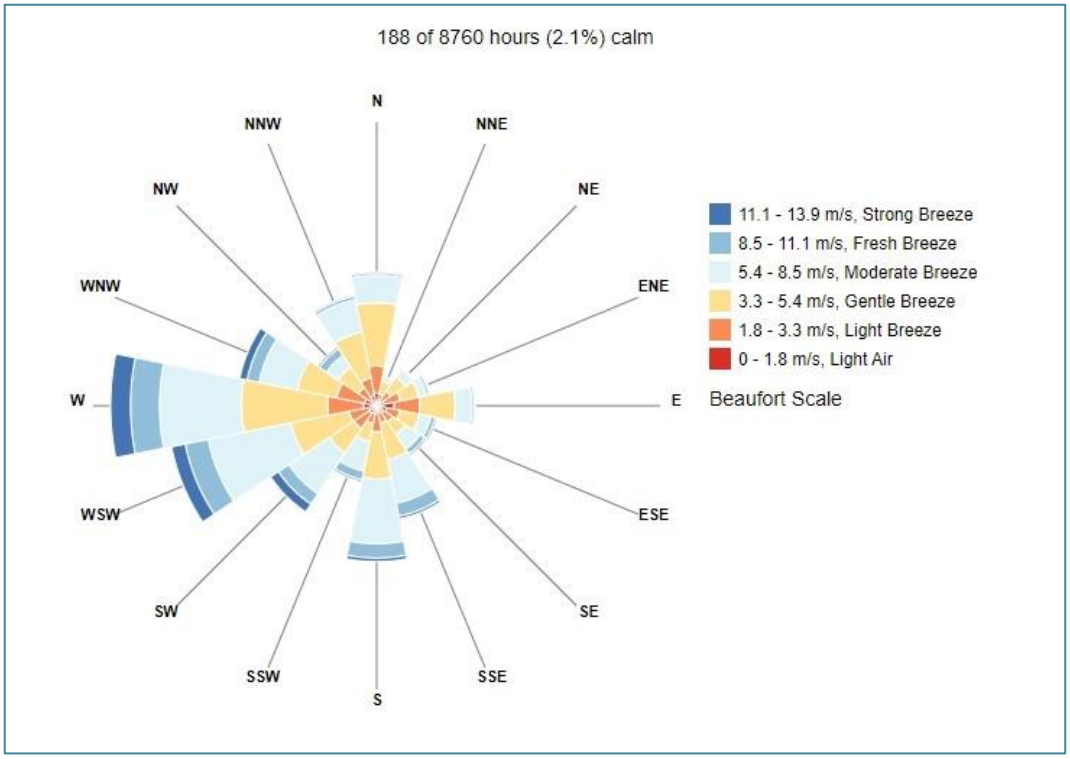

Figure 11.15: Wind rose as per IRL_NW_Galway.039640_TMYx.epw

Based on this, the mean wind speed recorded was **5.6m/s** with a south-westerly prevailing direction.

11.3.2 Weather Statistics

Based on this, the mean, and median wind speed recorded was 5 m/s with a south-westerly prevailing direction. That means, for 50% of year, the wind speed is higher than 5 m/s.

The Lawson's sitting comfort criteria, seen in Table 11.1, states that the local air speed at designated locations should not exceed 4 m/s for more than 5% of the year (equivalent to cumulative period of 18 days). The Lawson's standing comfort criteria states that the local air speed at designated locations should not exceed 6 m/s for more than 5% of the year.

Therefore, the proposed Project would be expected to reduce the frequency of wind speed at the Site by more than 10 times.

11.3.3 Wind Boundary Layer

In an atmospheric boundary layer, wind speed increases with height due to the influence of surface roughness (i.e. the presence of buildings, trees, roads etc. on the ground), see **Figure 11.16**.

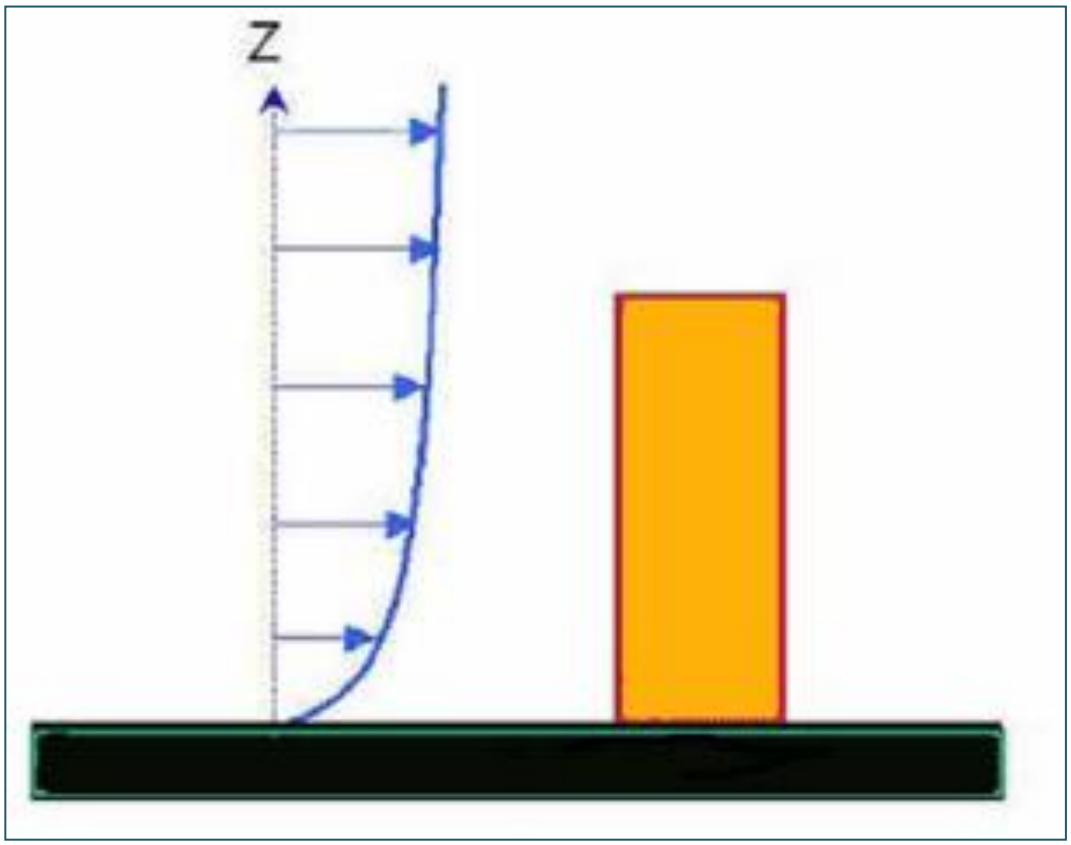

Figure 11.16: Typical velocity profile of an atmospheric boundary layer

In the current CFD modelling, the velocity profile was generated according to the parameterised ASHRAE methodology described below. This allows for different wind profiles across various terrain types: Open country; urban; and city centre.

The wind speed $\mathbf{U_H}$ at height **H** above the ground is given by:

$$U_H = U_{met}\left(\frac{\delta_{met}}{H_{met}}\right)^{a_{met}}\left(\frac{H}{\delta}\right)^{a} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (Eq.1)$$

Where,

a = Exponent in power law wind speed profile for local building terrain

δ = fully developed strong wind atmospheric boundary layer thickness (m)

$\mathbf{a_{met}}$ = Exponent for the meteorological station

$\boldsymbol{\delta_{met}}$ = Atmospheric boundary thickness at the meteorological station (m)

$\mathbf{H_{met}}$ = Height at which meteorological wind speed was measured (m)

$\mathbf{U_{met}}$ = Hourly meteorological wind speed, measured at height $\mathbf{H_{met}}$ (m/s)

The parameters for different types of terrain are given as in **Table 11.3** below.

Terrain Category	Description	a	δ
1	Large city centres 50% of buildings above 21m over a distance of at least 2000m upwind.	0.33	460
2	Urban, suburban, wooded areas.	0.22	370
3	Open, with scattered objects generally less than 10m high.	0.14	270
4	Flat, unobstructed areas exposed to wind flowing over a large water body (no more than 500m inland).	0.10	210

Table 11.3: Terrain Wind Parameters

For the current project, we used the atmospheric boundary layer corresponding to the terrain category 2 i.e. suburban type of site -typical of a low rise city block The met data was taken on category 3 terrain at a height of 10m., which represents the typical location of a weather station.

11.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

11.5 Potential Impact of the Proposed Development

11.5.1 Construction Phase

The simulation for the construction phase was not carried out as the construction phase does not reflect the final shape of the site. Typically, 2m to 3m high hoardings will be installed around

the site while the construction is going on. These hoardings are likely to obstruct the wind to protect the workers from any adverse effects of winds at ground level.

11.5.2 Operational Phase

11.5.2.1 Sitting and Standing Comfort Criteria

The Lawson's Sitting Comfort Criterion states the local air speed at designated locations should not exceed 4m/s for more than 5% of the duration analysed. The Lawson's Standing Comfort Criterion states the local air speed at designated locations should not exceed 6m/s for more than 5% of the duration analysed.

11.5.2.2 Balcony Spaces

Figure 11.17 to **Figure 11.24** show the results of sitting and standing comfort on the balconies. Results show excellent compliance and fully met the requirements of the Lawson's Sitting and Standing Comfort Criterion for full year. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement. There are unlikely to be effects on the balcony spaces.

No adverse effects with respect to all pedestrian activities are observed on the balcony extents.

No mitigation measures are recommended.

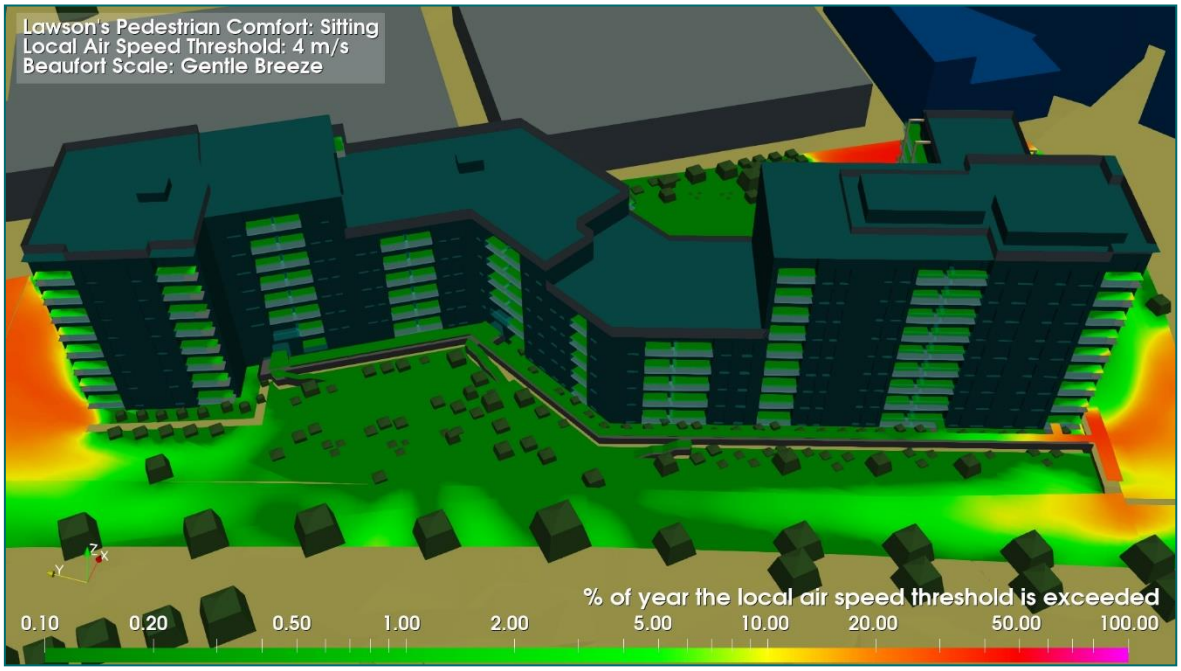

Figure 11.17: Sitting Comfort Criterion: Balconies: West Façade

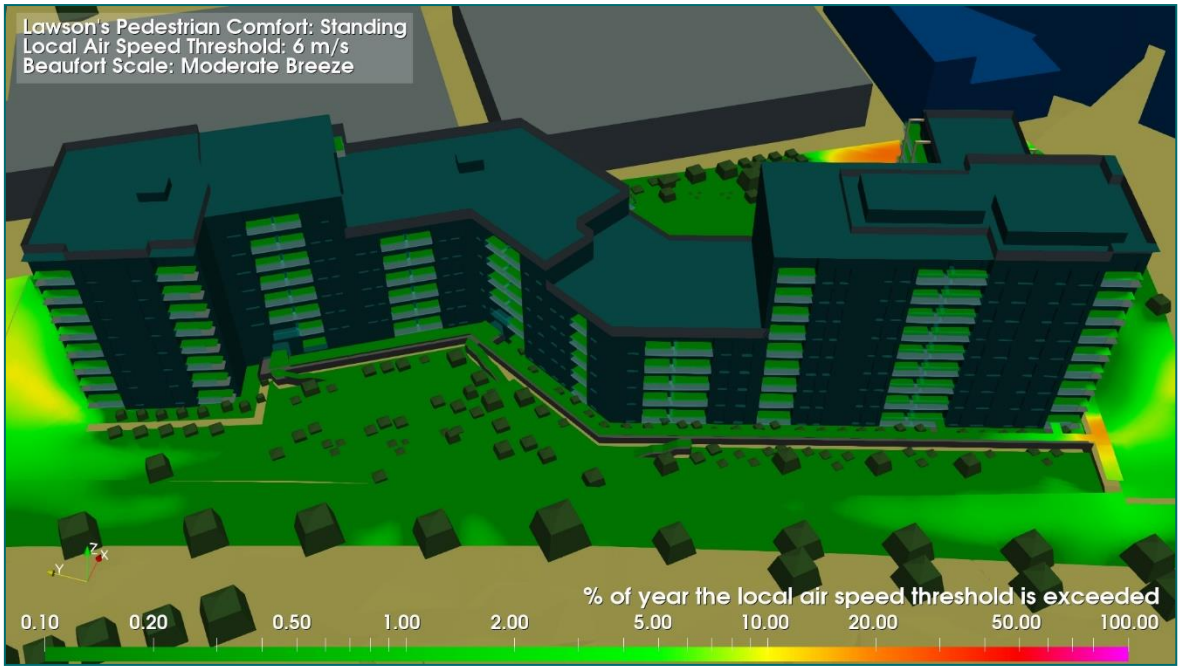

Figure 11.18: Standing Comfort Criterion: Balconies: West Façade

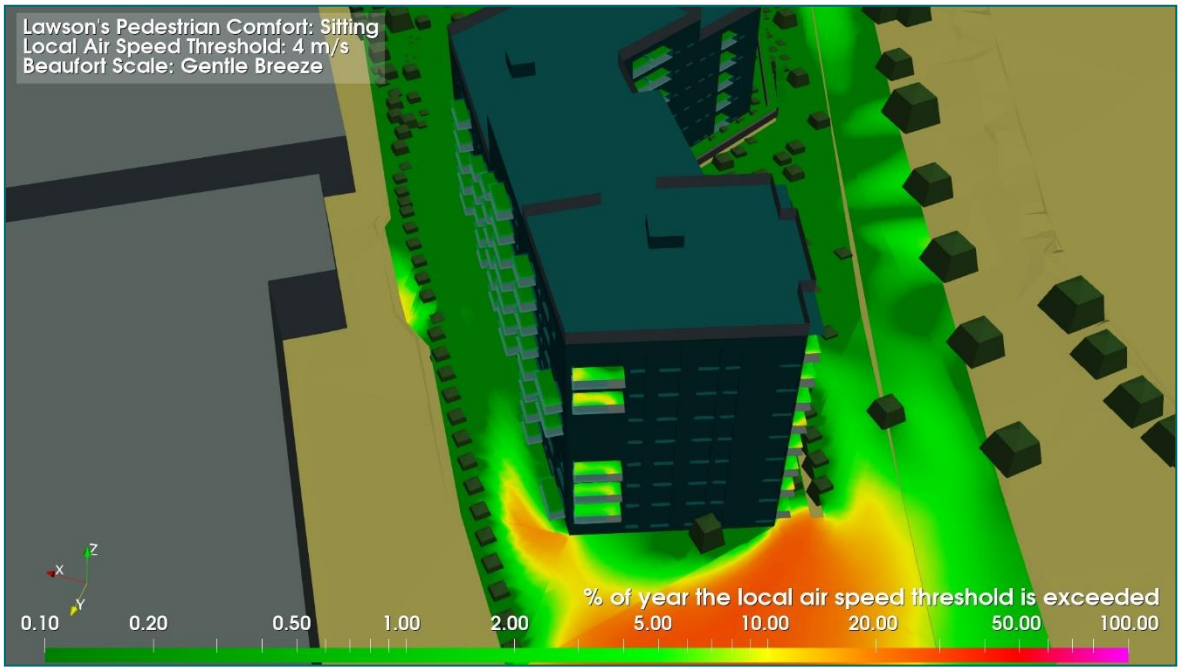

Figure 11.19: Sitting Comfort Criterion: Balconies: North Façade

Figure 11.20: Standing Comfort Criterion: Balconies: North Façade

Figure 11.21: Sitting Comfort Criterion: Balconies: East Façade

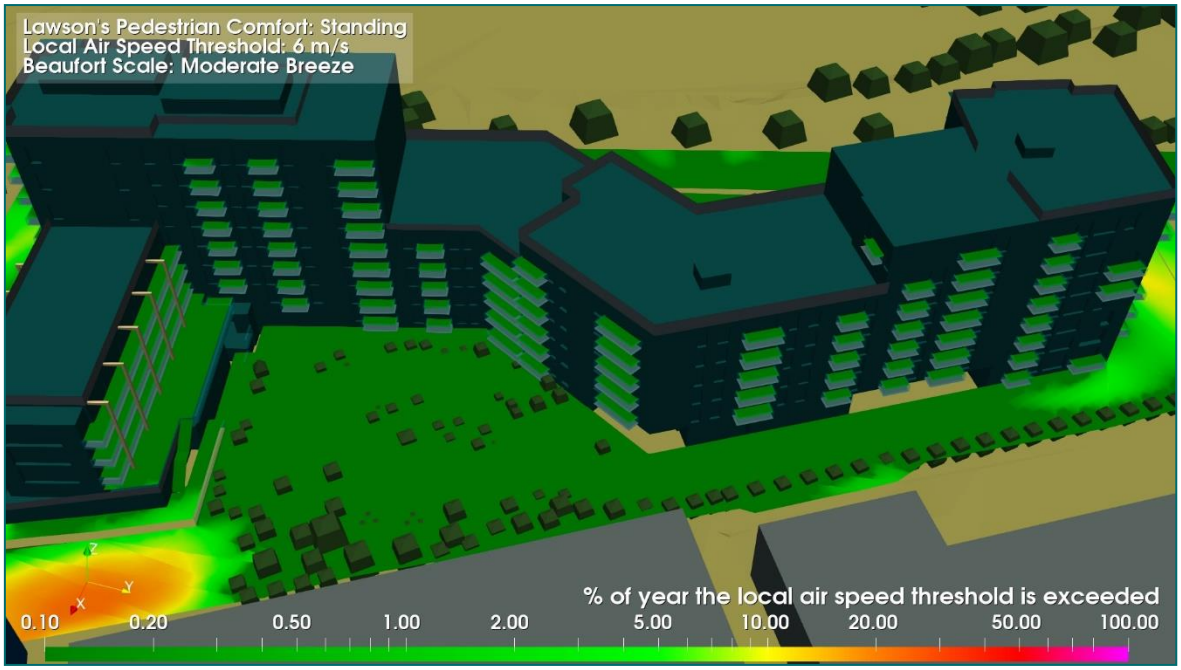

Figure 11.22: Standing Comfort Criterion: Balconies: East Façade

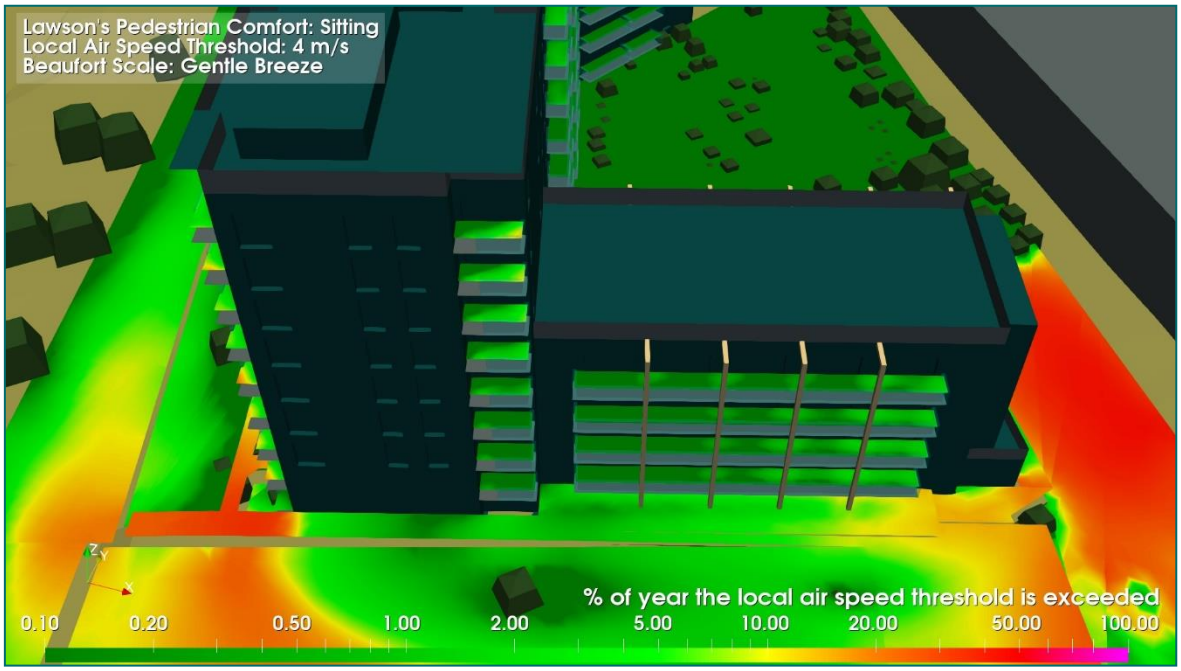

Figure 11.23: Sitting Comfort Criterion: Balconies: South Façade

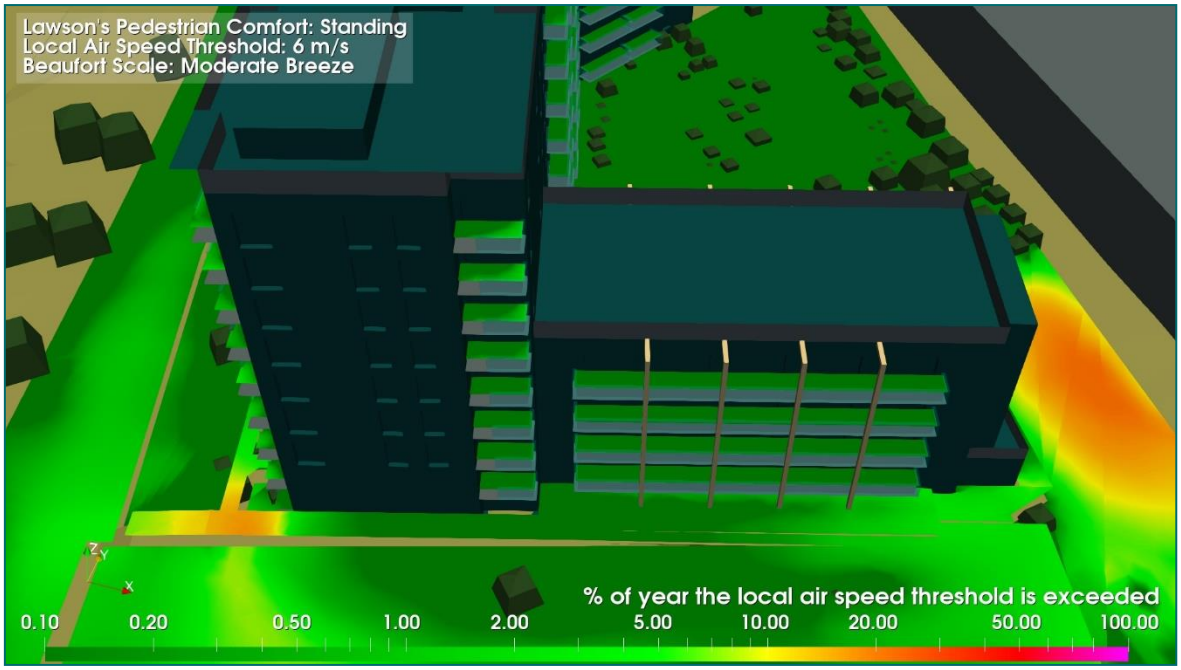

Figure 11.24: Standing Comfort Criterion: Balconies: South Façade

11.5.2.3 Ground Amenities

11.5.2.3.1 Public Open Space and Courtyard

Figure 11.25 and **Figure 11.26** below show the results of sitting and standing comfort on the public open spaces and courtyard space marked in white.

The results show excellent compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement. There are unlikely to be effects on the public open spaces, with no further mitigation measures required.

No adverse effect with respect to sitting, standing and walking comfort activities are observed on the public open spaces and the courtyard.

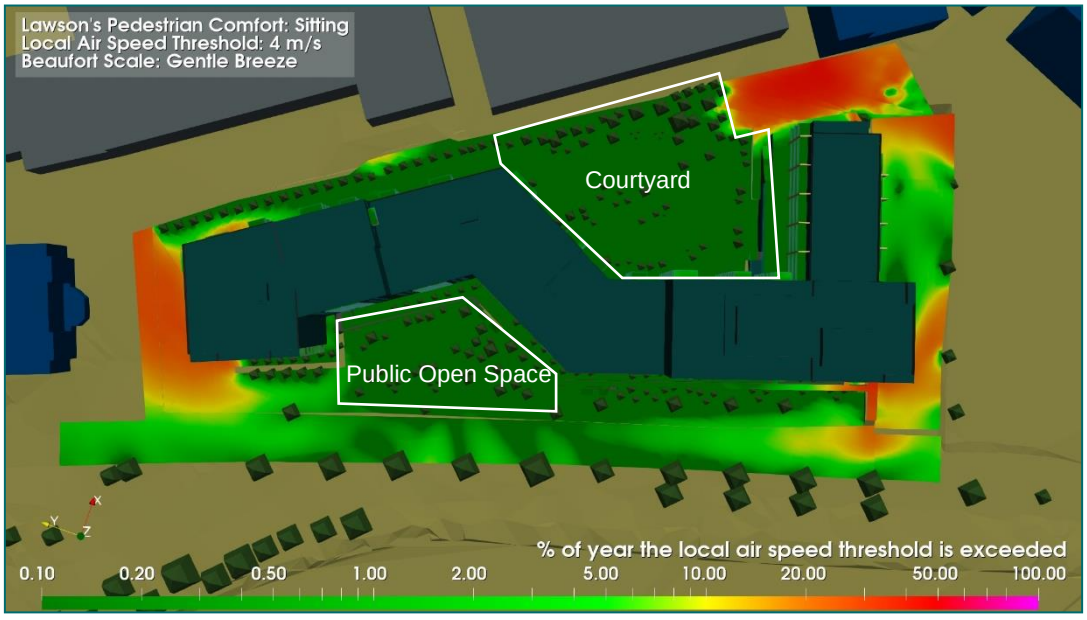

Figure 11.25: Sitting Comfort Criterion: Ground Amenities: Public Open Space and Courtyard

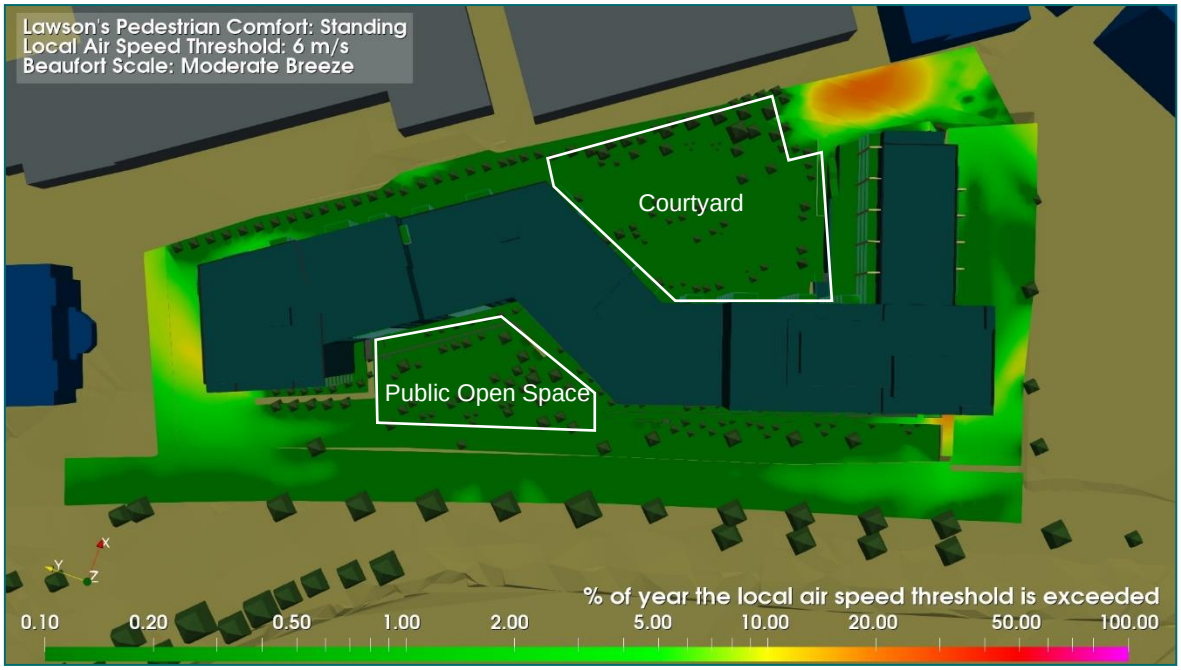

Figure 11.26: Standing Comfort Criterion: Ground Amenities: Public Open Space and Courtyard

11.5.2.3.2 Creche Play Spaces

Figure 11.27 and **Figure 11.28** below show the results of sitting and standing comfort on the creche play spaces marked in white.

The results show excellent compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement. There are unlikely to be effects on the creche play spaces, with no further mitigation measures required.

No adverse effect with respect to sitting, standing and walking comfort activities are observed on the creche play area.

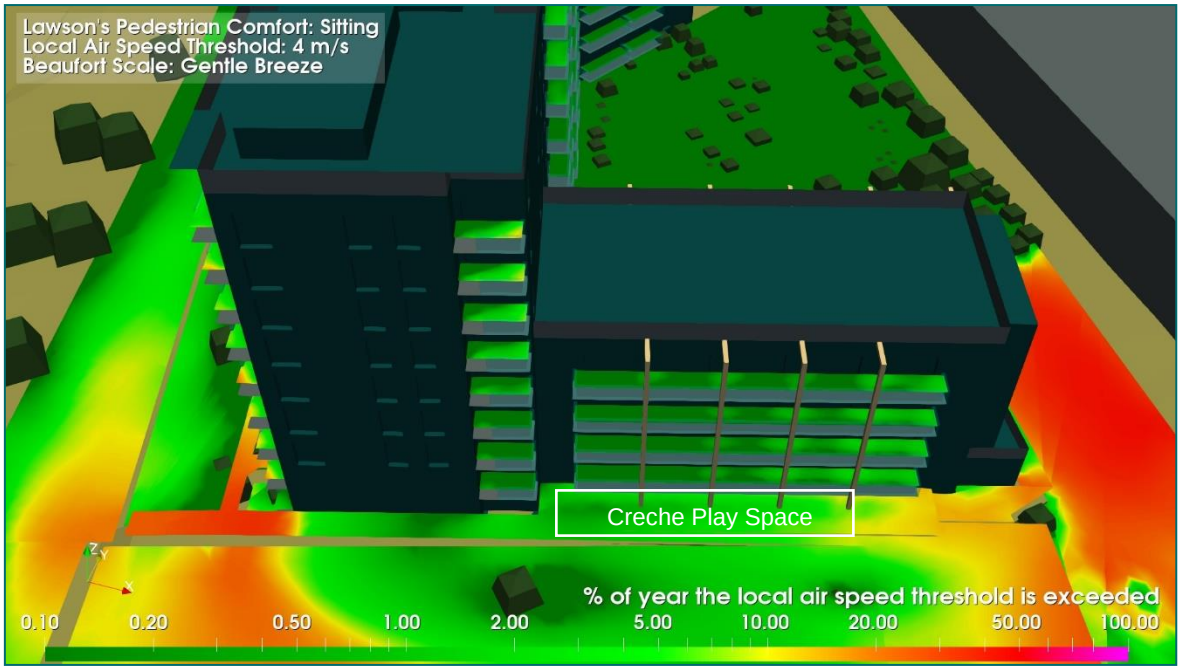

Figure 11.27: Sitting Comfort Criterion: Ground Amenities: Creche Play Spaces

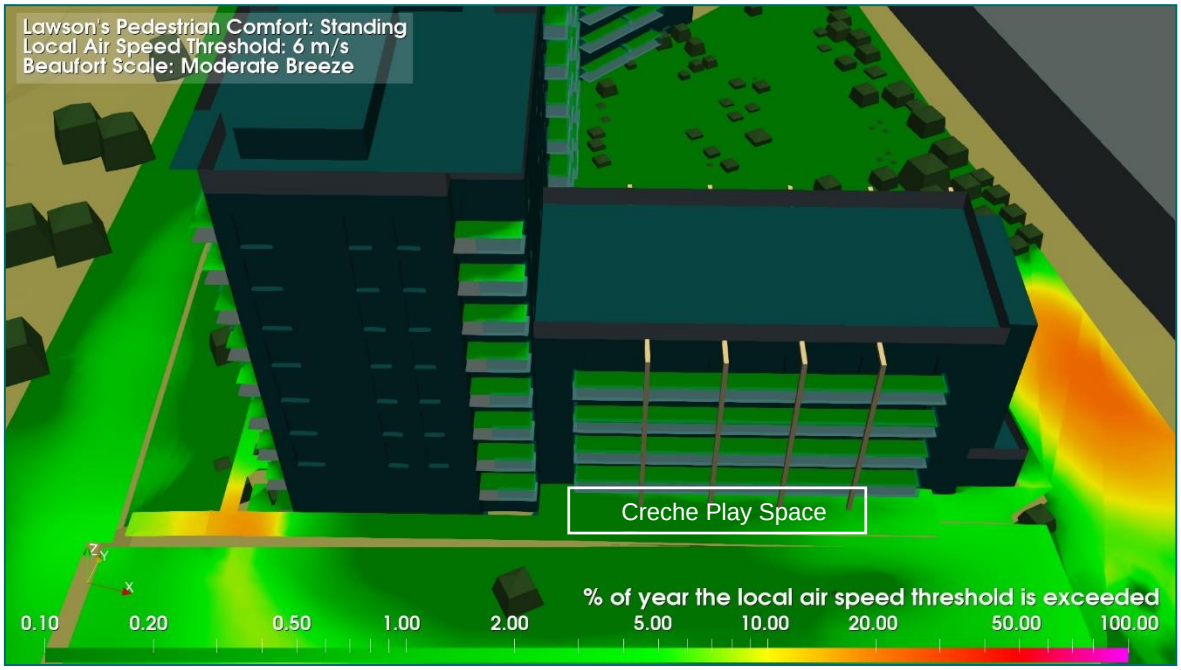

Figure 11.28: Standing Comfort Criterion: Ground Amenities: Creche Play Spaces

11.5.2.3.3 Ground Amenities towards South

Figure 11.29 and **Figure 11.30** below show the results of sitting and standing comfort on the ground amenities towards south. These are marked in white.

The results show good compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion for the full year. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement.

Some spaces with yellow and orange color contouring show limited compliance to the Lawson's sitting comfort. The local air speed is likely to exceed 4m/s for up to 20% of the year

at these locations. These spaces are impacted due to unobstructed wind flowing from prevailing westerly and south westerly wind. Also, wind gets accelerated due to the passage between the main block and the adjacent block towards south.

When comparing these results with the Lawson's Standing Comfort Criterion results, they show excellent compliance, i.e. the local air speed does not exceed 6 m/s for more than 5% of the year, see **Figure 11.30**. Of the 20% of the year when the local air speed exceeds 4 m/s, three quarters of the collective time (i.e. 15% of the year) it does not exceed 6 m/s. The local air speed on balconies will be less than 4m/s for 80% of the year and between 4-6 m/s for 15% of the year. Any exceedance noted can be considered very marginal as the air speed even if more than 4 m/s is unlikely to higher than 6 m/s for more than 5% of the year, and will not result in an unpleasant environment to use. The local air speed will only be greater than a gentle breeze but more frequently less than a moderate breeze. Such conditions are unlikely to have any impact on usability of the space for recreation. The effects can be termed as 'Not Significant'.

Overall, the local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities at the ground level.

There are no sitting activities designed at these locations. These locations are access path to the building and the various amenities. Seating activities are unlikely to occur on this pathway, as people would be moving in and out. Standing and Walking activities are likely to occur when people access these locations.

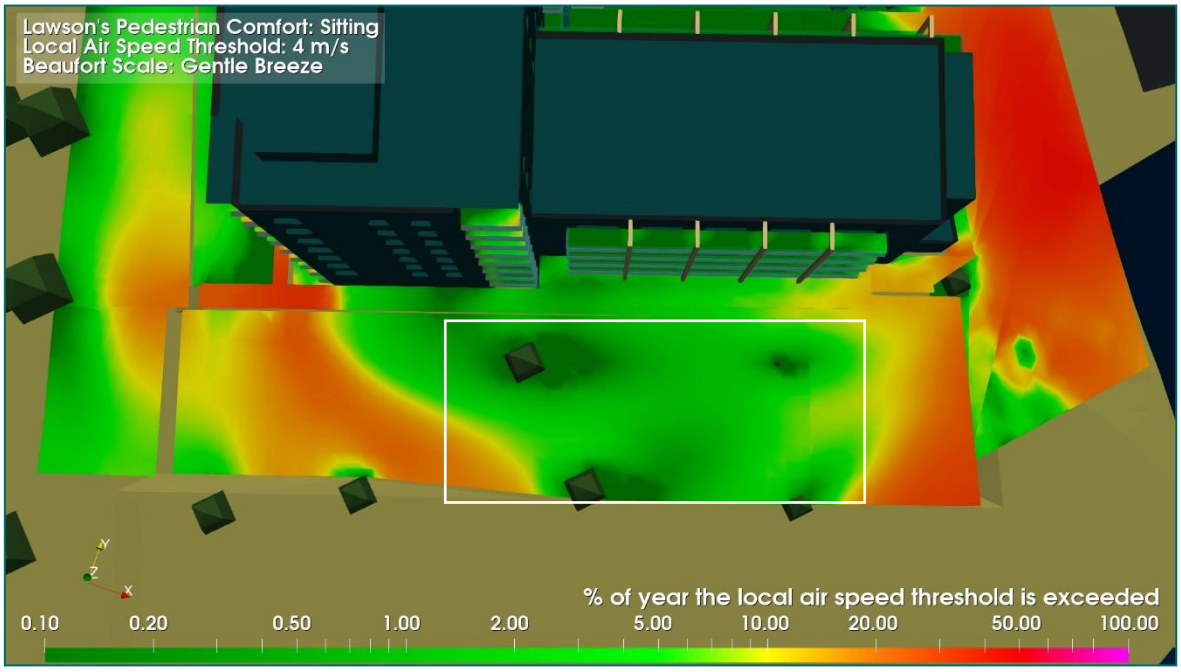

Figure 11.29: Sitting Comfort Criterion: Ground Amenities: Towards South

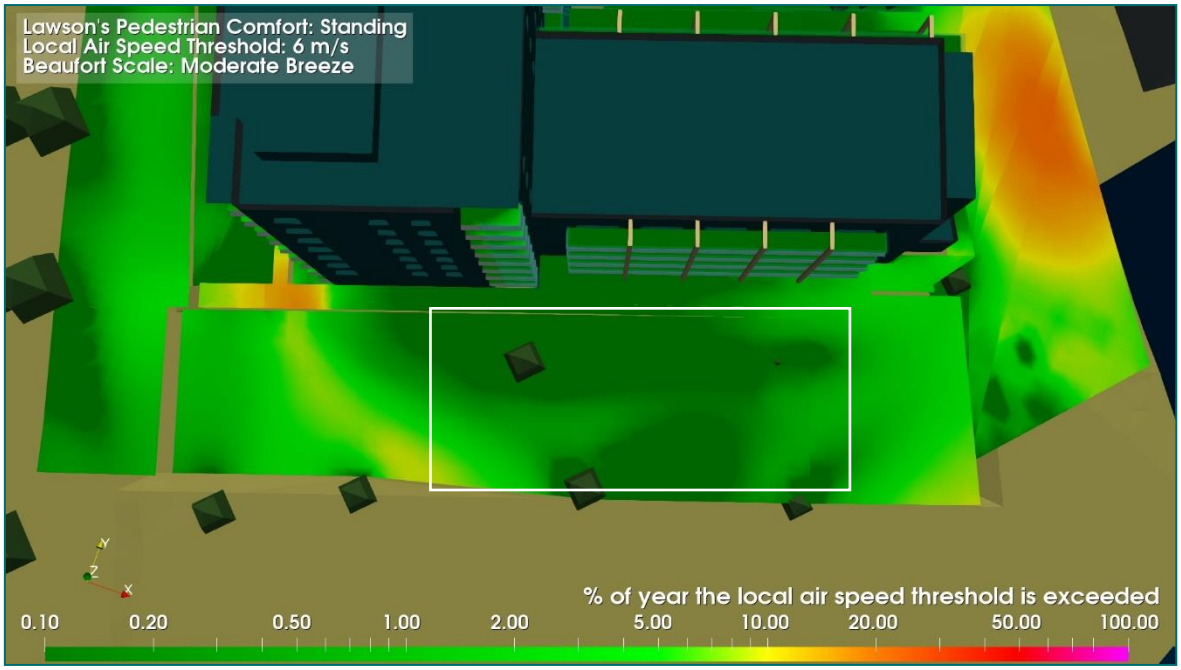

Figure 11.30: Standing Comfort Criterion: Ground Amenities: Towards South

11.5.2.3.4 Ground Amenities towards North

Figure 11.31 and **Figure 11.32** below show the results of sitting and standing comfort on the ground amenities towards north. These are marked in white.

The results show good compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion for the full year. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement.

Some spaces with yellow and orange color contouring show limited compliance to the Lawson's sitting comfort. The local air speed is likely to exceed 4m/s for up to 20% of the year at these locations. These spaces are impacted due to unobstructed wind flowing from prevailing westerly and south westerly wind.

When comparing these results with the Lawson's Standing Comfort Criterion results, they show excellent compliance, i.e. the local air speed does not exceed 6 m/s for more than 5% of the year, see **Figure 11.32**. For the 20% of the year when the local air speed exceeds 4 m/s, three quarters of the collective time (i.e. 15% of the year) it does not exceed 6 m/s. The local air speed on balconies will be less than 4m/s for 80% of the year and between 4-6 m/s for 15% of the year. Any exceedance noted can be considered very marginal and will not result in an unpleasant environment is to use. The local air speed will only be greater than a gentle breeze but more frequently less than a moderate breeze. Such conditions are unlikely to have any impact on usability of the space for recreation. The effects can be termed as 'Not Significant'.

Overall, the local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities at the ground level.

There are no sitting activities designed at these locations. These locations are access path to the building and the various amenities. Seating activities are unlikely to occur on this pathway, as people would be moving in and out. Standing and Walking activities are likely to occur when people access these locations.

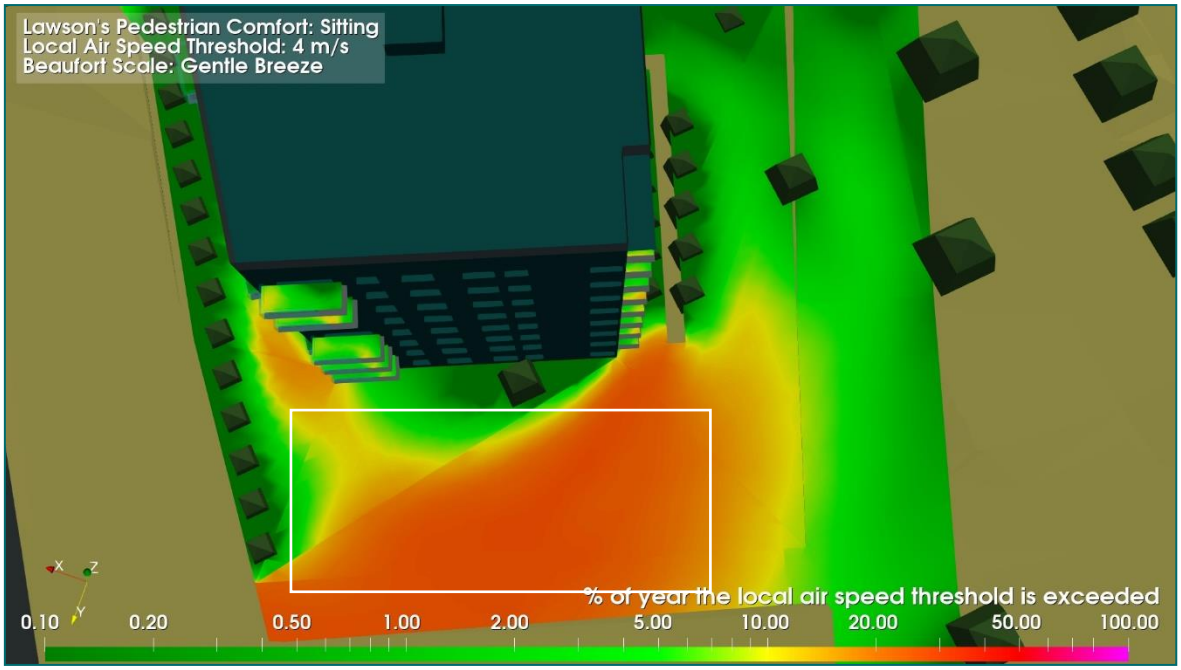

Figure 11.31: Sitting Comfort Criterion: Ground Amenities: Towards North

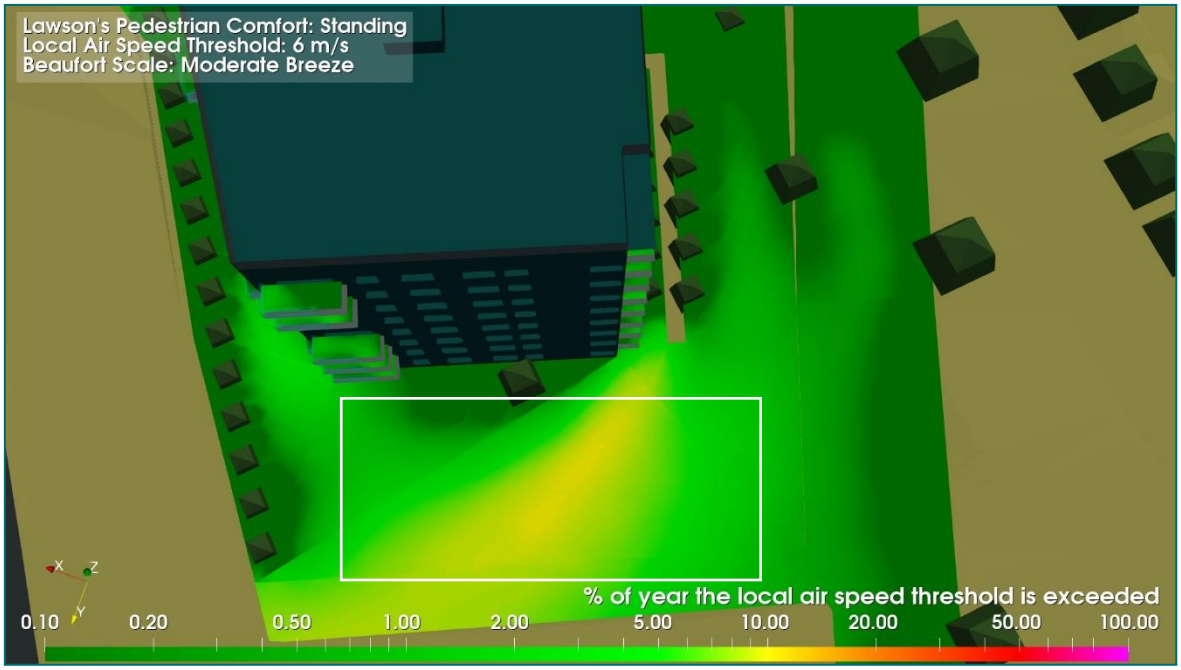

Figure 11.32: Standing Comfort Criterion: Ground Amenities: Towards North

11.5.2.4 Raised Boardwalk

Figure 11.33 and **Figure 11.34** below show the results of sitting and standing comfort on the raised boardwalk near the west façade of the building. The results show excellent compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement. There are unlikely to be effects on the boardwalk, with no further mitigation measures required.

The boardwalk entrances towards south and north show limited compliance with the Lawson's Sitting Comfort Criterion. The local air speed is likely to exceed 4m/s for more than 20% of the year at these locations. These are impacted due to the wind flowing from the prevailing westerly and south-westerly direction.

When comparing the results for these balconies to Lawson's Standing Comfort Criterion results, they show good compliance, i.e. the local air speed does not exceed 6 m/s for more than 5% of the year, see **Figure 11.34**. For the 20% of the year when the local air speed exceeds 4 m/s, three quarters of the collective time (i.e. 15% of the year) it does not exceed 6 m/s. The local air speed on balconies will be less than 4m/s for 80% of the year and between 4-6 m/s for 15% of the year. Any exceedance noted can be considered very marginal and will not result in an unpleasant environment is to use. The local air speed will only be greater than a gentle breeze but more frequently less than a moderate breeze. Such conditions are unlikely to have any impact on usability of the space for recreation.

There is not be any sitting activity designed on the boardwalk. It is mainly designed for the walking activity to move in and out from the building. There are unlikely to be effects on the boardwalk, with no further mitigation measures required. The effects can be termed as 'Not Significant'.

Overall, the local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities at the ground level.

There are no sitting activities designed at these locations. These locations are access path to the building and the various amenities. Seating activities are unlikely to occur on this pathway, as people would be moving in and out. Standing and Walking activities are likely to occur when people access these locations.

Figure 11.33: Sitting Comfort Criterion: Ground Amenities: Raised Boardwalk

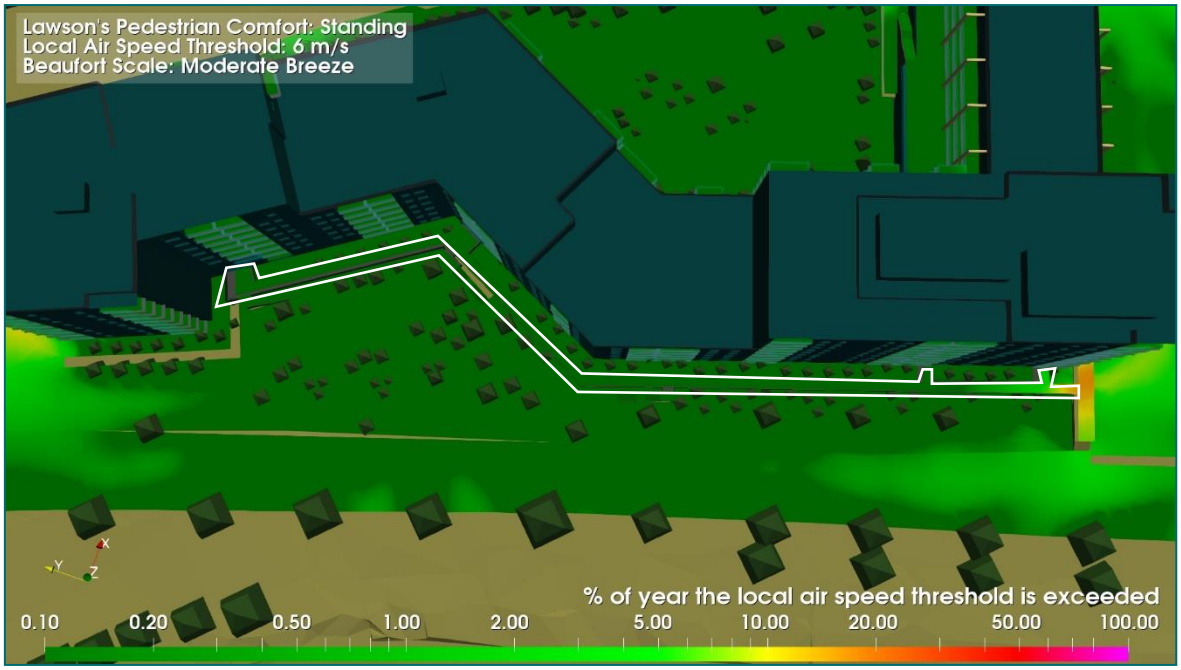

Figure 11.34: Standing Comfort Criterion: Ground Amenities: Raised Boardwalk

11.5.2.5 Building Entrances

Figure 11.35 to **Figure 11.38** below show the results of sitting and standing comfort on the building entrances marked in white.

The results show excellent compliance with the requirements of the Lawson's Sitting and Standing Comfort Criterion. The wind speed is generally lower than 4m/s for more than 95% of the year as per the criterion's requirement. There are unlikely to be effects on the creche play spaces, with no further mitigation measures required. No adverse effects with respect to the pedestrian activities are observed on the building entrances. No further mitigation measures are recommended.

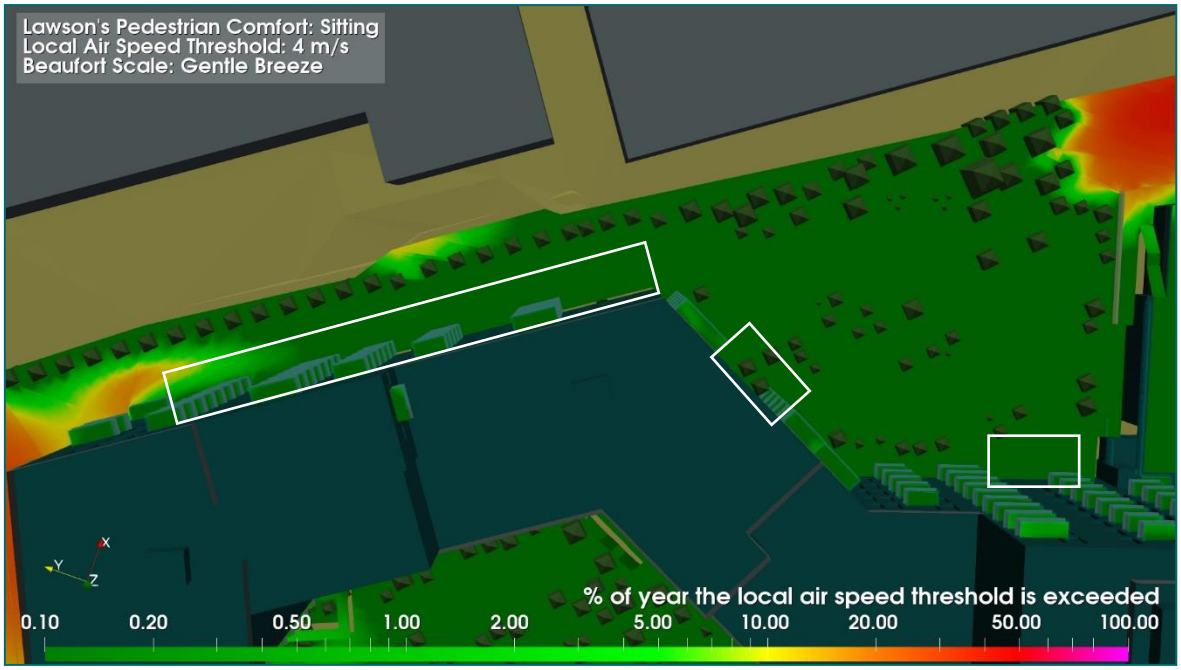

Figure 11.35: Sitting Comfort Criterion: Lower Ground Floor Entrances

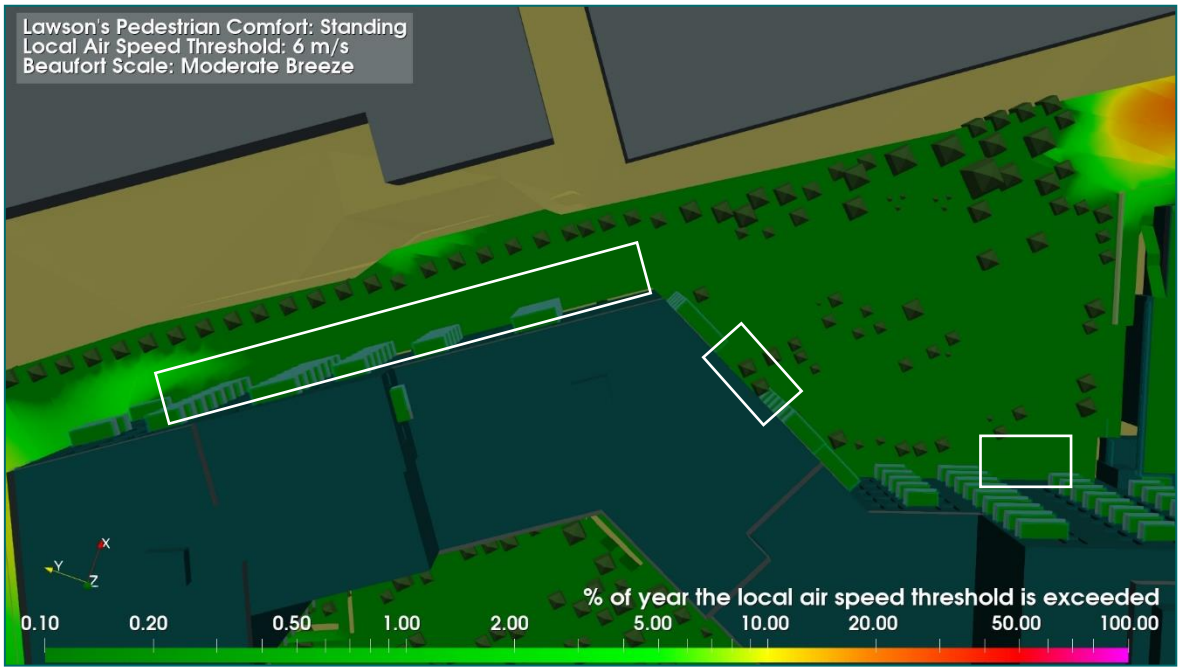

Figure 11.36: Standing Comfort Criterion: Lower Ground Floor Entrances

Figure 11.37: Sitting Comfort Criterion: Building Core Entrances (Upper Ground)

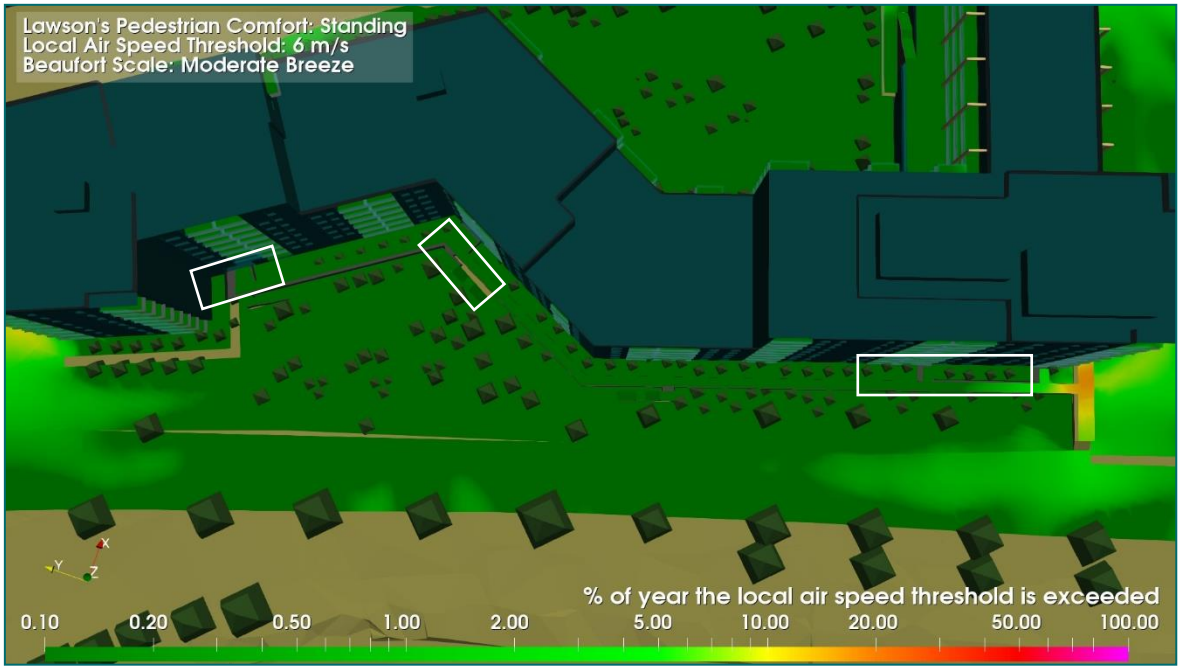

Figure 11.38: Standing Comfort Criterion: Building Core Entrances (Upper Ground)

11.5.2.6 Walking Comfort

The Lawson's Leisure Walking Comfort Criterion states the local air speed at designated locations should not exceed 8 m/s for more than 5% of the duration analysed, on the various paths around the development. Additionally, the Lawson's Business Walking Comfort Criterion states the local air speed at designated locations should not exceed 10 m/s for more than 5% of the duration analysed, on the various paths around the development. These show excellent compliance with the requirements of the Lawson's Business Walking Comfort Criterion. The local air speed does not exceed 8 m/s and 10 m/s for more than 5% of the year, respectively. **Figure 11.39** and **Figure 11.40** below shows the results of walking comfort criteria.

No adverse effect with respect to walking comfort activities are observed around the site.

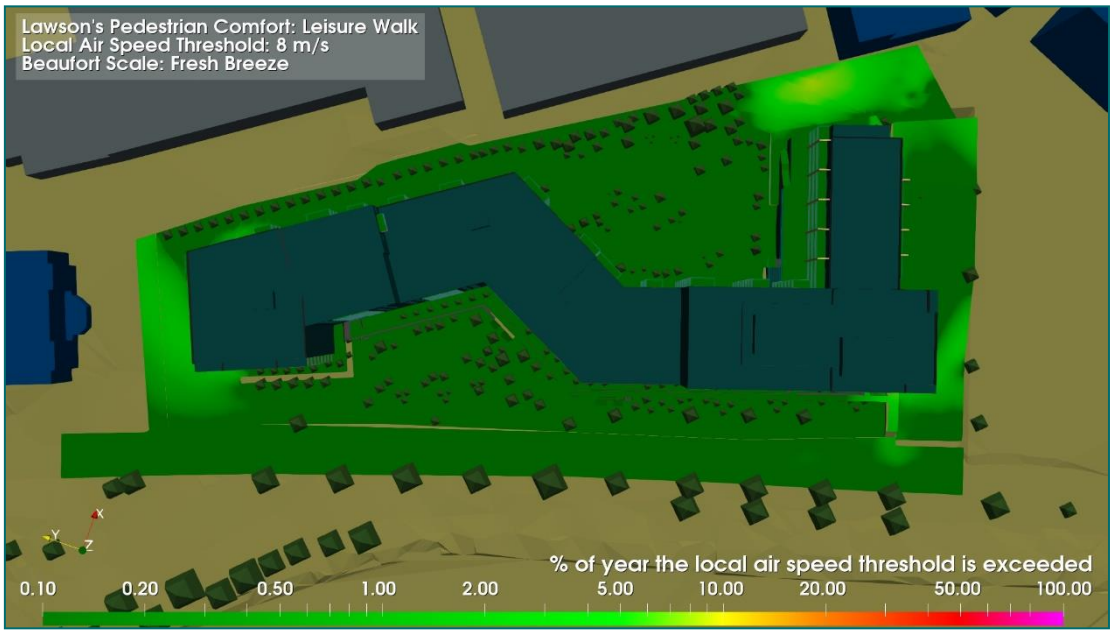

Figure 11.39: Leisure Walking Comfort Criterion: View form the Top

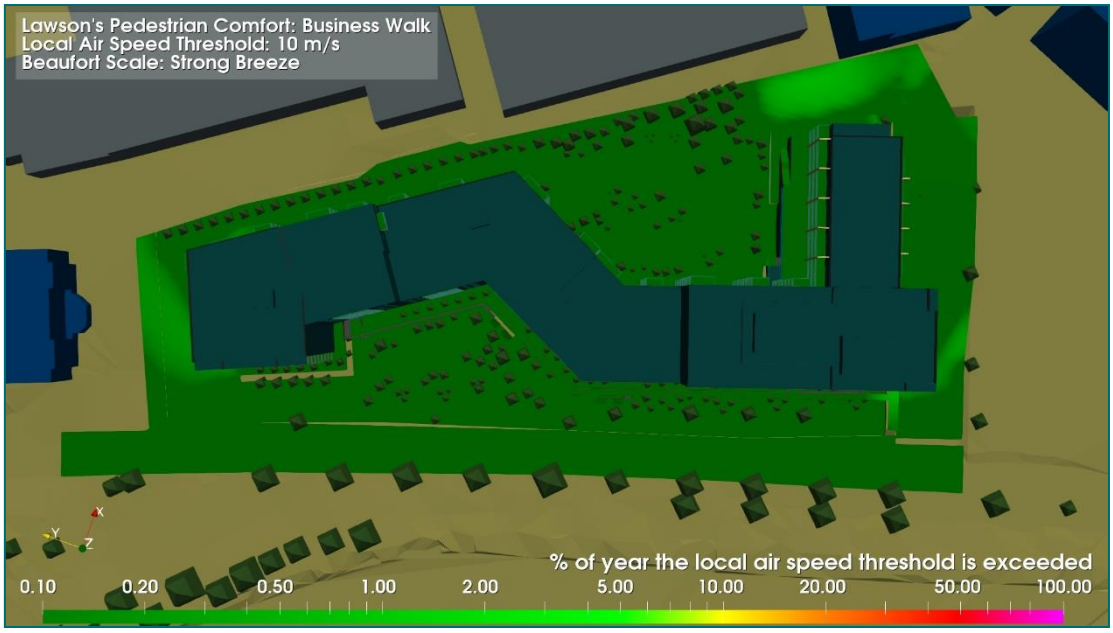

Figure 11.40: Business Walking Comfort Criterion: View form the Top

11.5.2.7 Safety Criteria

The Lawson's Normal Pedestrian Safety Criterion states the local air speed at designated locations should not exceed 20 m/s for more than 0.01% of the duration analysed. Additionally, the Lawson's Sensitive Pedestrian safety criteria states the local air speed at designated locations should not exceed 15 m/s for more than 0.01% of the duration analysed. The Sensitive Pedestrian safety criterion applies to the vulnerable population such as pensioners and children. Note the limit of the criterion is 0.01% and not 5% as with the comfort criterion.

These criteria are also intended for various paths and grounds around the development, as access is always required irrespective of weather conditions to enter or exit the various

buildings. **Figure 11.41** and **Figure 11.42** show the results of safety criteria assessment. The results of the normal pedestrians and sensitive pedestrians are observed to be below 0.1% of the year.

The criterion for the normal pedestrian and sensitive pedestrian is achieved through out the site.

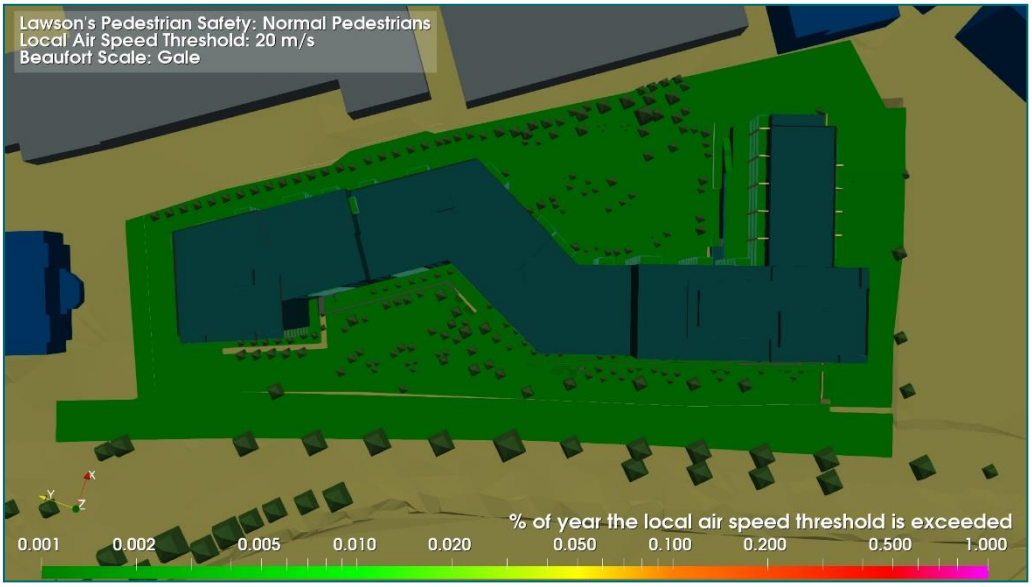

Figure 11.41: Normal Pedestrian Safety Criterion: View of the entire site

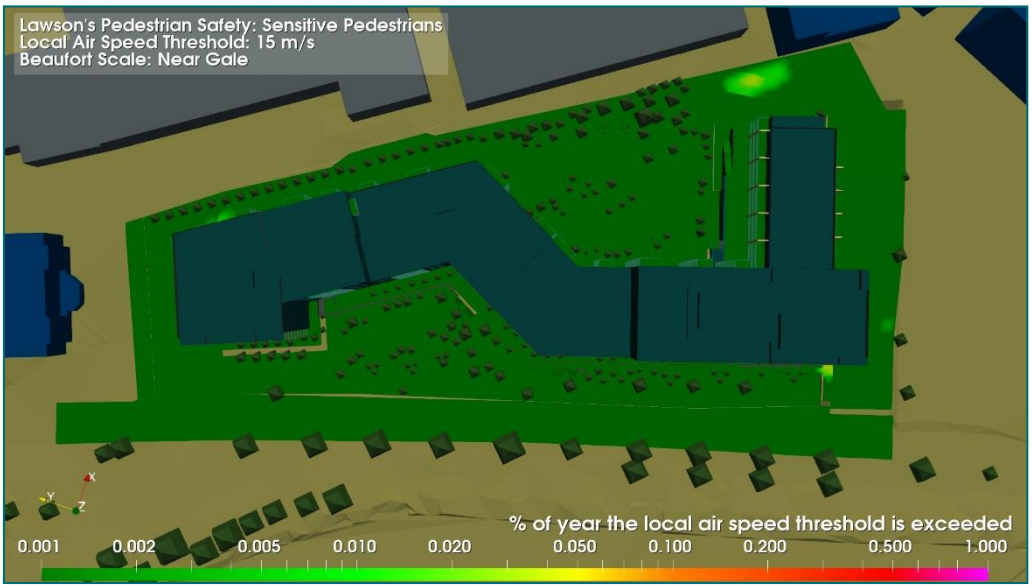

Figure 11.42: Sensitive Pedestrian Safety Criterion: View of the entire site

11.5.2.8 Conclusion

Significant negative impacts on pedestrian comfort and / or safety are <u>not</u> predicted to occur as a result of the wind microclimate at the Site of the proposed Project during the operational phase. There is no significant medium to long-term residual impacts on the development.

During the construction phase, typically, 2m to 3m high hoardings installed around the site will likely to obstruct the wind to protect the workers from any adverse effects of winds at ground level.

11.5.3 Potential Cumulative Impacts

1. Baseline Scenario
   Baseline Scenario was not conducted for the wind analysis. There was an existing open carpark on this site and subjected to unobstructed high wind speeds. A proposed residential development will be carried out on this carpark site. Any development on this site will show better wind comfort results than the existing car park site.

2. Assessment Scenario 1 (the Proposed Development)

   There are no long-term cumulative impacts of the wind on the development. The assessment was carried out with considering proposed phase 1 of the development along with the existing developments. There is no long-term cumulative effect on the surrounding development observed. The following **Figure 11.43 and Figure 11.44** shows the location of the site.

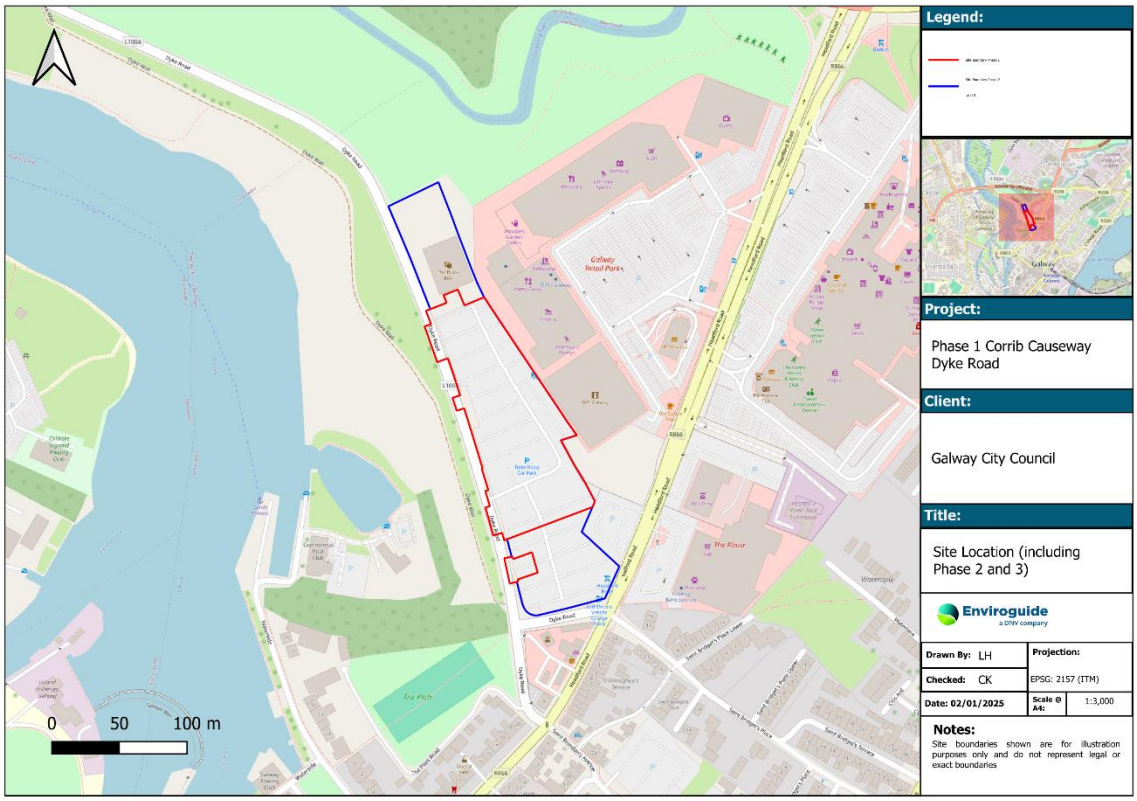

Figure 11.43: Site Location Map: Phase 1

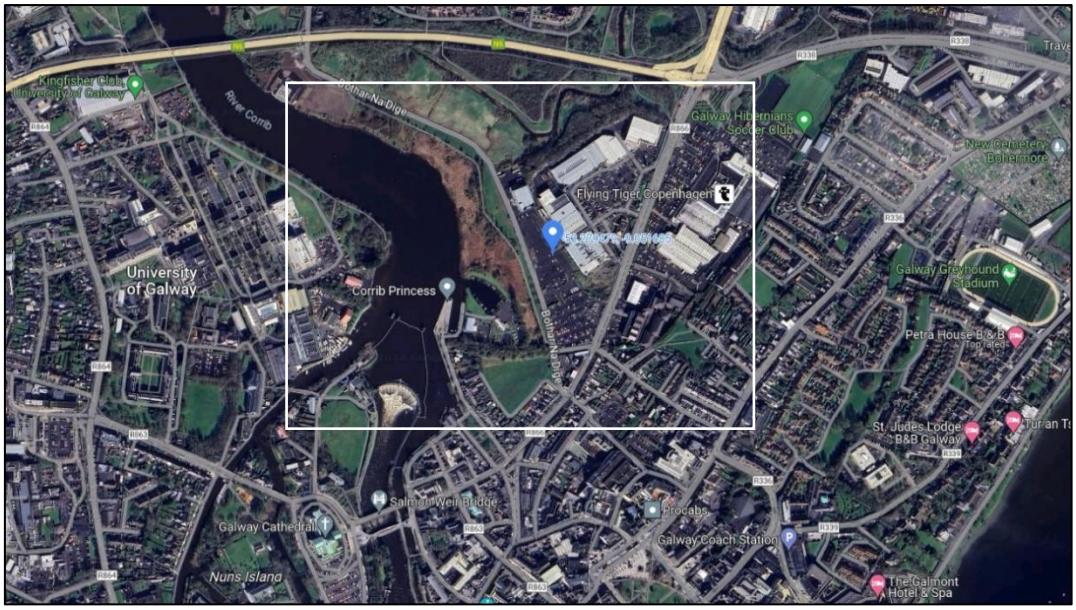

Figure 11.44: Site Location on Google Earth

Following figure 11.45 illustrate the collective results of wind comfort for the 5% threshold on the proposed development Phase 1. The results were captured at planning stage. These results were summed to calculate the total number of hours that a given pedestrian activity class exceeds the 5% yearly threshold based on hierarchy of wind speed. The results on the amenity spaces showed good compliance with the Sitting, Standing and Walking activities.

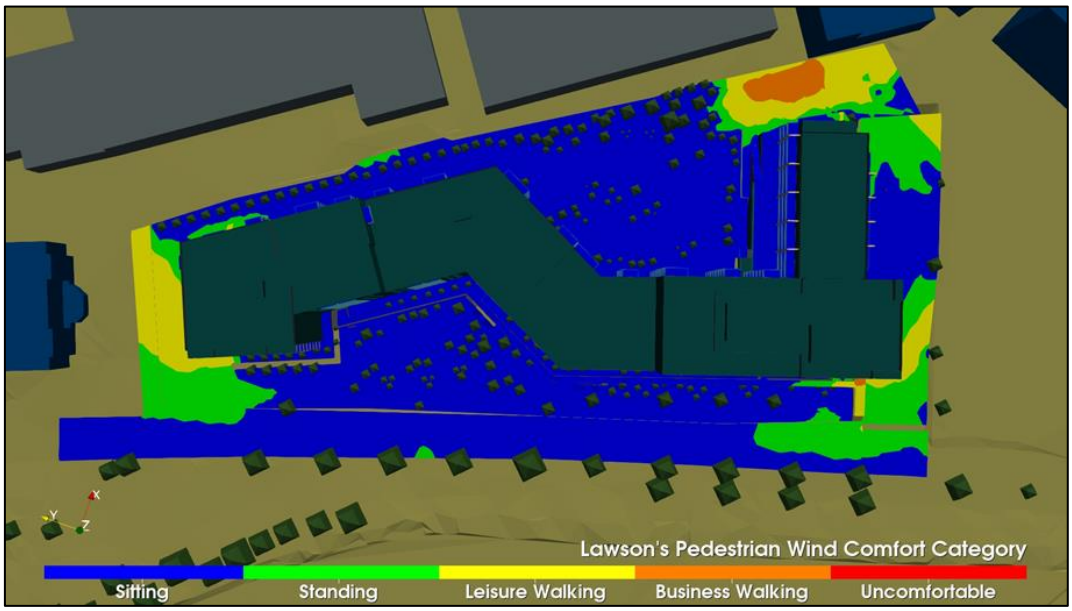

Figure 11.45: Collective Results: Phase 1: 5% Threshold

3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

   There are no long-term cumulative impacts of the wind on the development. The assessment was carried out with considering all the proposed phases of the development along with the existing developments. There is no any long-term cumulative effect on the surrounding development was observed. The following **Figure 11.46** shows the location of the site.

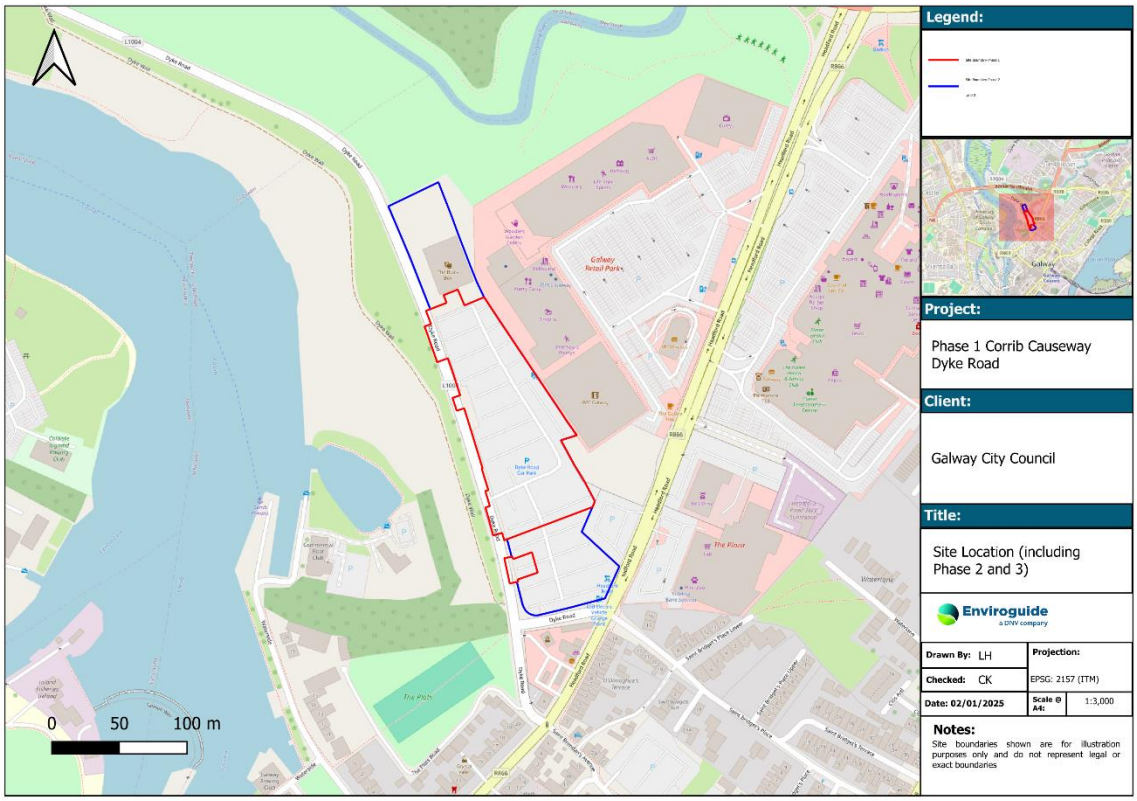

Figure 11.46: Site Location Map: All Phases

Following **Figure 11.47** illustrate the collective results of wind comfort for the 5% threshold on the proposed development Phase 1 plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework. The results were captured at planning stage. These results were summed to calculate the total number of hours that a given pedestrian activity class exceeds the 5% yearly threshold based on hierarchy of wind speed. The results on the amenity spaces showed good compliance with the Sitting, Standing and Walking activities.

The results did not differ much when compared with the results of the Phase 1 application.

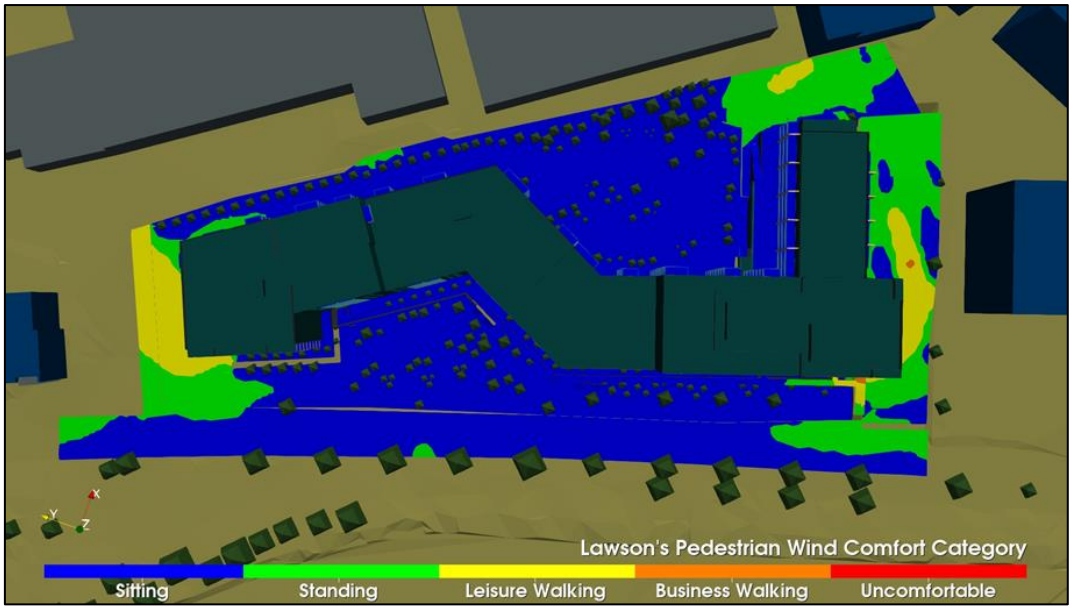

Figure 11.47: Collective Results: All Phases: 5% Threshold

4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

   Based on the analysis performed, no further impacts expected. The other developments are located far away from the Phase 1 towards NW and SE. They will not have any effect on the wind flow results of the Phase 1 development.

11.5.4 Summary of effects

The effects due to the construction were not studied in the analysis. The construction crew will follow the health and safety guidelines while the construction is going on. These construction measures will not have any adverse effects on the site. The effects sue to the wind will be studied for the usability of the end occupants.

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
typically, 2m to 3m hoardings will be installed around the site while construction is going on. These hoardings are likely to obstruct the wind to protect the workers from any adverse effects of winds at ground level.								
Operational Phase								
Sitting	Balconies, Courtyard, Public Open Spaces, Creche Play areas	No Impact	Neutral Effects	Imperceptible	Annual	Indirect Effects	Not Required	No Residual Effects
Standing	Balconies, Courtyard, Public Open Spaces, Creche Play areas	No Impact	Neutral Effects	Imperceptible	Annual	Indirect Effects	Not Required	No Residual Effects
Leisure Walking	Courtyard, Public Open Spaces, Creche Play areas, Building Entrances, Boardwalk	No Impact	Neutral Effects	Imperceptible	Annual	Indirect Effects	Not Required	No Residual Effects
Business Walking	Courtyard, Public Open Spaces, Creche Play areas, Building Entrances, Boardwalk	No Impact	Neutral Effects	Imperceptible	Annual	Indirect Effects	Not Required	No Residual Effects

Table 11.4: Summary of Likely Significant Effects

11.5.5 "Do Nothing" Impact

In absence of the development, the existing wind pattern is likely to continue unchanged. There was an existing open carpark on this site which does not contains any wind obstructing elements/structures so, the existing wind flow will remain unobstructed in the absence of the development.

11.6 Avoidance, Remedial and Mitigation Measures

11.6.1 Construction Phase

There are no mitigation measures recommended for construction. Established construction practices where typically, 2m to 3m high hoardings will be installed around the site are likely to ensure wind comfort for the site workers. These hoardings are likely to obstruct the wind to protect the workers from any adverse effects of winds at ground level.

11.6.2 Operational Phase

This assessment pertains to operational phase impacts. As such, no mitigation measures are recommended during the construction phase. The mitigation measures such as location, orientation and shape of the amenity spaces, trees and vegetation along various paths required for the operational phase have already been incorporated in the design of the scheme.

No further mitigation measures are required.

11.6.3 "Worst Case" Scenario

The worst-case scenario has been studied in this report. No further mitigation measures required.

11.7 Residual Impacts

- There are no long-term residual impacts on the development.
- There are no adverse effects with respect to all pedestrian activities observed on the balcony spaces
- There are no adverse effects with respect to all pedestrian activities observed on the public open spaces and courtyard spaces
- There are no adverse effects with respect to all pedestrian activities observed on the creche play area
- The local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities at the ground amenity spaces towards south. The effects can be termed as 'Not Significant'. There are no adverse effects with respect to walking activities at the ground amenity spaces towards south.
- The local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities at the ground amenity spaces towards north. The effects can be termed as 'Not Significant'. There are no

adverse effects with respect to walking activities at the ground amenity spaces towards north.

- The local wind conditions are likely to be imperceptibly different than the receiving environment for the pedestrian Sitting and Standing activities on the Raised Boardwalk. The effects can be termed as 'Not Significant'. There are no adverse effects with respect to walking activities on the Raised Boardwalk.
- There are no adverse effects with respect to all pedestrian activities observed on the building entrances.

11.8 Monitoring

11.8.1 Construction Phase

No monitoring measured are required for the construction phase of the proposed development with respect to the wind flow.

11.8.2 Operational Phase

No monitoring measures are required for the operational phase of the proposed development with respect to the wind flow.

11.9 Interactions

This chapter is likely to have interactions with the architectural report and the landscape design report. The architectural design and landscape design discussed in that chapter has been included as an input to this study.

11.10 Difficulties Encountered When Compiling

No difficulties were encountered in preparation of this Chapter.

11.11 References

- T. V. Lawson (2001) Building Aerodynamics, Imperial College Press, London.
- ASHRAE Fundamentals Handbook (2013)

12 THE LANDSCAPE

12.1 Introduction

Murray and Associates were engaged by the Galway City Council to complete a Landscape and Visual Impact Assessment for Phase 1 Corrib Causeway Dyke Road. The proposed site is located to the northeast of Galway City Centre, currently comprising a public Car Park.

The Proposed Development is part of an overall three phased Development Framework which will deliver a residential-led, mixed-use development. Phase 2, an existing car park south of the site, is intended to be redeveloped for civic, commercial and cultural uses. Should the existing Black Box theatre situated to the north be relocated, the site may be repurposed into an additional residential block, designated as Phase 3. Please refer to full development description in the Description chapter.

The landscape of the area is described in terms of its existing character, which includes a description of landscape values and the landscape's sensitivity to change. The landscape and visual impact assessment of the proposed development uses representative viewpoints and photomontages. The potential impacts in both landscape and visual terms are then assessed, including cumulative impacts

The report was completed by Luciana Pinho, Senior Landscape Architect and Mark Boyle, Director & Landscape Architect of Murray & Associates, Landscape Architecture. Both are full corporate members of The Irish Landscape Institute. Luciana (BSc. Arch, MILI) holds a bachelor's degree in architecture and urban planning from the Federal University of Santa Catarina (UFSC - Brazil), and she has been working as a Landscape architect in Ireland since 2015. Mark Boyle (BAgrSc (LH), MLArch, MILI) has been in practice since 1998 and is a Director at Murray & Associates. He holds a master's degree in landscape architecture from University College Dublin.

12.2 Study Methodology

12.2.1 Legislation, Policy and Guidance

The following sources were used to inform and structure this chapter:

- 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 (EIA Directive);
- The National Landscape Strategy (NLS) for Ireland 2015-2025.;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (2022 (EPA Guidelines 2022));
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government;
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute;
- Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19, published by the Landscape Institute.
- Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document

12.2.2 Terminology

Landscape impacts are defined as changes in the fabric, character and quality of the landscape as a result of the development. This includes direct effects on landscape receptors and indirect effects that can alter the wider distinctiveness of the landscape. Landscape receptors are the physical or natural resource that will experience an impact. The sensitivity of a landscape receptor is its vulnerability to change.

The extents of landscape effects are assessed by first establishing the baseline conditions by classifying baseline data according to its importance and sensitivity. Secondly, evaluation of the landscape impact on the baseline environment using the terminology defined in Tables 1, 3 and 4.

For the purposes of this study, the term ‘landscape’ as applied throughout should be read as being inclusive of the urban fabric of the city and the built environment, or ‘townscape’.

Table 12.1 - The extent of Landscape Impact (based on ratings from the EPA Guidelines, 2022)

Extent	Description
Level 1 Imperceptible Effects	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.
Level 2 Not significant	An effect which causes noticeable changes in the character of the landscape but without noticeable consequences. There are no appreciable changes to landscape context, character or features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.
Level 4 Moderate Effects	An effect that alters the character of the landscape in a manner that is consistent with existing and emerging trends.

Extent	Description
	There are minor changes over some of the area (up to 30%) or moderate changes in a localised area.
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area (30-50%) or an intensive change over a more limited area
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. There are notable changes in landscape characteristics over a substantial area (50-70%) or a very intensive change over a more limited area
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. There are notable changes in landscape characteristics over an extensive area (70-100%) or a very intensive change over a more limited area

Visual impacts relate solely to changes in available views of the landscape and the effects of those changes on people, viewer group or special interest groups. They include the direct impact of the development on views, the potential reaction of viewers, their location and number and the impact on visual amenity. The intensity of the visual impacts on the baseline visual environment is assessed by using the terminology defined in Tables 2, 3 and 4.

Table 12.2 The extent of Visual Impact (based on ratings from the EPA Guidelines, 2022)

Extent	Description
Level 1 Imperceptible Effects	There are no noticeable changes to views in the visual landscape.
Level 2 Not significant	An effect which causes noticeable changes in the character of the visual environment but without noticeable consequences. The proposal is adequately screened due to the existing landform, vegetation or constructed features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Level 4 Moderate Effects	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.

Extent	Description
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the visual environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

Table 12.3 - Quality of the Landscape and Visual Impact (EPA Guidelines 2022)

Extent	Description
Neutral Effect	Neither detracts from nor enhances the landscape of the receiving environment or view
Positive Effect	Improves or enhances the landscape of the receiving environment or a particular view
Negative Effect	Detracts from the quality of the landscape or view

Table 4 - The Duration of Landscape and Visual Impact (EPA Guidelines 2022)

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

Please note: "Momentary" and "Brief" Effects as defined in the EPA Guidelines (2022) are not considered relevant to landscape & visual assessment as effects of such short duration are extremely unlikely to generate appreciable effects.

The landscape and visual assessment methodology will be utilised in conjunction with a professional evaluation of the proposed development to determine the degree of impact.

The term 'study area' as used in this report refers to the site itself (i.e. the extent of the planning application) and its wider landscape context in the study of the context, physical landscape and landscape character. This may extend for approximately 1km or more in all directions from the site in order to achieve an understanding of the overall landscape. The selection of a 1km study area is based on professional judgment, informed by the scale and nature of the proposed development. In terms of the visual assessment, the study of visual amenity may extend outside the study area, from areas where views of the site are available, but the majority of visual impacts for a development of this nature would be most likely within the local context, as this landscape is relatively flat and enclosed. Please see Figure 12.1 for a map indicating the study area with reference to identified receptors.

The methodology employed in the landscape and visual impact assessment is as follows:

a) Desktop survey of detailed maps, aerial photography and other information relevant to the study area.
b) Site survey and photographic survey to determine landscape character of the general study area and specific landscape.
c) In determining visibility, the views to and from the proposed development areas are considered based on the heights, finishes, design and other visual characteristics of the proposed structures and setting. Verified Photomontages have been prepared by a specialist 3-D Visualisation company to represent selected views which are typical of the views within the area and are intended to demonstrate the scale of the buildings in the wider landscape. The extent of visual effects of the proposed development on the built environment is demonstrated through a selection of representative view locations around the proposed development. The photomontages on which the following assessments is based are provided in the CGIs and Verified Views issued by 3D Design Bureau.
d) Assessment of the potential impacts of the proposed scheme utilising the plan and elevation drawings of the scheme to determine the main impacting features and the degree to which these elements would be visible in relation to observations made during the field survey, and how they compare with the permitted development. In determining visibility, the views to and from the proposed development site are considered and the heights of the proposed structures.
e) A scheme of mitigation measures is proposed, where relevant. These will be defined as measures which will be generally implemented and specific landscape measures which would be site-specific and address particular landscape or visual issues identified.
f) An evaluation of the impacts of the scheme with and without amelioration. For the purposes of assessment, the residual visual effects of the scheme are assumed at 10 years following the completion of the proposed development.

Specific Considerations from the EPA Guidance 2022

The EPA Guidance 2022 suggests that the following should be considered in Landscape and Visual Assessment, and these are considered in the assessment where relevant:

Visual Effects:

- Context
- Character

- Significance
- Sensitivity
- Views & Prospects

Landscape Amenity:

- Public access
- Public amenities
- Recreation
- Tourism

The Landscape:

- Landscape Appearance and Character
- Landscape Context
- Historical Landscapes

Significance and Sensitivity of the Local Landscape and Visual Amenities

In landscape and visual assessments, one of the key factors is the sensitivity of a landscape to change, where the proposed development will inevitably result in adding a new element to the landscape. The publication *Guidelines for Landscape and Visual Impact Assessment* (2013) defines sensitivity as: *"A term applied to specific receptors, combining judgments of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor."*

Sensitivity refers to the inherent sensitivity to change of the landscape resource, as well as the visual sensitivity in terms of views, visibility, number and nature of viewers and scope to mitigate visual impact.

During the initial research and evaluation of the suitability of the subject site for the development, a typology was developed based on the fieldwork and research into the site. These categories will help to identify the sensitivity of the existing receptors.

Table 12.5 - Baseline Evaluation – Sensitivity of Landscape Receptor (developed by the author for the proposed development with reference to fieldwork and research)

Landscape typology / Receptor	Category
Designated Landscapes (e.g. Corrib SAC) and/or Urban Landscape associated with protected views, buildings or ACA.	Very High (IV)
Key Public Urban Spaces/ Historic Character Street/ Local Parks/ Tourist Attractions/Routes, Mature trees in the public realm, Local Landmark	High (III)
Local Streets, Residential landscapes	Medium (II)
Degraded urban townscapes/ streetscapes, Arterial Roads	Low (I)
A low-quality landscape, e.g. Industrial landscape, etc.	Not sensitive

Table 12.6 - Baseline Evaluations – Sensitivity of Visual Receptors (developed by the author for the proposed development with reference to fieldwork and research)

Receptor	Category
Views and Prospects listed in Relevant Planning Documents	Very High (IV)
Local receptors within 100m of the site (residential properties, nursing homes, residential care units, schools, cemeteries, tourist accommodation, tourist facilities, parks) with direct views of the development	High (III)
Local receptors within 100m of the site with oblique or compromised views of the development, or more than 100m from the site with existing high-quality views, or from a primary pedestrian route.	Medium (II)
People travelling through the area.	Low (I)
People working in the area.	Not sensitive

It should be noted that existing adverse factors can reduce the baseline evaluation of the sensitivity category of a landscape or visual receptor. For instance, if there are unsightly or low-quality elements in the landscape or view such as car parking, industrial elements or derelict structures, this can result in an alteration to the sensitivity category rating applied in the assessment.

The significance of effects can be measured as a function of the magnitude of change and the sensitivity of the receptor. The following table 7 acts as a guide for the assessor. It is important to note that the assessor's professional judgement, common sense and experience are also factors in ascribing rational judgements for the significance of effects.

Table 12.7- Level of Impact resulting from combination of Sensitivity Rating & Magnitude of Change

	Magnitude of Change				
Sensitivity	**Very High**	**High**	**Medium**	**Low**	**No appreciable change**
Very High (IV)	Profound	Very Significant	Significant	Moderate	Slight
High (III)	Very Significant	Significant	Significant	Moderate	Slight
Medium (II)	Significant	Significant	Moderate	Slight	Not Significant
Low (I)	Moderate	Moderate	Slight	Not Significant	Imperceptible
No sensitivity	Slight	Slight	Not Significant	Imperceptible	Imperceptible

Assessing Cumulative Landscape and Visual Effects

Current guidelines suggest that a determination should be made as to whether cumulative effects are likely to occur – these are outlined in the current GLVIA guidelines (3rd edition) as 'the additional changes caused by the proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together'. Such

determination needs to be made in respect of any permitted development of a similar nature which will have a bearing on the assessment of the proposed development.

The purpose of assessing cumulative landscape and visual effects is to provide a comprehensive understanding of potential cumulative impacts and to inform decision-making processes, ensuring that the cumulative implications of multiple projects are considered and managed appropriately.

The Proposed Development (known as 'Corrib Causeway) is part of an overall three phased Development Framework:

- Phase 1 (the Proposed Development);
- Phase 2 (referred to as River Side Residential Neighbourhood);
- Phase 3 (referred to as the Terryland Forest Residential Neighbourhood)

It is proposed to assess potential cumulative effects through the following assessment scenarios.

1. Baseline Scenario
2. Assessment Scenario 1 (the Proposed Development)
3. Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.
4. Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

As the detail for Phase 2 and 3 is very high level due to its stage in the development process, it is proposed that the cumulative assessment will be undertaken based on high level parameters, assumptions and qualitative data. By structuring the assessment into baseline, individual, and cumulative scenarios, this methodology ensures a comprehensive evaluation of potential impacts.

A comprehensive list of existing and approved projects in the area can be found in Table 12.11.

12.3 Planning Context

Zoning and Designations

The proposed development site is zoned as 'CI-Enterprise, Light Industry and Commercial' within the Galway City Development Plan 2023-2029. There are also areas zoned as 'Recreation and Amenity', Residential, 'Community, Cultural and Institutional' in the study area, as shown in Figure 12.1. However, Chapter 10 of the City Development Plan identifies the site as a regeneration and opportunity site (Dyke Road Car Park Regeneration Site). Located near the River Corrib and Terryland Forest Park, the site currently adjoins the Black Box Theatre to the north and a large surface car park to the south. The site was selected for development by Galway City Council with a Development Framework formulated for a mixed-use development, including housing and potential office, civic, and cultural spaces in future phases.

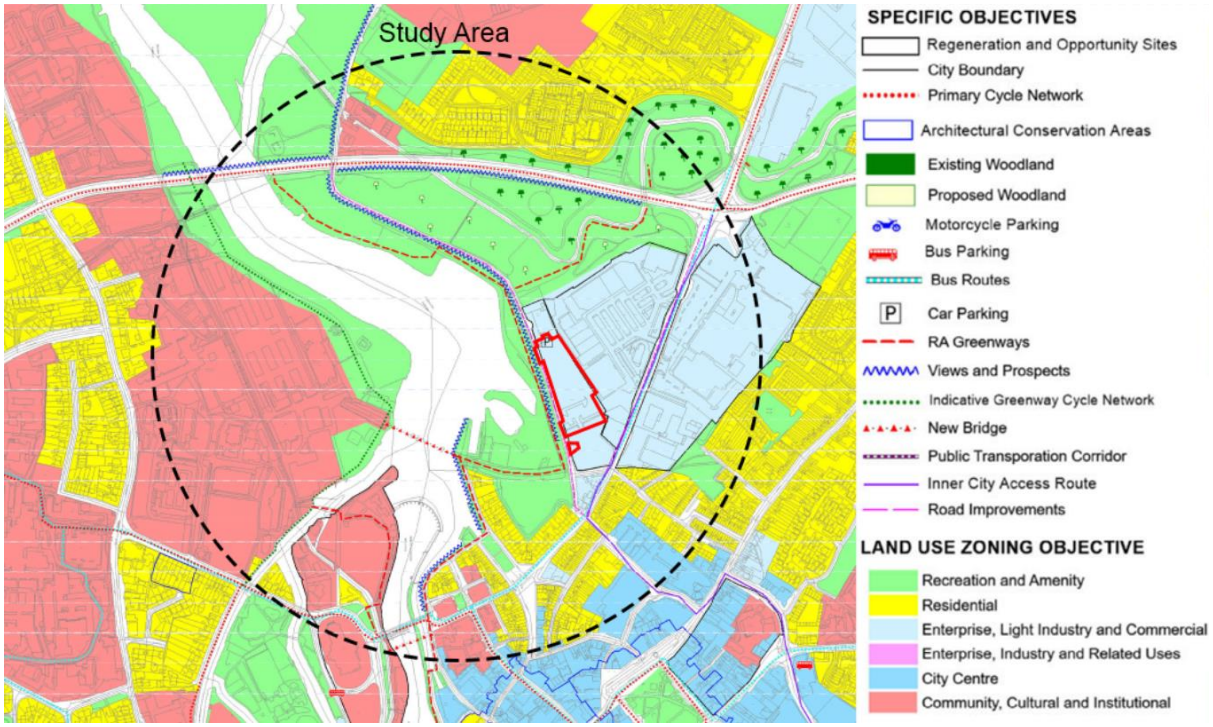

Figure 12.1 - Land Use and Zoning and Specific Objectives with Indicative Phase 1 Red Boundary Line (Source: Galway City Development Plan 2023-2029)

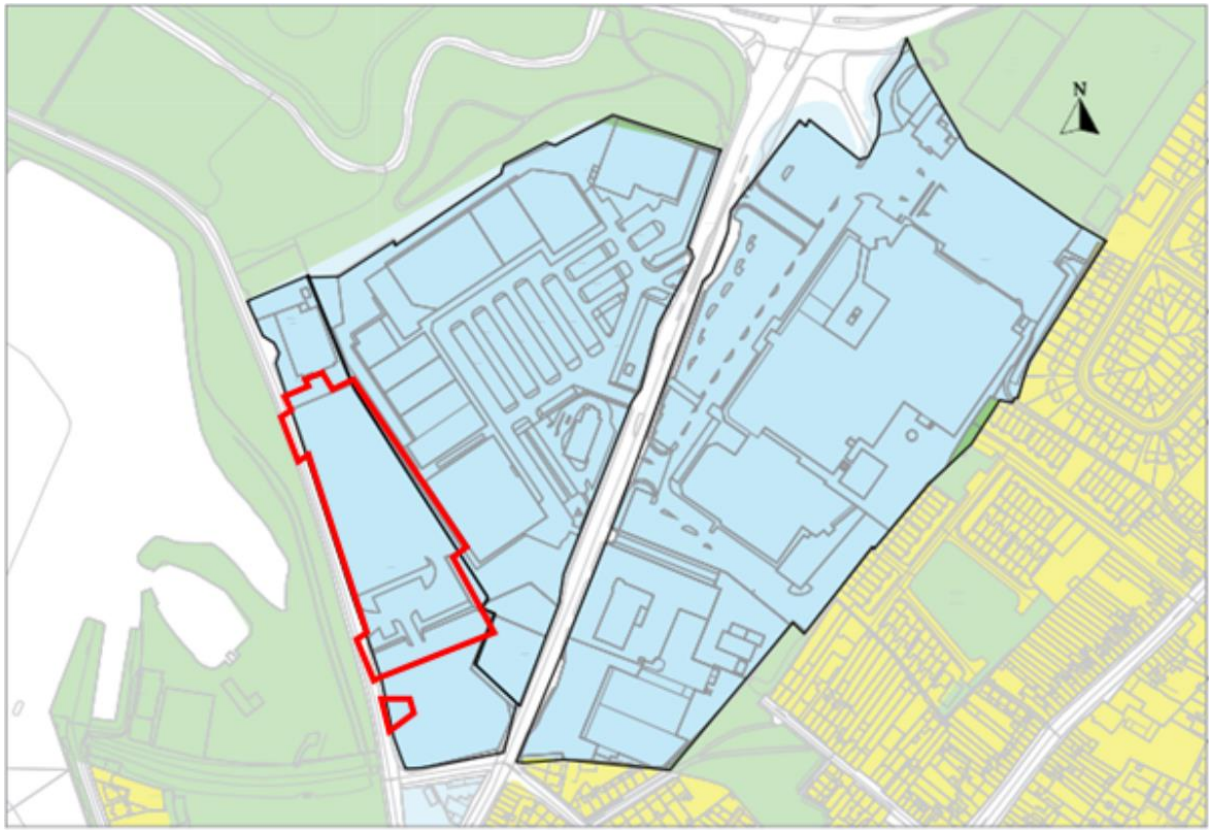

Figure 12.2 Headford Road Regeneration Sites, with Indicative Phase 1 Red Boundary Line (Source: Figure 10.4 of Galway City Development Plan 2023-2029, p. 258)

The regeneration sites near Galway city centre offer significant redevelopment opportunities, supported by the National Planning Framework. These areas are in proximity to the city centre, existing infrastructure, and natural heritage resources.

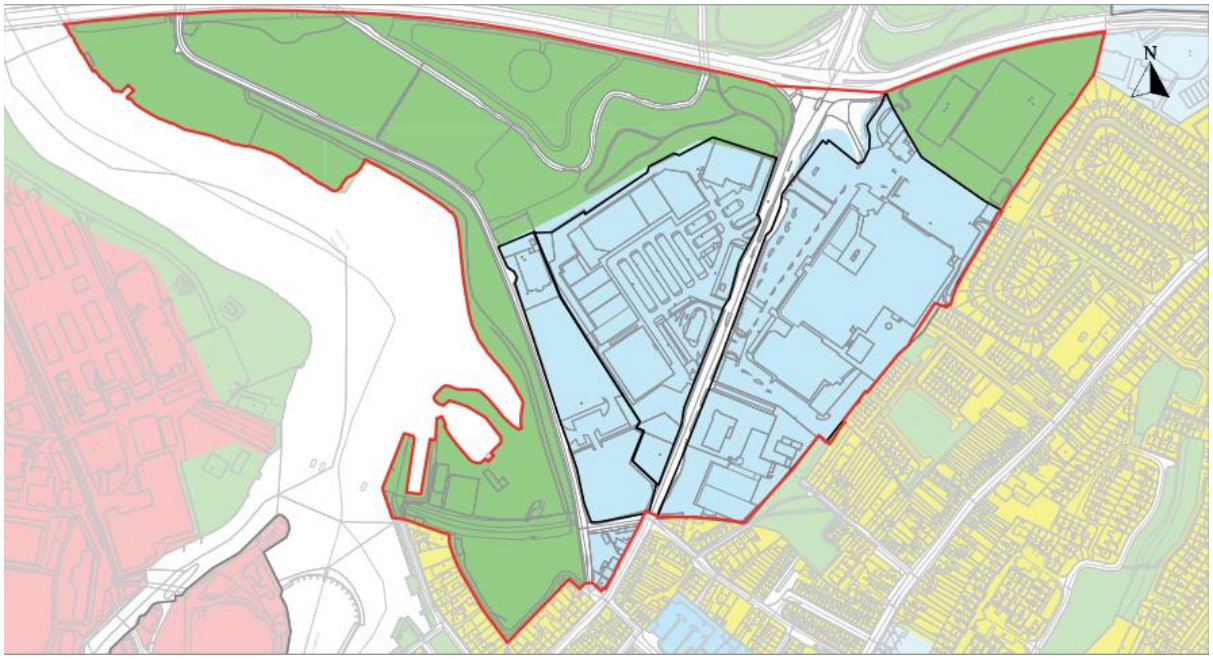

Figure 12.3 Headford Road LAP area (outlined in red) (Source: Figure 10.4 of Galway City Development Plan 2023-2029, p. 259)

12.3.1 Planning Context relevant to Landscape and Visual Assessment

Galway City Development Plan 2023-2029

Relevant policies and objectives relating to the landscape of the county, heritage, visual assessment, etc. are set out within the Galway City Development Plan 2023-2029. These policies help to identify values and sensitivities of the landscape and related themes, as attributed by the county planners. Some of the most relevant to the current assessment report are as follows:

The Green Network - Section 5.2

The green network approach in Galway City aims to balance environmental conservation with recreational needs by strategically connecting open and natural spaces for integrated management. This approach enhances habitat protection, supports biodiversity, contributes to climate action, and improves the quality of life by offering aesthetic and recreational benefits. It addresses climate challenges through nature-based solutions like managing flood risks and reducing urban heat. Furthermore, the green network aligns with various European directives and supports significant biodiversity and environmental strategies at both the EU and national levels.

The network consists of ecologically significant green and blue spaces, including parks, rivers, and coastal areas, that facilitate wildlife movement within the urban setting and connect community and agricultural spaces for comprehensive natural resource management. The city's green strategy is reinforced by plans such as the Galway Heritage Plan and the Climate

Adaptation Strategy, and it is set to be enhanced by a revised Recreation and Amenity Needs Study focusing on a Green Space Strategy.

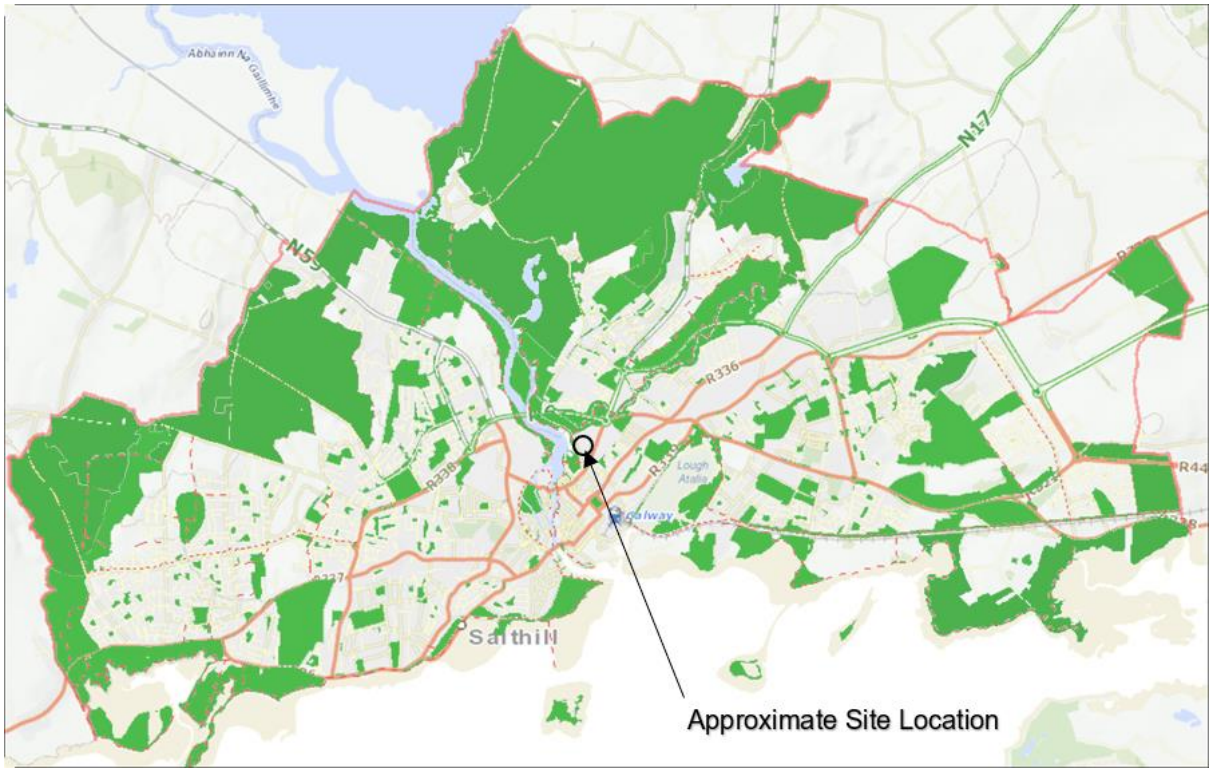

Figure 12.4 - Green Network (Source: Figure 5.1 of Galway City Development Plan 2023-2029, p. 122)

National Designated Sites

National Designated Sites are areas protected by a country's government for their natural, cultural, or scientific significance, such as national parks, wildlife reserves, and heritage sites.

There are no national designated sites within the site boundary of the proposed development. There is a special area of conservation, ‘Lough Corrib SAC (Site Code 000297)’ in the study area, adjacent to the proposed development. However, views to the river are not visible from the site due to existing vegetation.

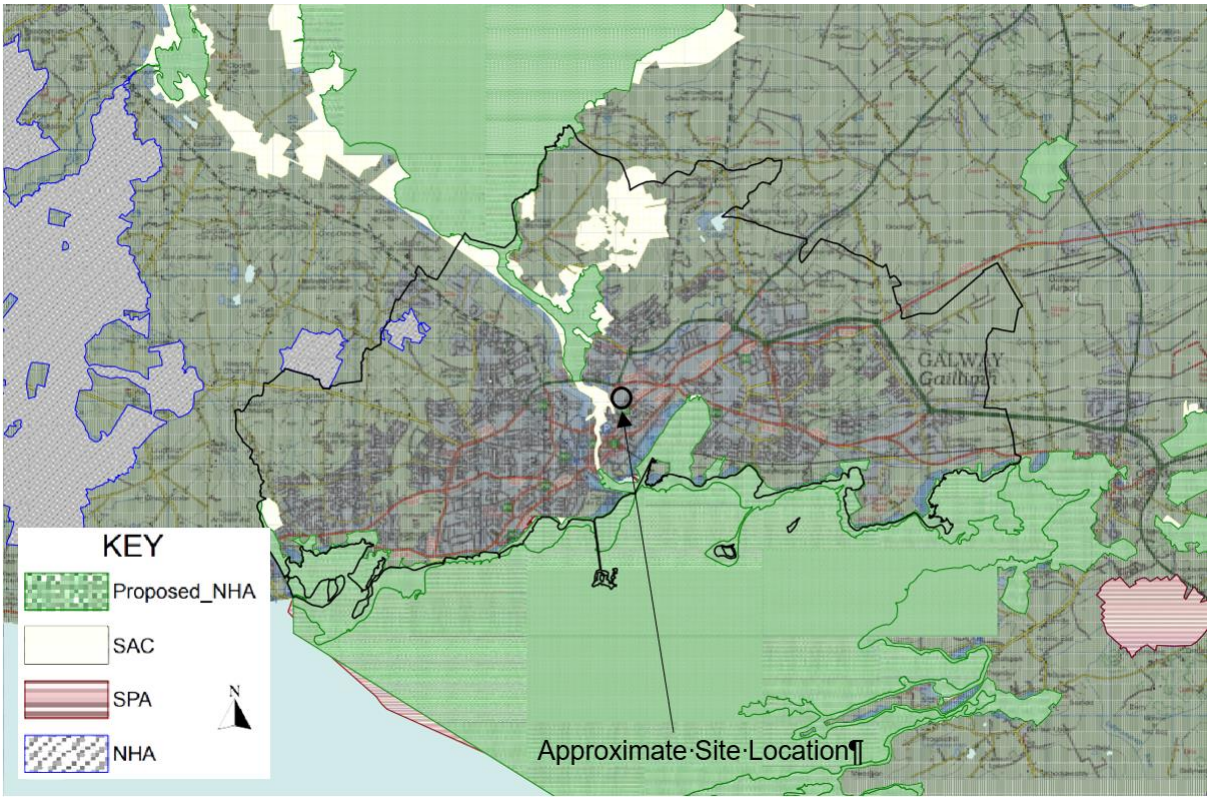

Figure 12.5 - SACs, NHAs and pNHAs in the city (Source: Figure 5.2 of Galway City Development Plan 2023-2029, p. 129)

Views and Prospects

There are views within the city's landscape, which require special protection due to their distinctive scenic amenity, aesthetic or cultural value or historic setting. Views of scenic amenity value and interest define the character of the city, engender a strong sense of place and significantly enhance local amenities. Policy 5.7 relating to Community Spaces: Protected Views of Special Amenity Value and Interest of the City Development Plan states:

1. *Protect views and prospects of special amenity value and interest, which contribute significantly to the visual amenity and character of the city, through the control of inappropriate development.*
2. *Require landscaping schemes as part of planning applications to have regard to such views and limit any planting which could have a detrimental impact on the value of protected views.*

Galway City Council identifies two categories of protected views, panoramic and linear. Panoramic views offer expansive views over scenic landscapes, cityscapes, and key landmark buildings. Linear views are focused views toward a specific landscape, observed from a particular point. There are no protected views within the site boundary of the proposed development. There is one panoramic protected view along Dyke Road, V2 described as 'Views from Dyke Road and Coolagh Road encompassing the River Corrib and Coolagh fen' in the study area, adjacent to the proposed development. Please refer to Figure 12.1 *Land Use and Zoning and Specific Objectives* for views and prospects' location.

12.4 The Existing and Receiving Environment (Baseline Situation)

In this section, the baseline landscape is described and classified. The various components of the landscape are considered and described, including adjacent structures and public spaces, urban fabric, topography, cultural landscape elements and the scenic quality of the study area.

The objective of this part of the assessment is to define a baseline of landscape and visual quality against which the effects of the development can be measured. The existing landscape is described from fieldwork and against the context of the relevant planning documents.

12.4.1 Site Setting / Landscape Context

The site is located at Dyke Road, on the edge of Galway City Centre. The wider area is characterized by its relatively flat topography, and the variety of natural and built environment, including the Terryland Forest Park, the River Corrib and a mix use of existing buildings. The River Corrib, which flows through the city, adds to its scenic character. The river and its floodplains play a significant role in the area's landscape, influencing both the natural environment and the development patterns of the town.

The site is set within an urban context, and it is visible from the road network which surrounds the site and from a variety of other potential spaces and receptors throughout the area and environs. It is adjacent to commercial properties to the north and northeast. The River Corrib, flowing through Galway, is approximately 100 meters west of the site.

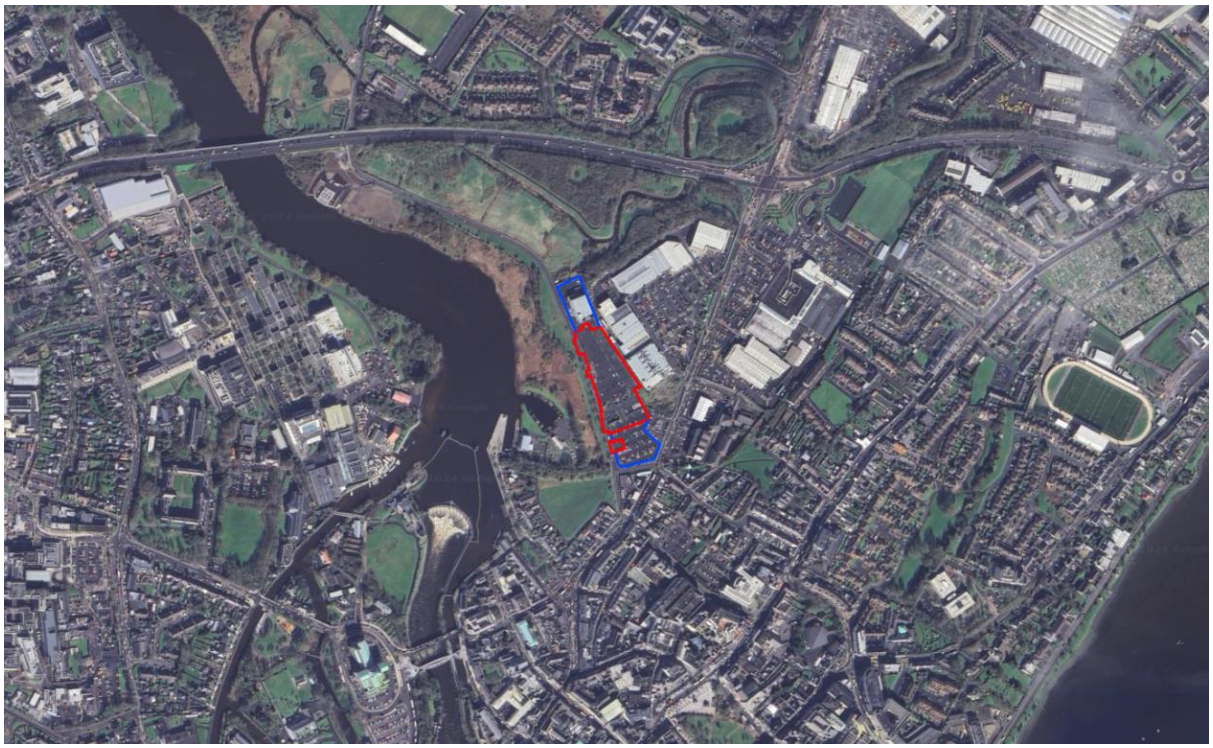

Figure 12.6 - Site and Local Context, with Indicative Boundary Line

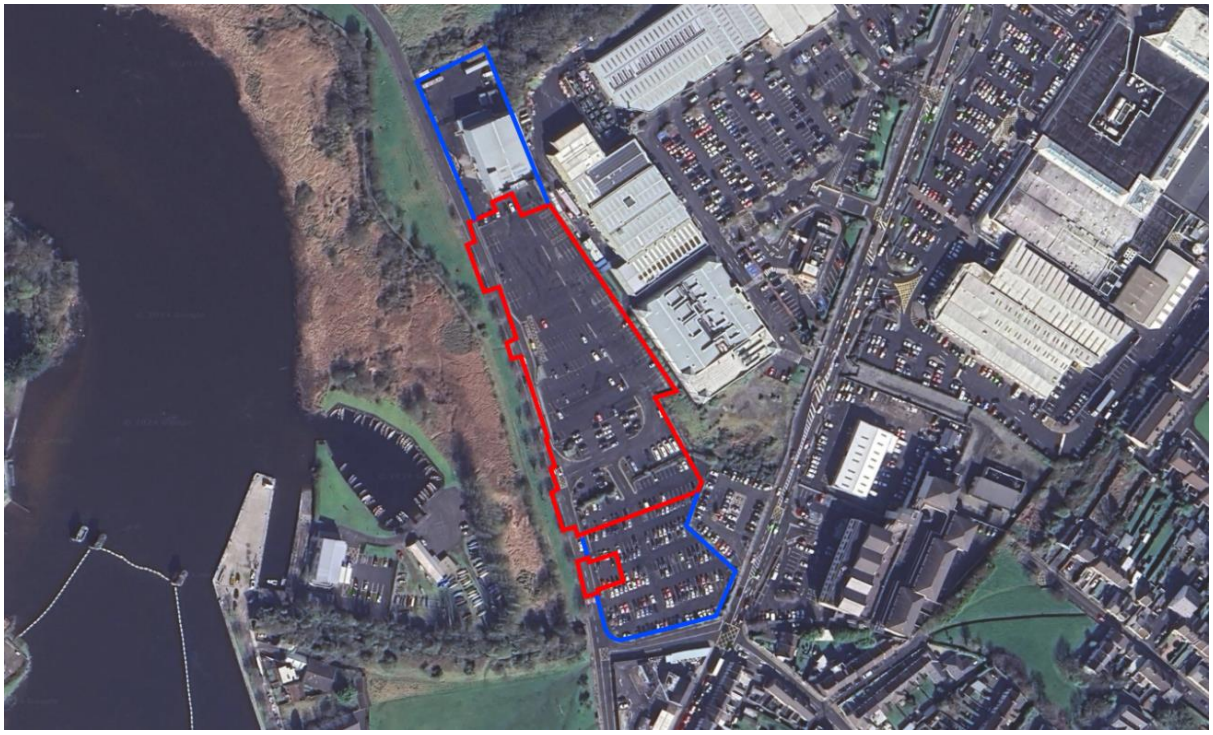

Figure 12.7 - Site and Immediate Surrounds, with Indicative Boundary Line

12.4.2 Description of Site Character

The site, covering approximately 1.144 hectares, is located North of Galway city centre and near to the River Corrib. At present, the site consists of a parking area (Dyke Road Car Park); it is bounded by commercial properties to the north-east, the Dyke Road to the west, and Black Box Theatre to the North.

The site topography is relatively flat. It gradually slopes from the south to the north, towards the Black Box Theatre, with a level difference of approximately 2 meters.

Access to the site is currently available from Dyke Road. An additional access point is proposed to facilitate entry to the southern part of Dyke Road Car Park (future Phase 2 works). Pedestrian access is present between the two commercial buildings at the northeastern boundary to the Galway Retail Park.

There are no trees on the site. There is existing hedgerow along the northeast boundary, in front of the commercial buildings. The western boundary of the site is demarcated by a low wooden post-and-rail fence that runs parallel to Dyke Road. Additionally, bottle and clothes banks are positioned along this boundary, providing a designated area for waste separation and recycling. The southern boundary of the site directly interfaces with the existing car park. Similarly, the northern boundary interfaces with the car park of the Black Box Theatre.

12.4.3 Views and Visual Environment – Including Views of and from the Site

The site area, consisting of a car park, exhibits low visual quality. The site is primarily defined by its extensive coverage of impermeable surfaces, including both asphalt and block/slab paving.

Views from the site towards the northeastern boundary are not of good quality, with commercial units dominating the middle ground. These commercial units have an industrial appearance, further detracting from the overall visual quality. The Black Box Theatre, located at the northern boundary, is visible from the site and also lacks visual appeal. The presence of trees along Dyke Road contributes to the local skyline, west of the site.

Views of the River Corrib, situated west of the site, are obstructed by the distance and the existing vegetation along Dyke Road, which lies outside the site boundary.

12.4.4 Sensitivity of the Identified Receptors

In landscape and visual assessment, one of the key factors is the sensitivity of a landscape to change, where the proposed development will inevitably result in adding new elements to the landscape. The publication Guidelines for Landscape and Visual Impact Assessment (2013) defines sensitivity as: "*A term applied to specific receptors, combining judgments of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor*."

The potential landscape and visual receptors identified are the car park, the existing trees along Dyke Road and local receptors within 100m of the site with direct views of the development or from a primary pedestrian route. The landscape character of the car parking areas has no appreciable sensitivity in this context.

In landscape terms, due to the car park's low value, the sensitivity of the site is considered low.

Visual receptors have greater potential sensitivity to change in the landscape, however this is reduced by the following existing adverse factors:

- Low visual value of the existing car park;
- There are visual barriers for many potential receptors, including building, trees, etc. which limit views of the site;
- The site is zoned as 'Regeneration Sites' by Galway City Council and prioritized by the Land Development Agency for mixed-use development. Its redevelopment is seen as key to transforming and regenerating the Headford Road area.

Please see Figure 12.8 and Table 12.8 for details of the full list of receptors and sensitivity.

While there is no specific rational given in the Galway City Development Plan for the reason for selection of the protected views, in our professional judgement, the panoramic views within the study area are selected as these routes are surrounded by natural heritage elements for example woodland of Terryland Forest Park, Lough Corrib SAC, and riparian landscape. Dyke Road is also an entrance route into the city centre and as such, the quality of views is important.

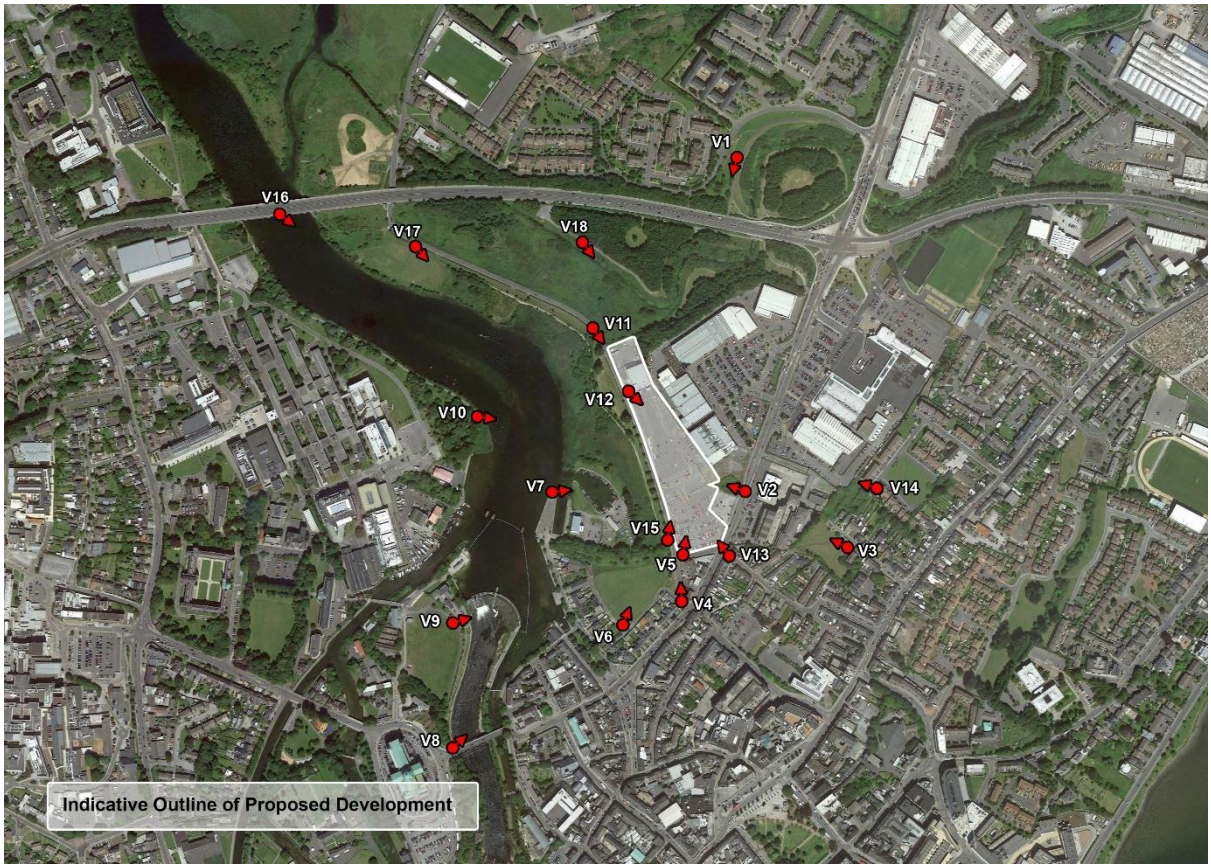

Figure 12.8 - Location Map of Visual Receptors (Image courtesy of 3D Design Bureau)

Table 12.8 - Sensitivity of Potential Visual Receptors

Ref.	Viewpoint location	Distance from site*	Description of View	Level of Sensitivity
V1	Terryland Forest Park (northwest of the site)	370m	Protected view from Terryland Forest Park looking southwest a public open space. The view comprises a local park. The foreground shows a pedestrian path with scrub vegetation on the left and a wooden fence on the right of that pathway. The background shows an outline of existing vegetation.	High (III)
V2	Headford Rd (Southeast of the site)	60m	View from Headford Road looking west towards the site's southern boundary, which features a low wall and security fencing. The view shows Headford Road in the foreground. The background comprises an existing building of 3 story in height on the right, and an outline of existing trees on the left. The car park is screened by the boundary fence.	Low (I)
V3	Water Lane	220m	View from Water Lane looking northwest towards a Public Open Space. The view comprises a local park and residential area. The foreground shows a large grass area. The	Medium (II)

Ref.	Viewpoint location	Distance from site*	Description of View	Level of Sensitivity
			middle ground shows existing residential buildings of 4 storey. Few semi-mature trees are partially screening those residential buildings. An outline of building can be seen in the horizon.	
V4	Dyke Road junction with Plots Local Park	140m	View from Dyke Road looking northwards towards Dyke Road and the Black Box Theater in the background. The view comprises Dyke Road. There is an existing 2 storey high residential building on the right and a local park on the left.	Low (I)
V5	Dyke Road (South junction)	80m	View from Dyke Road looking north towards the site's southern boundary, which features a low wall. The view comprises Dyke Road in the foreground, the car park in the middle ground and the commercial buildings in the background. A buffer planting is visible along Dyke Road on the left side of this view.	Low (I)
V6	Plots Local Park	193m	View from Plots Local Park looking northeast towards a Public Open Space. The view comprises a large grass area in the foreground, and vegetation at the back of this grass area. A local road and few existing buildings 2 to 4 storey high can be seen on the right of this view.	Medium (II)
V7	Corrib Waterside Pier	150m	Protected view from Corrib Waterside Pier looking east towards the river harbour. The view comprises high quality views of Corrib River. An outline of buildings and vegetation is visible in the background. The site is slightly screened by existing vegetation in proximity to the river.	High (III)
V8	Salmon Weir Bridge	480m	Protected view from Salmon Weir Bridge looking northeast towards the Salmon Weir. The view comprises high quality views of Corrib River in the foreground and residential buildings in the middle ground, on both sides of the river.	High (III)
V9	Inland Fisheries Ireland	350m	Protected view from the entrance gate at Inland Fisheries Ireland looking eastwards towards the entrance gate. The view comprises 1 storey high buildings at the foreground. The River Corrib is mostly screened by the buildings and an existing rubble wall. The background comprises an outline of existing building and vegetation.	Medium (II)
V10	University of Galway (Riverside path)	228m	Protected view from the University of Galway at the riverside looking eastwards towards the River Corrib, and the Black Box Theater in the Background. The view comprises high quality views of Corrib River in the foreground and	High (III)

Ref.	Viewpoint location	Distance from site*	Description of View	Level of Sensitivity
			middle ground. The background comprises an outline of trees and 2 to 6 storey high buildings.	
V11	Dyke Road (Northwest of the site)	125m	Protected view from Dyke Road looking southwards at Dyke Road and Black Box Theater. The view comprises Dyke Road in the foreground with an outline of vegetation on both sides of the view. The background comprises an outline of 6 storey high buildings.	High (III)
V12	Dyke Road (at Black Box Theatre)	37m	View from Dyke Road at Black Box Theater looking southeast towards the car park (site). The view comprises Dyke Road in the foreground. The black box theater is on the right of the view. The car park is in the middle ground. The background comprises an outline of building from 2 to 6 storey in height.	Low (I)
V13	Headford Road junction with St Bridget's Place	107m	View from Headford Road junction with St Bridget's Place looking northwest towards the site's southern boundary, which features a low wall. There is some existing vegetation behind that wall which partially screens the car park. The view comprises Dyke Road in the foreground. The background comprises an outline of 3 storey high existing buildings and vegetation.	Low (I)
V14	Cill Ard	246m	View from Cill Ard looking westwards towards IMC Cinema Galway building in the middle ground. The foreground comprises a local road with a residential building to the write and a high wall to the left. The horizon line is visible in the background between the building and the wall.	Low (I)
V15	Dyke Road (southwest of the site)	58m	View from Dyke Road looking northwards towards the car park. The foreground comprises a grasses area and Dyke Road. Few semi-mature trees are visible at the left of this view. The car park is located in the middle ground of the view. The background comprises an outline of existing building from 2 to 4 storey in height.	High (III)
V16	Quincentennial Bridge	615m	Protected view from Terryland Forest Park, Quincentennial Bridge looking southeast towards the river. The view comprises high quality views of Corrib River in the foreground. The background comprises an outline of buildings and existing vegetation.	High (III)
V17	Dyke Road (near N6 Junction)	400m	Protected view from Dyke Road looking southeast at the Terryland Forest Park. The view comprises a local park. The background shows an outline of existing buildings and	High (III)

Ref.	Viewpoint location	Distance from site*	Description of View	Level of Sensitivity
			vegetation. Views of the River Corrib is mostly screened by existing vegetation.	
V18	Terryland Forest Park (north of the site)	250m	View from Terryland Forest Park looking southwards. The view comprises a local park. The foreground comprises a large grass area and a pedestrian path. The background shows an outline of existing buildings and vegetation.	Medium (II)

12.5 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

12.5.1 Inherent Mitigation by Design

It should be noted that the architectural, engineering and landscape architectural proposals include strategies to avoid, reduce or remedy potential effects that were identified at earlier stages of the design process. Such strategies include:

- Urban design
- Siting, positioning, etc
- Reference to town's architecture
- Biodiverse planting
- Planting to screen and soften the building
- Material selection – reduction of visual mass, variation in roofline and elevation

Mitigation of potential effects has been incorporated into the development proposals and includes the following measures:

a) Variation of building height, and roof types (including green roofs) gives visual relief and punctuates the block layout.
b) Creation of a boardwalk within the layout which breaks up visual mass and afford a play of light and shadow within the block layout.
c) The proposed development represents a high quality of design and the quality of materials proposed throughout should reflect this quality. See Architects' Design Statements for full details of buildings and urban design strategies.
d) General landscape planting of trees and shrubs along the boardwalk, street and open space areas will create an attractive immediate visual environment and will, over time as trees mature, create a sylvan character and give further relief and variety in the visual presentation of the development in views from outside and in. Planting will also

create shelter and reduce wind speeds, thus increasing pedestrian comfort and amenity value. See Landscape Architect's drawings and report for full details.

e) Use of native trees, shrubs and wildflowers and non-native pollinator-friendly plants where possible will enhance the landscape and biodiversity value of the proposed development and add to wider landscape quality.

f) Elevated views of the River Corrib from the development site will create a sense of place and setting, providing residents or users with a connection to the natural landscape and cultural heritage of the area.

See Landscape Architect's drawings and report submitted with the planning documentation.

12.5.2 Visual Characteristics of the Proposed Development

The proposed development will be urban in character and comprise a residential block ranging from 5 to 9 storey in height, in a stepped profile. The proposed development also includes an elevated pedestrian boardwalk, a public open space, a communal open space and parking facilities.

The visual appearance of the proposed development in views will primarily be defined by the massing of the proposed building and the boardwalk structure along the west and south elevations.

The façade design features variations in depth, materials, and patterns, creating a visually dynamic appearance. Sympathetic design elements and material choices ensure a sense of continuity and coherence across the facade, reinforcing the building's identity.

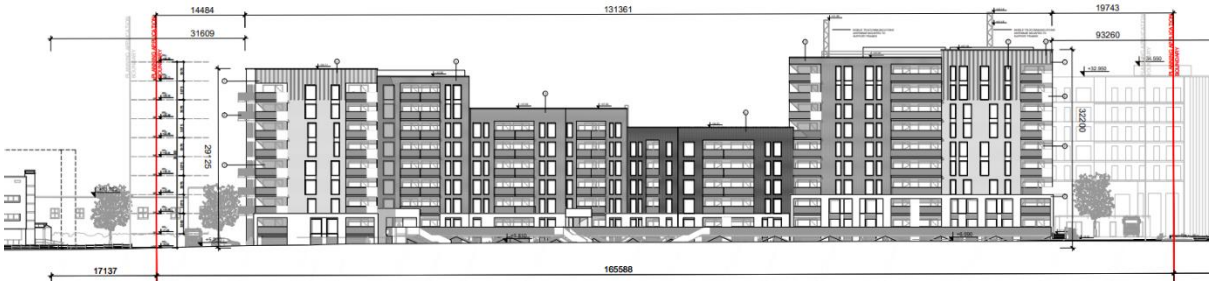

Figure 12.9 – Proposed elevation along Dyke Road. (Refer to architect's drawing DRG-MOLA-ZZ-XX-DR-A-0111)

The variation in height and colouration helps to reduce the visual mass of the development and create visual interest with the block. Building materials will be varied and will include concrete plinth, brick, glazed and metal frame facades; perforated metal screen and metal balconies & railings. Details and trims will be in metal (including louvred panels) generally. The façade colour palette is predominantly light and dark greys, with accent materials / panels in terracotta.

Landscape and public realm materials include concrete (block and in-situ) paving, resin bound gravel and compacted gravel to landscape surfaces, and timber and steel for external furniture.

The public open space and communal open space will include natural play features such as wooden logs and boulders, enhancing the visual appeal of the development. Trees along the elevation and boardwalk will help screen the building and soften its appearance, creating a more natural and attractive environment. Additionally, trees along Dyke Road will improve the visual appeal and provide a human-scale experience.

12.5.3 Magnitude of Change in the Landscape & Visual Environment

The proposed development will result in a change to the landscape, which will give rise to landscape and visual effects. The likely extent of the impact within the landscape context is considered to be very significant as there will be intensive changes to landscape character within this localised area, which will be visible from surrounding areas. The magnitude of change will vary depending on the viewpoint from which it is viewed and how visible the proposed buildings are in that view.

The proposed building will result in a permanent change in character of the site from car park to residential development including a public open space and access streets. Notably, since the site is zoned for development, it could be said that the current land use is temporary and that the proposed development represents a return to a more 'appropriate' urban form for this town centre area.

Table 12.9 –Summary of Magnitude of Change

Ref.	Viewpoint location	Distance from site*	Description of View	Magnitude of Change
V1	Terryland Forest Park (northwest of the site)	370m	Protected view from Terryland Forest Park looking southwest at a public open space. View of site is screened by existing trees.	No appreciable change
V2	Headford Rd (Southeast of the site)	60m	View from Headford Road looking northwest towards the site's southern boundary. The massing of the proposed development is visible in the middle ground.	High
V3	Water Lane	220m	View from Water Lane looking Northwest towards a Public Open Space. View of the proposed development is obstructed by existing buildings.	No appreciable change
V4	Dyke Road junction with Plots Local Park	140m	View from Dyke Road looking northwards towards Dyke Road. Massing of proposed building is visible in this view.	High
V5	Dyke Road (South junction)	80m	View from Dyke Road looking north towards the site's southern boundary. Massing of proposed development is visible in this view.	High
V6	Plots Local Park	193m	View from Plots Local Park looking northeast towards a Public Open Space. Massing of proposed building is partially screened by existing vegetation.	Low
V7	Corrib Waterside Pier	150m	Protected view from Corrib Waterside Pier looking east towards the river harbour. The site	High

Ref.	Viewpoint location	Distance from site*	Description of View	Magnitude of Change
			is slightly screened by existing vegetation in proximity to the river.	
V8	Salmon Weir Bridge	480m	Protected view from Salmon Weir Bridge looking northeast towards the Salmon Weir. Outline of proposed development roof is visible but is mostly screened by existing buildings and vegetation.	No appreciable change
V9	Inland Fisheries Ireland	350m	Protected view from the entrance gate at Inland Fisheries Ireland looking eastwards towards the entrance gate. Massing of proposed development is partially screened by the existing buildings and vegetation.	Low
V10	University of Galway (Riverside path)	228m	Protected view from the University of Galway at the riverside looking eastwards towards the River Corrib. Massing of proposed development is visible in the background.	High
V11	Dyke Road (Northwest of the site)	125m	Protected view from Dyke Road looking southwards at Dyke Road and Black Box Theater. Massing proposed development is partially screened by the Black Box Theatre.	Medium
V12	Dyke Road (at Black Box Theatre)	37m	View from Dyke Road at Black Box Theater looking southeast towards the car park (site). Massing of proposed development is visible in this view.	Very High
V13	Headford Road junction with St Bridget's Place	107m	View from Headford Road junction with St Bridget's Place looking northwest towards the site's southern boundary. Massing of proposed development is visible in this view.	Medium
V14	Cill Ard	246m	View from Cill Ard looking westwards towards IMC Cinema Galway building. Massing of proposed development is partially screened by an existing wall and vegetation.	Low
V15	Dyke Road (southwest of the site)	58m	View from Dyke Road looking northwards towards the car park. Massing of proposed development is visible in the middle ground.	High
V16	Quincentennial Bridge	615m	Protected view from Terryland Forest Park, Quincentennial Bridge looking southeast towards the river. Massing of proposed development is visible in the background	Medium
V17	Dyke Road (near N6 Junction)	400m	Protected view from Dyke Road looking southeast at the Terryland Forest Park. Outline of the proposed development is partially visible in the background.	No appreciable change
V18	Terryland Forest Park (north of the site)	250m	View from Terryland Forest Park looking southwards. Outline of the proposed development is partially visible in the background.	Low

12.5.4 Quality of Change

With regard to quality of change in the landscape, the proposed development is generally considered positive. In reaching this conclusion regard has been had to the following considerations:

- The new building and landscape spaces of architectural merit are all considered positive changes or improvements to the landscape, which currently consists in a car park.
- The new use creates a higher quality of space. This positive quality of landscape will be seen from the local context, as it provides an improvement in the landscape amenity value of the site for users and there is increased vegetation and tree cover which is considered inherently positive.
- Low value of existing car park
- At planning level, this development is put of the wider regeneration of its area in accordance with the Headford Road Regeneration Sites
- In terms of urban design, the building proposed creates a landmark on the entrance to Galway City, which emerges from the wooded landscape of Terryland Forest Park

Streetscape trees would be expected to reach greater size, maturity and quality, assuming good practice in site preparation and tree planting methodology.

The proposed building will contrast with the existing landscape resulting in a permanent change in character.

Construction stage impacts, where they occur, are considered to be of negative quality and short term, as the construction stage is expected to last significantly less than seven years.

12.6 Predicted Impacts of the Proposed Development

The predicted impacts are the impacts that the development is most likely to have on the receiving environment. For the sake of clarity, these shall be considered under the following headings: Landscape Impacts and Visual Impacts.

These impacts are measured under the following categories:

- Construction Stage
- Operational Stage

12.6.1 Construction Phase

The construction stage will last from one to five years in total (i.e. the duration of the planning permission), so any impacts generated at this stage will be short term in duration, save for some landscape effects which will be permanent.

Landscape impacts during construction will be negligible due to the low value of the existing landscape of a car park. The low character value of the landscape means that there will be no impact to the quality of the landscape due to construction activities.

Visual impacts will be more acute than in the operational stage, but short term in duration. This is due to the construction traffic, site hoarding, cranes, etc. Cranes will be taller than the proposed buildings and therefore more visible in the landscape. There will also be vehicular

and crane movement and changes to the configuration of the site, typical of building sites, resulting in visual impacts to local viewpoints.

The most substantive effects during construction will be experienced by the adjacent residential and commercial receptors. The users which are nearest to the development and have direct views will experience profound short term visual impact during construction due to the very high level of change in the environment and their proximity.

See Table below for a summary of all likely construction impacts on the visual receptors.

Table 12.10 - Construction Stage Visual Impacts

View	Magnitude	Probability	Duration	Sensitivity	Quality	Significance of Effect
V1	No appreciable change	Likely	Short-Term	High (III)	Negative	Slight
V2	High	Likely	Short-Term	Low (I)	Negative	Moderate
V3	No appreciable change	Likely	Short-Term	Medium (II)	Negative	Not Significant
V4	High	Likely	Short-Term	Low (I)	Negative	Moderate
V5	High	Likely	Short-Term	Low (I)	Negative	Moderate
V6	Low	Likely	Short-Term	Medium (II)	Negative	Slight
V7	High	Likely	Short-Term	High (III)	Negative	Significant
V8	No appreciable change	Likely	Short-Term	High (III)	Negative	Slight
P9	Low	Likely	Short-Term	Medium (II)	Negative	Slight
V10	High	Likely	Short-Term	High (III)	Negative	Significant
V11	Medium	Likely	Short-Term	High (III)	Negative	Significant
V12	Very High	Likely	Short-Term	Low (I)	Negative	Moderate
V13	Medium	Likely	Short-Term	Low (I)	Negative	Slight
V14	Low	Likely	Short-Term	Low (I)	Negative	Not Significant
V15	High	Likely	Short-Term	High (III)	Negative	Significant
V16	Medium	Likely	Short-Term	High (III)	Negative	Significant
V17	No appreciable change	Likely	Short-Term	High (III)	Negative	Slight
V18	Low	Likely	Short-Term	Medium (II)	Negative	Slight

12.6.2 Operational Phase

Following construction, the main landscape effects of the proposed development are associated with the completion of the site. The completed landscape character will have a positive effect on the site and the areas through the completion of the new public open space, pedestrian links and increase in street-level activity that the development will bring.

Verified views have been prepared in accordance with the relevant methodologies to ensure that the photomontages are accurate, it should be noted that – in an urban landscape – views are part of a continuum of constantly evolving and changing views. The viewpoints selected are representation of the views available within and around the site. The key considerations for selecting the viewpoints include their relevance to the receptors, ensuring they represent views experienced by residents, pedestrians, and commuters. They also cover different

perspectives and the urban context, incorporating views from significant locations such as parks, rivers, and residential areas to reflect the diverse visual experience surrounding the site.

See Table 12.11 (Summary of Likely Significant Effects) and Appendix 12.1 (Visual Impact Assessment) for a full assessment of likely visual impacts to all receptors.

Landscape amenity values will experience positive impacts due to the new public open space and public amenity area.

The introduction of trees and vegetation will positively impact the site's landscape, which is currently dominated by impermeable surfaces and devoid of greenery. This enhancement will be evident both at ground level and on the green roofs, improving the overall environmental quality of the area.

12.6.3 Potential Cumulative Impacts

Baseline Scenario

The baseline scenario, which provides the context and existing conditions against which the proposed development will be assessed, is comprehensively detailed in section 12.4 of this chapter. This section outlines the current state of the site and its surroundings, including land use, physical characteristics, and environmental factors. It serves as a critical reference point for evaluating the potential impacts and changes brought about by the proposed development. It also identifies the sensitivity of the receptors, serving as a critical reference point for evaluating the potential impacts and changes brought about by the proposed development.

Assessment Scenario 1 (the Proposed Development)

Assessment scenario 1, focusing on the Proposed Development, is detailed in section 12.5, "Characteristics of the Proposed Development." This section includes an analysis of the visual characteristics, highlighting the scale, form, and aesthetic changes. Furthermore, section 12.6 delves into the predicted impacts of the development, covering both the construction and operational phases, assessing temporary and permanent effects on the local environment and visual context.

Cumulative assessment scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

Cumulative Assessment Scenario 1 evaluates the combined impacts of the Proposed Development (Phase 1) and Phases 2 and 3 of the Corrib Causeway Development Framework. Future phases will include further mixed use civic/commercial and retail developments with similar scale, form, and aesthetic qualities to Phase 1, they are expected to have similar impacts as described in sections 12.5 and 12.6. Additionally, during Phase 3 should an alternate location for the Black Box Theatre be found, it may affect the local area’s cultural aspects.

Cumulative assessment scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

Within the Headford Road Regeneration Sites there are further lands zoned for development to the east of the proposed development. Any further development within the vicinity of the

proposed lands could have the possibility of impacting on the same sensitive receptors as identified above. The cumulative effect of the impact of this future development associated with these zoned lands will contribute towards lessening the magnitude of the impact of the proposed residential development. However, these future developments will have further impact on the named receptors above that cannot at this stage be quantified but would be subject to their own assessment.

Refer to Chapter 2 for a list of existing and approved projects in the wider area. Projects included are those existing or approved by the planning submission date, including those under construction, with planning permission but not yet built, and pending approval. This encompasses all projects within 100m of the development and larger projects meeting specific criteria: residential developments over 150 units, commercial projects over 10,000 sqm, and infrastructure developments over 1km, within a 2km radius. 100m is considered appropriate for the cumulative assessment given the nature of the proposed development and its location in an area of existing residential and business developments.

Taken together, these developments, and the lands zoned for development as envisaged in the Development Plan will result in very significant change to the landscape and visual environment. As this is in accordance with the Development Plan zoning objective, the development is planned and orderly and while residential development will generate landscape and visual impacts, it is considered that the policies in the Development Plan 2023-2029 will result in a continuation of high-quality development. Thus, similar to the current development, cumulative impacts of further development may result in visual impacts to existing sensitive receptors of varying degrees, but overall, the expansion of the settlement in a planned and orderly manner will result in positive landscape amenity and access benefits with new links, public open spaces and areas of high amenity value for the wider population.

12.6.4 Summary of effects

Table 12.11 Summary of Likely Significant Effects

Ref	Viewpoint Location	Distance from Site	Level of Sensitivity	Magnitude of Change	Residual Effect	Quality	Duration
Construction Phase							
V1	Terryland Forest Park (northwest of the site)	370m	High (III)	No appreciable change	Slight	Negative	Short-Term
V2	Headford Rd (Southeast of the site)	60m	Low (I)	High	Moderate	Negative	Short-Term
V3	Water Lane	220m	Medium (II)	No appreciable change	Not Significant	Negative	Short-Term
V4	Dyke Road junction with Plots Local Park	140m	Low (I)	High	Moderate	Negative	Short-Term
V5	Dyke Road (South junction)	80m	Low (I)	High	Moderate	Negative	Short-Term
V6	Plots Local Park	193m	Medium (II)	Low	Slight	Negative	Short-Term
V7	Corrib Waterside Pier	150m	High (III)	High	Significant	Negative	Short-Term
V8	Salmon Weir Bridge	480m	High (III)	No appreciable change	Slight	Negative	Short-Term
P9	Inland Fisheries Ireland	350m	Medium (II)	Low	Slight	Negative	Short-Term

Ref	Viewpoint Location	Distance from Site	Level of Sensitivity	Magnitude of Change	Residual Effect	Quality	Duration
V10	University of Galway (Riverside path)	228m	High (III)	High	Significant	Negative	Short-Term
V11	Dyke Road (Northwest of the site)	125m	High (III)	Medium	Significant	Negative	Short-Term
V12	Dyke Road (at Black Box Theatre)	37m	Low (I)	Very High	Moderate	Negative	Short-Term
V13	Headford Road junction with St Bridget's Place	107m	Low (I)	Medium	Slight	Negative	Short-Term
V14	Cill Ard	246m	Low (I)	Low	Not Significant	Negative	Short-Term
V15	Dyke Road (southwest of the site)	58m	High (III)	High	Significant	Negative	Short-Term
V16	Quincentennial Bridge	615m	High (III)	Medium	Significant	Negative	Short-Term
V17	Dyke Road (near N6 Junction)	400m	High (III)	No appreciable change	Slight	Negative	Short-Term
V18	Terryland Forest Park (north of the site)	250m	Medium (II)	Low	Slight	Negative	Short-Term
Operational Phase							
V1	Terryland Forest Park (northwest of the site)	370m	High (III)	No appreciable change	Slight	Neutral	Permanent

Ref	Viewpoint Location	Distance from Site	Level of Sensitivity	Magnitude of Change	Residual Effect	Quality	Duration
V2	Headford Rd (Southeast of the site)	60m	Low (I)	High	Moderate	Positive	Permanent
V3	Water Lane	220m	Medium (II)	No appreciable change	Not Significant	Neutral	Permanent
V4	Dyke Road junction with Plots Local Park	140m	Low (I)	High	Moderate	Positive	Permanent
V5	Dyke Road (South junction)	80m	Low (I)	High	Moderate	Positive	Permanent
V6	Plots Local Park	193m	Medium (II)	Low	Slight	Neutral	Permanent
V7	Corrib Waterside Pier	150m	High (III)	High	Significant	Positive	Permanent
V8	Salmon Weir Bridge	480m	High (III)	No appreciable change	Slight	Neutral	Permanent
P9	Inland Fisheries Ireland	350m	Medium (II)	Low	Slight	Neutral	Permanent
V10	University of Galway (Riverside path)	228m	High (III)	High	Significant	Positive	Permanent
V11	Dyke Road (Northwest of the site)	125m	High (III)	Medium	Significant	Positive	Permanent
V12	Dyke Road (at Black Box Theatre)	37m	Low (I)	Very High	Moderate	Positive	Permanent

Ref	Viewpoint Location	Distance from Site	Level of Sensitivity	Magnitude of Change	Residual Effect	Quality	Duration
V13	Headford Road junction with St Bridget's Place	107m	Low (I)	Medium	Slight	Positive	Permanent
V14	Cill Ard	246m	Low (I)	Low	Not Significant	Neutral	Permanent
V15	Dyke Road (southwest of the site)	58m	High (III)	High	Significant	Positive	Permanent
V16	Quincentennial Bridge	615m	High (III)	Medium	Significant	Positive	Permanent
V17	Dyke Road (near N6 Junction)	400m	High (III)	No appreciable change	Slight	Neutral	Permanent
V18	Terryland Forest Park (north of the site)	250m	Medium (II)	Low	Slight	Neutral	Permanent

12.6.5 "Do Nothing" Impact

The 'Do-Nothing' impact pertains to the scenario where the proposed development is not implemented. The primary consequence of this would be the absence of the anticipated impacts and effects. If the site remains in its current state as a car park, it will not align with the current land use designation and Planning Scheme, which envision significant development for a mixed-use development, including housing and potentially office, civic, and cultural spaces.

12.7 Avoidance, Remedial and Mitigation Measures

The following recommendations are put forward to mitigate against any negative impacts and to reinforce the positive impacts of the proposed development. Mitigation measures are proposed and considered only on the lands of the subject site.

12.7.1 Construction Phase

During the construction phase, site hoarding will be erected to restrict views of the site. Construction activities will adhere to the hours specified in the Preliminary Construction and Environmental Management Plan. Mitigation measures will include enclosing all site areas visible from local dwellings with robust, visually impermeable hoarding at least 2 meters high. Additionally, trees will be planted in appropriately sized tree pits to accommodate the proposed species.

12.7.2 Operational Phase

There are no relevant mitigation measures over and above the measures integrated into the design of the scheme such as landscape works, visual variety in the building, height limitations, breaking down of visual massing and variation of materials.

A comprehensive landscape architectural design for the entire site is proposed, integrating mitigation measures that are required to avoid or reduce potential negative effects of the development. Please see the landscape plans and reports by Murray & Associates, Landscape Architecture as submitted with the planning application for full details of the extensive landscape proposals. The primary measures of note are as follows:

- Variation of building heights, and roof types (including green roofs) gives visual relief and punctuates the block layout.
- The proposed development represents a high quality of design and the quality of materials proposed throughout should reflect this quality. See Architects' Design Statements for full details of buildings and urban design strategies.
- General landscape planting of trees and shrubs along the boardwalk and in the open spaces will create an attractive immediate visual environment and will, over time as trees mature, create a sylvan character and give further relief and variety in the visual presentation of the development in views from outside and in. Planting will also create shelter and reduce wind speeds, thus increasing pedestrian comfort and amenity value. See Landscape Architect's drawings and report for full details.

- Use of native trees, shrubs and wildflowers and non-native pollinator-friendly plants where possible will enhance the landscape and biodiversity value of the proposed development and add to wider landscape quality.
- A new habitat plantation and integrated Sustainable Drainage measures.

The existing boundary hedges around the site to the east are to be retained. In areas where these existing boundaries need rehabilitation and filling in, semi-mature native tree planting, bare-root tree planting and native shrub planting is proposed as part of the planning application. This will create a landscape buffer space that will reduce the views into the site from adjacent properties.

Mitigation measures are shown on the submitted landscape drawings. At time of planting, the proposed standard trees in the landscaped buffer zones will be at least 3.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependent on species within the medium term.

12.7.3 "Worst Case" Scenario

The views selected for analysis are those from where the proposed development is most likely to be visible and so the analysis of impacts, above, represents a worst-case scenario.

12.8 Residual Impacts

The design of the proposed development has already incorporated all feasible measures to avoid or reduce its impacts to acceptable levels. In other words, there are no additional practicable steps—beyond those already proposed into the design—that could further lessen the predicted impacts without compromising the development's viability or its compliance with the Development Plan.

As there are no substantive mitigation measures over and above those incorporated into the design of the proposed development, the impacts will be as per the predicted impacts (see section 12.6).

The proposed development aligns with and adheres to the policies outlined in the Galway City Development Plan. It creates a high-quality, appealing, and cohesive residential development.

Please see Appendix 12.1 for the verified views and commentary on the visual analysis and effects created by the proposed development.

12.9 Monitoring

12.9.1 Construction Phase

Landscape tender drawings and specifications will be produced to ensure that the landscape work is 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 planting season after completion of the main civil engineering and building work.

12.9.2 Operational Phase

This will consist of inspections of the site and ongoing maintenance to ensure that the public realm remains in good condition and the site vegetation is managed appropriately. All landscape works will be in an establishment phase for the initial three years from planting. A landscape management plan accompanies the planning application.

12.10 Interactions

In terms of interactions, the impact on the landscape relates to many of the impact areas considered. In the current context, the most significant interactions are considered in the following Chapters:

- Population and Human Health
- Biodiversity
- Land and Soils

The impact on landscape is significant but consistent with the prevailing planning policy context and sustainable development objectives enunciated in international, national, regional and local policy.

12.11 Difficulties Encountered When Compiling

No difficulties were encountered during the landscape and visual impact assessment.

12.12 References

Galway City Development Plan 2023-2029

Environmental Resources Management, Landscape Character Assessment of County Clare, March 2004

Environment Protection Agency, 2003. *Advice Notes For Preparing Environmental Impact Statements.*

Environment Protection Agency, 2015. *Draft Advice Notes For Preparing Environmental Impact Statements.*

Environment Protection Agency, 2022. *Guidelines on The Information to Be Contained In Environmental Impact Statements*.

Routledge, 2013. The Landscape Institute / Institute of Environmental Assessment *Guidelines for Landscape and Visual Impact Assessment* 3rd Edition

13 MATERIAL ASSETS - TRAFFIC AND TRANSPORT

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 section is to assess the impact of the Proposed Development on the surrounding road network and transport infrastructure on the Dyke Road and in Galway City.

This section is written as a concise summary of the Traffic and Transport Assessment (TTA), included with the planning application submission. Rather than repeat the detailed traffic assessments carried out within the Traffic and Transport Assessment, it is referred to throughout this chapter, with the impact assessment findings discussed below.

13.1.1 Quality Assurance and Competency of Experts

This chapter was prepared by Julie Tiernan BE(Civil) (Hons) MSc CEng MIEI of PUNCH Consulting Engineers.

13.2 Study Methodology

The assessment is based on the Traffic and Transport Assessment, Outline Mobility Management Plan and Public Transport Capacity Assessment Report as well as the following documents:

- TII's Traffic and Transport Guidelines PE-PDV-02045 (May 2014);
- Galway City Development Plan 2023-2029;
- NTA Cycle Design Manual; and
- Design Manual for Urban Roads and Streets

Site visits were made at various dates to review the character and issues associated with the surrounding road network.

The scope of the TTA was discussed and agreed with Galway City Council Engineering representatives.

Traffic surveys at 3 junction locations were undertaken on Thursday 16th of November 2023 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. The impact of the Proposed Development was assessed by comparing the baseline traffic flows compared with the Proposed Development added up to the Design Year.

The existing public car park usage was surveyed over three consecutive days from Thursday 16th to Saturday 18th of November between the hours of 07:00-19:00. This gathered representative weekday and weekend usage data as per industry practice.

A public transport capacity occupancy survey was undertaken on Thursday 11th of April 2024 at 2 no. bus stops in close proximity to the site as per industry practice.

A Quality Audit (including a Stage 1 Road Safety Audit) has been carried out on the Proposed Development and surrounding network.

13.3 The Existing and Receiving Environment (Baseline Situation)

13.3.1 Site Location

The site is located to the north of Galway City Centre and are bounded by Dyke Road to the west, an existing public carpark to the south, Galway Retail Park to the east and the Black Box Theatre and Terryland Park to the north. The site is currently a public car park and vehicular access to the site is currently via the west from one access point on Dyke Road.

13.3.2 Existing Public Car Park

The site is an active public car park with a total of 554 available parking spaces that were surveyed.

The car park was divided into two separate areas for the purpose of surveying the existing usage. Car Park 1 (northern) consists of 311 spaces and Car Park 2 (Southern) consist of 243 spaces.

For the entire 3-day November 2023 carpark survey, Carpark 2 had a higher occupancy than Carpark 1, with users choosing to use Carpark 1 only when Carpark 2 had started to fill up. The overall carpark tended to fill up from the southern end (city-side) first with user preference to park close to the Headford Road. Some users of Carpark 1 also tended to park close to the pedestrian access to Galway Retail Park located to the east.

The overall surveyed maximum capacity of the combined car parks was 263 on the weekday and 350 on the weekend.

Across the entire carpark, 112 spaces were not used during the survey, this includes 109 spaces in Car Park 1 not used at all during the 3-day survey.

Additionally, the carpark survey recorded the length of time each space was occupied by individual cars. Users of both sections tended to be using the spaces for long periods of time.

13.3.3 Existing Road Network

Dyke Road is a two-way single carriageway with a single wide footpath on the western side of the carriageway until the N6 overpass at which point the footpath ends and restarts on the eastern side. There are no existing designated cycle lanes on the road. The road is height restricted to 2.28m when it passes below the N6. The speed limit on the road is 50 km/h. Based on the November 2023 survey, the baseline Annual Average Daily Traffic (AADT) for the Dyke Road is approximately 8,300 with 0.7% Heavy Goods Vehicles (HGVs).

Dyke Road meets Headford Road south of the site at two points. The primary junction between Dyke Road and Headford Road is a signal-controlled junction. Headford Road is a main route into Galway City Centre. Based on the November 2023 survey, the baseline AADT for the Headford Road is approximately 12,600 with 2% HGVs.

The 3 No. junction traffic surveys undertaken on Thursday 16th of November 2023 found that the mean morning peak hour traffic flow at the existing junctions surrounding the development generally occurred between 08:00 and 09:00 (AM). The evening peak hour flow was found to be between 16:00 and 17:00 (PM).

13.3.4 Existing Pedestrian Facilities

Existing pedestrian facilities are poor in the vicinity of the site. They do not provide full connectivity to the surrounding roads and there is visible ponding of water and vegetation overgrowth at times.

13.3.5 Existing Cycling Facilities

Existing cycling facilities are poor in the vicinity of the Proposed Development site. Cyclists are not offered segregated facilities for their journeys.

13.3.6 Existing Public Transport Facilities

A Public Transport Capacity Assessment Report was carried out on the surrounding public transport frequency. Due to its city centre location, the site is well served by the existing bus network with 9 no. routes passing within 1km of the Proposed Development.

In order to determine the baseline public transport capacity, an occupancy survey was undertaken on Thursday 11th of April 2024 at 2 no. bus stops in close proximity to the site. The report demonstrates that the Proposed Development site is well served by public transport with large capacity, and frequent services.

13.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

The Proposed Development will include 2 No. vehicular access points. The northern vehicular access will be for access to a small residential carpark. The southern vehicular access will be for access to a small residential carpark, creche set-down, refuse collection, ESB substation and Uisce Eireann pump station access.

It is proposed to provide a total of 33 parking spaces for the Proposed Development, with some on street parking provided on Dyke Road and the remaining included in the off street car parks. 2no space will be accessible and a minimum of 10% will have EV chargers. All spaces will be cabled for future EV use.

The layout of the Proposed Development requires the removal of a proportion of the existing public car park. 165 public car parking spaces will remain following the Proposed Development works. A new junction will be created with Dyke Road which requires minor modifications to the existing car park.

The remainder of the existing public car park (165 spaces) will be removed for Phase 2 of the Corrib Causeway Development Framework.

A new pedestrian crossing will be provided on Dyke Road providing connectivity from the Proposed Development to the River Corrib.

The Proposed Development will provide high quality pedestrian and cyclist access which will promote sustainable transport usage. 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.

13.5 Potential Impact of the Proposed Development

13.5.1 Construction Phase

Construction traffic travelling to the site will use the Dyke Road for access. The dominant traffic route will be via the N6/Headford Road to Dyke Road.

There will be approximate excavation volumes of 5,250m^3 for the formation of the site levels. This material will be removed from site and will require an approximate total number of 525 HGV loads to do so.

A ground improvement technique known as “rigid concrete inclusions” will be implemented to the site outside of the building footprint. Approximately 7,500m^3 of cut material will be removed for this technique which will require an approximate total number of 750 HGV loads. Following the installation of concrete piles to improve the ground material, hardcore fill with an approximate volume of 7,500m^3 will then be backfilled to formation level resulting in a similar HGV loading to the site.

This formation level and ground improvement process will be spaced over an approximate 120-day period at the start of the project resulting in a maximum of 10-20 HGVs per day during the busiest period of construction. The traffic volume associated with the construction phase is not considered to be excessive when compared to the baseline traffic volumes carried out in November 2023 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 points, which allows delivery vehicles to pull off into the site, there will be no significant disruption to the traffic flows on the Dyke Road as a result of the construction of the development. It is not envisaged that any diversions will be required.

There will be a neutral short-term slight impact to local traffic during the construction phase.

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 transportation will be published on site.

The eastern existing public footpath on Dyke Road is likely to be impacted by the project however there is an alternative footpath on the western side of Dyke Road.

Existing cycling facilities are poor in the vicinity of the Proposed Development site and will be unaffected during construction phase.

13.5.2 Operational Phase

Only 33 car parking spaces are proposed for the 219-unit residential development. The city centre location of the site supports sustainable transport usage and will therefore not generate high levels of vehicular traffic in the area.

Pedestrian access to the site will be improved with the provision of a new crossing on Dyke Road, improved public footpaths and provision of a raised boardwalk with pedestrian routes and desire lines that have been created to comply with the requirements indicated in the Draft Headford Road Framework Plan.

GCC have indicated that future cycle facilities on the Dyke Road are proposed on the dyke itself and no cycle lane provision on the road is currently required to meet their objectives for cycle provision in the area.

The removal of the existing public car park will also reduce the number of existing cars accessing the Proposed Development site by an estimated 38%.

While it is proposed to remove 389 spaces from the overall existing public carpark the majority of these spaces are not being used throughout the day based on the 3-day surveys carried out in November 2023.

The TTA shows that the Estimated AM and PM peak hour overall traffic generated by the Proposed Development (Table 13-1) has a minimal impact on the surrounding external junctions with the Proposed Development in operation.

Table 13-1 Estimated AM and PM peak hour overall traffic (Passenger Car Units (PCUs)) generated by Proposed Development

	AM Peak Predicted Movements	PM Peak Predicted Movements
Proposed Development Increase	+53	+58
Public Car Park Reduction	-33	-47
Overall Impact	+20	+11

Overall, at operational phase, there is likely to be a long-term neutral not significant impact on the surrounding roads as a result of the Proposed Development.

13.5.3 Potential Cumulative Impacts

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.

1. Cumulative Assessment Scenario 1 – the Proposed Development (Phase 1) plus Phase 2 and Phase 3 of the Corrib Causeway Development Framework.

With the addition of Phase 2 will come the removal of the remainder of the existing public car park. Therefore the traffic impact will be further improved in the area due to expected vehicular usage reduction.

Phase 3 will be a residential development also with a very low provision of car parking given the central location of the site with improved access to sustainable modes of transport (walking, cycling and public transport).

Therefore, the overall cumulative impact of the full Development Framework is expected to be a long-term positive impact on the surrounding roads.

2. Cumulative Assessment Scenario 2 – the Proposed Development (Phase 1) plus Phase 2 and 3 of the Corrib Causeway Development Framework plus cumulative schemes

As per Cumulative Assessment Scenario 1 the completion of the Development Framework development will likely see a reduction to vehicular traffic in the surround road network. A review of the neighbouring cumulative schemes in the area has not shown any significant traffic generations to be considered further. There will also be an improvement in provision of sustainable modes of transport (walking, cycling and public transport) with the introduction of future transport schemes in the area.

Therefore, the overall cumulative impact of the full Development Framework plus cumulative schemes is expected to be a a long-term positive impact on the surrounding roads.

13.5.4 Summary of effects

Table 13-2 Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Construction traffic (HGVs)	Road network	Impact upon local road network	Neutral	Slight	Short-term	Direct	N/A	Slight (Not Significant)
Operational Phase								
Road traffic	Road network	Impact upon local road network	Neutral	Not Significant	Long-Term	Direct	N/A	Neutral Not Significant

13.5.5 "Do Nothing" Impact

If the Proposed Development does not proceed there would be no reduction in traffic loading due to the removal of the existing public car park. The existing baseline traffic figures would be expected to grow as per the TII standard predicted values.

13.6 Avoidance, Remedial and 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 Construction Phase impacts raised, 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 Dyke 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 Construction Phase impacts raised, 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 and construction of the built services in accordance with the relevant guidelines and codes of practice will mitigate any potential impacts during the operational phase of the development.

13.7 Residual Impacts

13.7.1 Construction Phase

There will be no residual impacts on the surrounding traffic and transportation during the construction phase.

13.7.2 Operational Phase

Residual impacts on the surrounding roads and traffic during the operational phase is considered to be a long-term positive impact. The volumes of traffic generated from the currently Proposed Development when compared to the baseline scenario will have a not significant effect on the road network traffic volumes.

13.8 Monitoring

13.8.1 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:

- Galway City 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.

13.8.2 Operational Phase

There will be no monitoring requirements of the traffic and transport in the operational phase of the development.

13.9 Interactions

AADTs for the surrounding road network have been provided for the Noise/Air/Climate Chapters for the Do Nothing and Do Something Scenarios up to the Design Year of 2043.

The civil engineer provided estimated construction excavation volumes to inform the construction traffic volume estimations.

13.10 Difficulties Encountered When Compiling

No significant difficulties were encountered in completing this chapter.

13.11 References

- TII's Traffic and Transport Guidelines PE-PDV-02045 (May 2014)
- Galway City Development Plan 2023-2029

14 MATERIAL ASSETS: WASTE

14.1 Introduction

This chapter provides an assessment of the potential impact of the Proposed Development on waste management. Chapter 3 of this EIAR includes a detailed description of the Proposed Development.

14.1.1 Quality Assurance and Competency of Experts

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

14.2 Study Methodology

Regulations and Guidance

The methodology adopted for the assessment takes cognisance of the relevant guidelines, in particular the following:

- Environmental Protection Agency (EPA) (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR);
- EPA (2021) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects;
- Waste Framework Directive (Directive 2008/98/EC) as amended by Directive (EU) 2018/851;
- European Union (Waste Directive) Regulations 2020 as amended, S.I. No. 323 of 2020;
- Waste Management Act 1996 (as amended);
- The National Waste Management Plan for a Circular Economy 2024-2030;
- Galway City Development Plan 2023-2029; and
- Galway City Council. (2019). Segregation, Storage, and Presentation of Household and Commercial Waste Bye-laws.

The scope of work undertaken for the impact assessment includes a desk-based study of waste management services and infrastructure within the defined study area, specifically Galway City Council's jurisdiction. Additionally, the Proposed Development was assessed within the national context, considering the targets set out in the National Waste Management Plan for a Circular Economy (NWMPCE). The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area including published information and details pertaining to the Proposed Development provided by the Applicant and design

team. Information on waste management in the vicinity of the site of the Proposed Development was assembled by reviewing the following information:

- Outline Construction Environmental Management Plan (construction phase) (AECOM Ireland Limited, 2025);
- Outline Resource Waste Management Plan (construction phase) (AECOM Ireland Limited, 2025); and
- Operational Waste and Services Management Plan (operational phase) (AECOM Ireland Limited, 2025).

14.2.1 Description and Assessment of Potential Impacts

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this chapter is described in Table 14-1.

Table 14-1 Terminology used to assess the quality potential impacts and effects (Source: EPA Guidance, 2022)

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment.
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment.
Significance of Effects/Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	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 that is consistent with existing and emerging baseline trends.
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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects/Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day

Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects that can be undone, for example through remediation or restoration

14.2.2 National and Regional Policy

The National Waste Management Plan for a Circular Economy (NWMPCE) 2024 -2030, sets out the framework for the prevention and management of waste across Ireland. This document is a statutory document underpinned by national and EU waste legislation, and reflects the targets set out for construction and demolition (C&D) waste in the Waste Framework Directive (WFD). This Plan replaces the previous Regional Waste Management Plans, including the Connacht Ulster Waste Plan 2015-2021, which covered Galway City.

The strategic vision of the Plan is to rethink the approach to managing waste, and to move towards a 'circular economy' approach where resources are reused or recycled as much as possible, and the overall generation of waste is minimised.

In order to achieve this vision, the Plan has set out a number of specific and measurable performance targets in relation to construction and demolition waste:

- Achieve a 2% reduction per annum is proposed for total construction and demolition waste to achieve a cumulative 12% reduction by 2030 (Baseline is 9 million tonnes); and
- Achieve 70% of C&D waste sent for reuse, recycling and other recovery of construction and demolition waste (excluding natural soils and stones and hazardous wastes).

The Plan aims to “prioritise waste prevention and circularity in the construction and demolition sector to reduce the resources that need to be captured as waste”.
In order to achieve the objectives, set out in NWMPCE, it is imperative that robust resource and waste management plans are developed for and designed into the pre-construction, construction and operational phases of the Proposed Development.

The waste management policies, objectives, and actions for Galway City, as outlined in the Galway City Development Plan 2023-2029 and the Galway City Council Waste Bye-laws 2019, emphasize sustainable practices crucial for Large-Scale Residential Developments (LRD). Key policies include waste prevention, promoting recycling and reuse, supporting a circular economy, and enhancing waste collection and management systems. Objectives focus on reducing illegal dumping, improving waste segregation, and supporting sustainable practices to meet climate goals. Actions involve enforcing waste bye-laws, promoting recycling programs, and conducting educational campaigns to raise public awareness about sustainable waste management practices.

14.2.3 Article 27 of the European Communities (Waste Directive) Regulations 2011

Under Article 27 of the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011) as amended (referred to hereafter as Article 27), uncontaminated soil and stone free from anthropogenic contamination which is excavated during the Construction Phase of a development may be considered a by-product and not a waste, if (a) further beneficial use of the material is certain, (b) it can be used directly without any further processing, (c) it is produced as an integral part of the development works and (d) the use is lawful and will not have any adverse environmental or human health impacts (EPA, 2019). For Article 27 to apply, the beneficial use mentioned in point (a) above must be identified for the entirety of the excavated soil from the Proposed Development prior to its production, with that use taking place within a definite timeframe, for it to be regarded as certain.

14.3 Existing and Receiving Environment (Baseline Situation)

The Proposed Development site is located on the edge of Galway City and lies wholly within Galway City Council's jurisdiction.

14.3.1 Soils

The soils beneath the site of the Proposed Development are mapped by Teagasc (Teagasc, 2025) as made ground (IFS Soil Code: Made). It is noted that the soils beneath the existing Black Box Theatre adjoining the northern boundary of the site (i.e., Phase 3 of the overall Development Framework) are mapped as mineral alluvium (IFS Soil Code: AlluvMIN). As documented in the Infrastructure Report (AECOM, 2025), it is possible that the site was partially filled in the 1970s and 1980s with rubble from Galway's inner city, which may include medieval and late medieval architecture fragments.

14.3.2 Bedrock Geology

The bedrock beneath the site is mapped by the GSI (GSI, 2025) as the Burren Formation (New Code: CDBURR) described as pale grey packstones and wackestones, but also contains intervals of dark cherty limestones, often associated with oolitic grainstones.

While there are no bedrock outcrops mapped within the site boundary there are a number of bedrock outcrops mapped by the GSI (GSI, 2025) within a 2km radius of the site. The closest bedrock outcrop recorded by the GSI (GSI, 2025) is located approximately 0.36km west of the site. Additional outcropping is recorded approximately 0.87km north of the site.

14.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development.

The waste management objectives for the Proposed Development are as follows, and will facilitate material reuse and recycling, where possible, and seek to divert waste from landfill:

- Prevention: The Principal 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 Construction and Environmental Management Plan (CEMP);

- Reuse: Reusing wastes and surplus materials where feasible and in as many high value uses as possible;

- Recycle: Recycling wastes where possible such as introducing on site crushers to produce waste derived aggregates which, subject to appropriate testing and approvals, may be re-used in the Proposed Development; and

- Disposal: Where disposal of waste is unavoidable, this will be undertaken in accordance with the Waste Management Act 1996, as amended.

14.5 Potential Impact of the Proposed Development

14.5.1 Construction Phase

The construction phase will give rise to the requirement to remove and bring quantities of various materials to and from the site. Construction and excavation related wastes will be created during the construction phase. This has the potential to impact on the local waste management network.

An outline Construction Environmental Management Plan (oCEMP) and an outline Resource Waste Management Plan (oRWMP) have been prepared for the construction phase of the Proposed Development by AECOM Ireland Limited (hereafter 'AECOM') and has been included in Volume 3 - Appendices of this EIAR. Site clearance activities will occur in accordance with the oCEMP and oRWMP.

The majority of waste arising during the construction phase will consist of carpark surfacing – tarmacadam wearing course and stone base courses; along with excavated soil (peat, silt, gravel and clay). This material will be segregated from all other waste components in accordance with general waste segregation policy outlined in the oRWMP and oCEMP. Should reuse be required, and practical, clean soil will be retained on site and reused in areas of soft landscaping, backfilling, etc. A record of the volumes and reuse requirements will be maintained by the Principal Contractor as part of their RWMP. Material that cannot be reused on site will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be further sorted into individual waste streams for recycling, recovery or disposal.

A temporary segregation bay will be set aside at the site for the duration of the construction and demolition phase of the Proposed Development. The bay will include segregated areas for recyclable waste streams, such as gypsum (plasterboard), cardboard, timber, concrete/blocks/tiles, etc.

The Principal Contractor will, as part of their RWMP, prepare a project-specific Excavated Material Management Plan, which will detail the following as a minimum, as detailed in the outline RWMP (AECOM, 2025):

- Detail in-situ (prior to excavation) and ex-situ (post excavation) methodologies to classify waste soil for appropriate disposal, in accordance with relevant Irish and EU legislation and guidance;

- Identify reuse requirements and soils suitable for reuse on site in consultation with the design team, including assessment methodology to determine which soils are suitable for reuse on site;
- Site management procedures, including waste minimisation, stockpile management, temporary storage procedures, waste license requirements, and waste management documentation, including waste generation record keeping, waste transfer notes, confirmation of appropriate disposal and details of any rejected consignments.

Waste soil and material intended for offsite disposal, recycling or recovery shall not be removed from the site prior to appropriate waste classification and receiving written confirmation of acceptance from the selected waste receiving facility. The offsite reuse of material will be prioritised to minimise the potential loss of valuable good quality soil and subsoil to landfill as a waste. The reuse of soil offsite will be undertaken in accordance with all statutory requirements and obligations including where appropriate re-use as by-product in accordance with Article 27. Any surplus soil not suitable for reuse as a by-product and other waste materials arising from the construction phase will be removed offsite by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility sites will have been adequately assessed and mitigated as part of separate statutory consent processes.

During the construction phase, there will be some building material and packaging wate generated. This will mainly include excess ready-mix concrete and mortar, timber off cuts, plastics, metal cut offs, cladding and tile off-cuts, as well as plastic and cardboard waste from packaging and potential over-supply of materials.

Where possible, individual waste arisings shall be identified, classified, and quantified (volume, weight) as early in the project lifecycle as possible but, inevitably, unanticipated waste arisings may occur as site work progresses, necessitating the need for a procedure to provide for waste classification as the site work progresses.

It is anticipated that the majority of non-hazardous and inert waste generated will be suitable for reuse, recovery or recycling, as appropriate. Waste materials generated from the construction phase that are unsuitable for reuse or recovery shall be separately collected. Disposal of construction generated wastes will be considered a last resort, once recycling or recovery options have been ruled out. Waste will be collected as appropriate by suitably qualified and permitted nominated waste management contractors.

The presence of asbestos is unlikely and if present would be limited to redundant below ground pipework. If asbestos is identified, it is to be removed by a specialist contractor as per the outline RWMP (AECOM, 2025). The asbestos removal works must include a management plan put in place for their safe removal and disposal before demolition takes place. Where required under the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 (as amended), the works must be notified to the Health and Safety Authority at least 14 days in advance.

A minor volume of hazardous waste (in addition to any asbestos waste) may be generated during the construction phase. Offsite removal of hazardous waste will be undertaken in accordance with the oRWMP and relevant waste management legislation by an authorised

contractor and sent to the appropriately authorised (licensed/permitted) receiving waste treatment facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility sites will have been adequately assessed and mitigated as part of separate statutory consent processes.

Waste will also be generated from construction workers e.g., organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite 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. Office and canteen waste, including food waste, will be stored in wheelie bins on site and it will be collected by an appropriately authorised waste collector. All wastes generated on site will be sent for recycling, recovery, or disposal to a suitably licensed or permitted waste facility.

The potential impact from the construction phase on waste recovery and disposal is likely to be negative, short-term and moderate.

14.5.2 Operational Phase

The operational phase of the Proposed Development will result in an increase in the production of municipal waste in the region and will increase demand on waste collectors and treatment facilities, however, as the surrounding area is urban in nature, waste collection is commonplace. Anticipated wastes arising from the day-to-day operations at the Proposed Development are summarised in Table 14-2.

*Table 14-2 Typical Waste Types and Generated List of Waste (LoW) Codes (*Individual Waste Type may Contain Hazardous Materials)*

Waste Description	List of Waste Code
Mixed Municipal Waste	20 03 01
Dry Mixed Recyclables	20 03 01
Biodegradable Kitchen Waste	20 01 08
Glass	20 01 02
Bulky wastes	20 03 07
Waste electrical and electronic equipment*	20 01 35* 21 01 36
Batteries and accumulators*	20 01 33* 20 01 34
Textiles	20 01 11
Fluorescent tubes and other mercury containing waste*	20 01 21
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.)*	20 01 13/19/27-28/29-30
Plastic	20 01 39

Waste Description	List of Waste Code
Metals	20 01 40
Paper and Cardboard	20 01 01

**Individual waste type may contain hazardous materials*

Municipal waste is made up of household waste and commercial waste that is compositionally comparable to household waste. It includes residual, recyclables, organic, bulky, and waste electrical and electronic equipment. An Operational Waste and Services Management Plan has been prepared by AECOM (2025) and is included in Volume 3 – Appendices of this EIAR.

The Operational Waste and Services Management Plan details the waste segregation and storage capacity requirements, as well as the plan which will be adopted to manage the residential and commercial waste arising from the Proposed Development, once operational. The Operational Waste and Services Management Plan has reviewed relevant policy alongside best practice guidance and recommendations for sustainable waste and recycling management arrangements for the Proposed Development.

The potential impact from the operational phase on municipal waste disposal is likely to be long term, negative and moderate.

14.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor.

A review of other off-site developments was completed as part of this assessment. Chapter 2 of this EIAR details the existing, proposed and granted planning permissions on record in the area.

With regard to the other developments under construction and proposed in the vicinity of the Proposed Development, there will be a greater demand on existing local waste management services and on regional waste acceptance facilities.

The capacity of waste collection companies and waste management facilities in Galway City have been designed with forward planning and expansion in mind to cater for a growing population. It is necessary that all the developments provide the infrastructure and services to assist residents to segregate domestic waste at source, in order to reduce the generation and disposal of non-recyclable mixed waste. Existing waste collections currently take place in the local area and during the operational phase, the Proposed Development will be added to an existing collection route. The likely effect will be neutral and not significant on waste management facilities in the area in the long term.

14.5.4 "Do Nothing" Impact

In the 'Do Nothing' scenario, the Proposed Development does not proceed and there would be no excavation, construction or operational waste generated at the site. There would, therefore, be no additional demand or loading on waste management infrastructure locally or nationally and thus there would be a neutral effect on the environment in terms of waste.

14.6 Avoidance, Remedial and Mitigation Measures

14.6.1 Construction Phase

The following mitigation measures are recommended for the construction phase of the Proposed Development regarding Waste Management:

- The waste minimisation measures outlined in the outline Resource and Waste Management Plan (oRWMP) will be implemented in full and will form part of the mitigation strategy for the site. The waste minimisation measures outlined in the outline RWMP will ensure effective waste management and minimisation, reuse, recycling, recover and disposal of waste material generated during the construction phase of the Proposed Development;
- The Principal Contractor will implement the RWMP throughout the duration of the Proposed Development construction phase;
- Waste materials will be separated at source and will follow the outline Resource and Demolition Waste Management Plan;
- Beneficial use must be identified for the entirety of the excavated soil from the Proposed Development prior to its production for the excavated soil and stone to be considered as a by-product under Article 27 of the European Communities (Waste Directive) Regulations, 2011;
- A suitably competent and fully permitted waste management company will be employed to manage all waste arising for the Construction Phase. The appointed waste contractor must have the relevant authorisations for the collection and transport of waste materials, issued by the National Waste Collection Permit Office (NWCPO);
- Similarly, all waste materials will be transported to an appropriately authorised facility, which must have the relevant authorisations for the acceptance and treatment of the specific waste streams, i.e., a Certificate of Registration (COR) or a Waste Facility Permit (WFP) as granted by a Local Authority, or a Waste/Industrial Emission Licence as granted by the Environmental Protection Agency; and
- All waste quantities and types will be recorded and quantified, and records will be retained onsite for the duration of the construction phase.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with provisions of the Waste Management Act 1996, as amended, associated Regulations and Litter Pollution Act 1997 as amended, and The National Waste Management Plan for a Circular Economy 2024-2030. The mitigation measures will also ensure optimum levels of waste reduction, reuse, recycling and recover are achieved and will promote more sustainable consumption of resources.

14.6.2 Operational Phase

As previously stated, an outlined Operational Waste Management Plan has been prepared by AECOM (2025) and is included in Volume 3 - Appendices of this EIAR. The measures outlined in the outline Operational Waste and Services Management Plan will be implemented in full and form part of the mitigation strategy for the site. Implementation of this Operational Waste and Services Management Plan will ensure a high level of recycling, reuse and recovery at the Proposed Development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.

14.7 Residual Impacts

14.7.1 Construction Phase

The residual effects on waste management are considered to be minor, negative and short-term, this is due to:

- The prevention and mitigation measures proposed within this and other chapters of the EIAR;
- Compliance with national legislation and the allocation of adequate time and resources dedicated to efficient waste management practices; and
- Continued use of permitted/licensed waste hauliers and facilities. Waste removed from the facility will be managed appropriately and will avoid environmental impacts or pollution. In addition, the correct management and storage of waste will avoid litter or pollution issues at the site.

14.7.2 Operational Phase

Waste materials will be generated on an ongoing basis during the operational phase; these will for the most part consist of municipal waste and recyclable materials. Careful management of these, including segregation at source, will help to ensure a high level of waste recycling, reuse, and recovery at the Proposed Development. A certain proportion of operational waste will nevertheless need to be disposed of at landfill. Given the provision of appropriate facilities, and their correct use by residents, environmental impacts (e.g. litter, contamination of soil or water, etc.) arising from operational waste storage and removal are expected to be minimal. The use of suitably licensed waste contractors will ensure compliance with relevant legal requirements and appropriate off-site management of waste. With the implementation of the proposed operational waste management measures, the Proposed Development is not expected to have a significant environmental impact with respect to operational waste. The likely effect of the operational phase on waste management will be neutral and imperceptible in the long-term.

14.8 Monitoring

14.8.1 Construction Phase

All waste transfer notes will be checked and filed in the environmental plan, as outlined in the oRWMP, for regular review and monitoring.

The site control measures to manage and minimise waste include:

- Signage on the site office/welfare bins to separate them as environmental/domestic waste bins; and
- Briefing for all sub-contractors via induction handouts.

14.8.2 Operational Phase

No operational phase monitoring is proposed.

14.9 Interactions

Waste management interacts with other environmental receptors as follows:

- Population and Human Health: The improper removal, handling and storage of hazardous waste could negatively impact on the health of construction workers. Potential impacts on population and human health are addressed in Chapter 5.
- Biodiversity: The improper handling and storage of waste during the Construction and Operational Phases could negatively impact on biodiversity. Potential impacts on biodiversity are addressed in Chapter 6 (Biodiversity).
- Land and Soil: Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the Site. Potential impacts on land and soils are addressed in Chapter 7.
- Traffic and Transportation: Waste collection activities at the Proposed Development have the potential to impact upon traffic movements in the Galway City area. Potential impacts on traffic are addressed in Chapter 13.

14.10 Difficulties Encountered When Compiling

No difficulties were encountered while compiling this chapter.

14.11 References

AECOM, 2025, Dyke Road Residential Development Infrastructure Report.

AECOM, 2025, Dyke Road Residential Development Outline Construction Environmental Management Plan.

AECOM, 2025, Dyke Road Residential Development Outline Resource and Waste Management Plan.

AECOM, 2025, Dyke Road Residential Development Operational Waste and Services Managment Plan.

Department of Communications, Climate Action and Environment (DCCAE) (2021) A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020-2025

Environmental Protection Agency, 2022, Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports.

Environmental Protection Agency, 2021, Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects

Environmental Protection Agency, 2019, Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011, Version 3.

Environmental Protection Agency, 2003, Advice Notes on Current Practice in the preparation of Environmental Impact Statements.

Environmental Protection Agency, 2002, Guidelines on the information to be contained in Environmental Impact Statements.

Galway City Development Plan 2023-2029.

Galway City Council. (2019). Segregation, Storage, and Presentation of Household and Commercial Waste Bye-laws.

Litter Pollution Act 1997 (as amended).

The National Waste Management Plan for a Circular Economy 2024-2030.

Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851.

Waste Management Acts 1996-2011 (as amended).

15 MATERIAL ASSETS - UTILITIES INTRODUCTION

This chapter comprises an assessment of the likely effects on existing material assets (Utilities) of the proposed construction of a residential development as described in Chapter 3 during the demolition, construction, and operational phases of the Phase 1 Corrib Causeway Dyke Road Development. It will also identify the characteristics, predicted impact and mitigation measures arising from the Phase 1 Corrib Causeway Dyke Road Development.

15.1 Quality Assurance and Competency of Experts

This Chapter has been prepared by Thorne Prophet (AECOM Ireland Limited) and subsequently reviewed by Emma McKendrick (AECOM Ireland Limited).

Name: Emma McKendrick

Title: Regional Director, Chartered Civil Engineer, AECOM

Qualifications: BEng CEng MICE FIEI

Emma McKendrick is a Chartered Civil Engineer with 34 years' experience. Emma obtained a honours degree in civil engineering from Edinburgh University in 1990, became a chartered member of the Institution of Civil engineers in 2003 and a chartered member of Engineers Ireland in 2010.

Emma worked for a number of engineering consultancies in Scotland before relocating to Ireland in 2006. From 2006 to 2017 Emma was engaged by PUNCH Consulting Engineers and joined AECOM in 2017.

Emma acted as an Expert Witness in the UCC v ESB Court Case (2013 - 2016). Emma was commissioned by Matheson on behalf of Aviva as technical advisor in a €19m damages case arising from the release of waters from the ESB hydro-electric dams on the River Lee in November 2009. Emma prepared an expert witness report in respect of the contributory negligence case, gave evidence to the Court and assisted the legal team during evidence given by ESB expert witnesses. Emma has also given evidence at several Oral Hearings with respect to surface water and flood risk.

Emma has been a member of the core project team since the inception of the project.

15.2 Study Methodology

This chapter describes the material assets in the form of utilities that could potentially be impacted by the Proposed Development. The purpose of this chapter is to assess the impacts of the proposed utilities on the existing utility network which includes the following infrastructure:

- Surface Water Drainage,
- Foul Water Drainage,
- Water Supply,

The impacts of the development on Population and Human Health, Water, Air Quality, Climate, Traffic and Transportation, and Waste Management have been considered in the following chapters of this EIA Report as follows:

- Chapter 5: Population and Human Health,
- Chapter 8: Hydrology and Hydrogeology,
- Chapter 10: Air Quality,
- Chapter 13: Material Assets – Traffic and Transportation, and
- Chapter 14: Material Assets – Waste Management.

15.2.1 Source of Information

Office of Public Works' (OPW) national flood hazard mapping (www.floodmaps.ie);

OPW Western Catchment Flood Risk Assessment and Management (CFRAM) Study (www.cfram.ie);

Environmental Protection Agency (www.epa.ie);

Geological Survey of Ireland (GSI)(www.gsi.ie), and

Uisce Éireann

15.2.2 Identification of Utilities

The Infrastructure Report prepared for the Proposed Development, included in Appendix 15-1, includes information related to existing services in the vicinity of the Proposed Development site.

Water services information (surface water drainage, wastewater drainage and water supply) was provided by Uisce Éireann and Galway City Council.

A utility survey undertaken and completed by Apex Surveys in January 2024 of the Phase 1, 2 and 3 lands, identifying the existing utilities within vicinity of the development. AECOM reviewed existing utilities (Surface Water, Foul and Water) to identify the servicing of the development site and any potential impacts of existing infrastructure.

15.2.3 Relevant Guidelines

The assessment has been carried out in consultation with Uisce Éireann (formally Irish Water) and Galway City Council and in accordance with the relevant Standards and Guidelines, including but not limited to the following:

- BS EN 752-4: 1997 – Drain and Sewer Systems Outside Buildings, Part 4: Hydraulic Design and Environmental Considerations,
- Uisce Éireann (formally Irish Water) Standard Details and Specifications, Revision 4

- Uisce Éireann (formally Irish Water) Code of Practice for Wastewater Infrastructure, Revision 2
- Uisce Éireann (formally Irish Water) Code of Practice for Water Infrastructure, Revision 2
- Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments,
- Galway City Council City Development Plan (2023-2029) (May 2023) – Interim Version,
- Galway City Council City Development Plan (2023-2029) (January 2022) – Draft Strategic Flood Risk Assessment Report,
- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022).

15.2.4 Statutory Regulations

15.2.4.1 Flood Risk Management

Flood risk management under the EU Floods Directive (Directive 2007/60/EC) aims to minimise the risks arising from flooding to people, property, and the environment. Minimising risk can be achieved through structural measures that block or restrict the pathways of floodwaters, such as river defences or non-structural measures that are often aimed at reducing the vulnerability of people and communities such as flood warning, effective flood emergency response, or resilience measures for communities or individual properties.

A Stage 3 Flood Risk Assessment has been undertaken having regard to 'The Planning System and Flood Risk Management Guidelines for Planning Authorities, 2009'. Chapter 8, Section 8.4.4 of this EIAR outlines the flood risk to the proposed development.

15.2.4.2 Galway City Council Development Plan 2023-2029

In preparing this EIAR Chapter, AECOM have taken cognisance of the Galway City Council Development Plan (2023-2029). Of particular relevance to this assessment is Chapter 9, which focuses on Environment and Infrastructure.

Policy 9.1 of the Galway City Development Plan sets out the following objectives regarding Flood Risk:

Table 15-1 Galway City Council Development Plan – Policy 9.1 Flood Risk

	Policy 9.1 Flood Risk
1	Support, in co-operation with the OPW, the implementation of EU Flood Risk Directive (2007/60/EC), the Flood Risk Regulations (SI No, 122 of 2010) and the DECLG and OPW Guidelines for Planning Authorities, the Planning System and Flood Risk Assessment Management (2009), updated/superseding legislation or departmental guidelines and have regard to the findings and relevant identified actions of the Corrib Catchment Flood Risk Management (CFRAM) Study.
2	Support and facilitate the implementation of the Coirib go Cósta Galway City Flood Relief Scheme in conjunction with the OPW to support a climate resilient city, protect against flooding and minimise the impact of future climate events. Support in general the associated mitigation and adaptation measures in order to prevent flooding and coastal erosion, subject to appropriate environmental, visual, built heritage and other relevant considerations.

3	Ensure the recommendations of the Strategic Flood Risk Assessment (SFRA) for the Galway City Development Plan 2023-2029 are taken into consideration in the assessment of developments in identified areas of flood risk and require site specific Flood Risk Assessment (FRA) and associated design and construction measures appropriate to the scale and nature of the development and the risks arising, in all areas of identified flood risk including on sites where a only small proportion of the site is at risk of flooding and adopt a sequential approach in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)
4	Protect and promote sustainable management and uses of water bodies and watercourses from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands, and natural floodplains.
5	Ensure flood risk is incorporated into the preparation of any future local area plans, framework plans and masterplans in the city.
6	Ensure any proposed measure designed to alleviate flooding/coastal erosion is subject to Appropriate Assessment in accordance with Article 6 of the EU Habitats Directive, where appropriate.
7	Continue to protect the coastal area and the foreshore and avoid inappropriate development in areas at risk of coastal erosion and/or would cause and escalate coastal erosion in adjoining areas. 8. Protect and maintain, where feasible, undeveloped riparian zones and natural floodplains along the River Corrib and its tributaries.
8	Protect and maintain, where feasible, undeveloped riparian zones and natural floodplains along the River Corrib and its tributaries.

Policy 9.3 of the Galway City Development Plan sets out the following objectives regarding Water Services:

Table 15-2 Galway City Council Development Plan – Policy 9.3 Water Services

	Policy 9.3 Water Services
1	Work in close liaison with Irish Water in the operation of water and wastewater facilities in the city and the upgrade and expansion of the network and the delivery of strategic projects such as the Terryland Water Treatment Plant Intake Works
2	Support the delivery of the objectives of the Irish Water – Water Services Strategic Plan (2015) and implementation of the Irish Water Capital Investment Plan 2020 – 2024.
3	Work in conjunction with Irish Water to ensure the provision and maintenance, of a high quality and efficient water supply capable of meeting existing and future needs of the city and support any ongoing water mains rehabilitation and water conservation projects.
4	Encourage all significant water users to use best practices in water conservation and continue to promote water conservation measures in the design of all new development in the city, such as rainwater harvesting and re-use of grey water, in liaison with Irish Water.
5	Support and liaise with Irish Water in the provision of a sustainable and effective wastewater drainage collection and treatment system capable of meeting the existing and future needs of domestic, commercial, and industrial users in the city and MASP area.
6	Support the Irish Water ongoing watermain rehabilitation and water leak reduction programme in order to conserve the city's water supply.
7	Support the decommissioning of existing individual effluent treatment systems which include septic tanks at locations which include Ballyloughane, where there is a feasible option to connect to the public sewer network. Galway City Council will collaborate with Irish Water in this regard.
8	Support the development and implementation of Drinking Water Safety Plans by Irish Water, which seek to protect human health by identifying, assessing, and managing risks to water quality and quantity; taking a holistic approach from source to tap.
9	Support the promotion of effective management of trade in discharges to sewers by Irish Water in order to maximise the capacity of existing sewer networks and minimise detrimental impacts on sewage treatment works.

Policy 9.4 of the Galway City Development Plan sets out the following objectives regarding Sustainable Urban Drainage Systems (SuDS):

Table 15-3 Galway City Council Development Plan – Policy 9.4 Sustainable Urban Drainage System (SuDS)

Policy 9.4 Water Services	
1	Ensure the use of Sustainable Urban Drainage Systems (SuDS) and sustainable surface water drainage management, wherever practical in the design of development to enable surface water run-off to be managed as near to its source as possible and achieve wider benefits such as sustainable development, water quality, biodiversity local amenity and climate adaptation.
2	Promote the use of green infrastructure e.g. green roofs, green walls, bioswales, planting and green spaces for surface water retention purposes as an integrated part of SUDS and to deliver all the ancillary benefits.

15.2.5 Appraisal Methodology

The appraisal methodology used in this assessment considered a description of the impact i.e. the "quality" of the effects (i.e. whether it is adverse or beneficial), the "significance" of the effects (i.e. the magnitude of the effect in terms of the environment), the "probability" of the event occurring, and the "duration" of the effects (i.e. whether it is short or long term) and considers the significance / sensitivity of the existing environment. Terminology for describing the quality, significance, extent, probability, and duration of effects is set out in Section 3.7.3 of the EPA EIAR guidance.

A qualitative approach was used in this evaluation and **Figure 15-1** taken from the EPA EIAR guidance shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact.

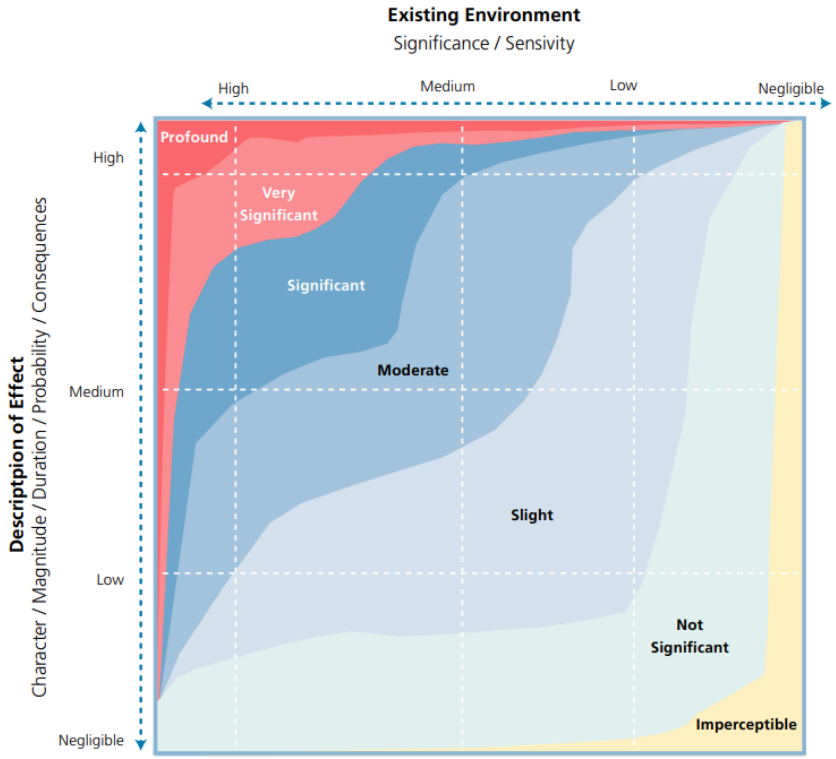

Figure 15-1 Determination of the Significance of the Impact

15.3 The Existing and Receiving Environment (Baseline Situation)

15.3.1 Proposed Development Site Description

The existing site conditions is described in detail in Chapter 2.

The overall landholding (phases 1 to 3) consists of a tarmacadam car park which spans over phases 1 & 2 respectively. The most northern part of the site is home to the Black Box Theatre (Phase 3). However, the existing uses comprising The Black Box Theatre and car parking (Phase 2) will remain operational until such times as consent is sought for their redevelopment.

A topographic survey undertaken by Apex Surveys in October 2023 of the overall landholding (phases 1to 3) indicates that ground levels on the site range from 3.84m at the northern end of the site to 7.12m in the southern portion of the site. There is a small retaining wall in the southern portion of the site where the car park levels step up from about 6.0m to around 7.0m. The ground levels on the phase 1 lands typically range from 4.8m to 5.9m with the level in the centre of the site typically being around 5.3m. The topography of the overall landholding naturally falls from south to north. The entire site is of hardstanding area.

15.3.2 Drainage and Natural Surface Water Bodies

15.3.2.1 Local Hydrology

The site is situated within a built-up urban area. The site is situated ±140 m east from the River Corrib and ±205 m south from the Terryland Stream as described 15.3.2.2.

Based on the record drawings supplied by Uisce Éireann and a utility survey of the site, undertaken by Apex Surveys in October 2023, the main surface water pipe running south to north along the western boundary of the site is a 450mm Ø concrete pipe. The pipe starts at an invert level of 5.8m on Bóthar Na Dige Road and falls to an invert level of 3.73m around the middle of the site, where it increases in size to a 525mm Ø concrete pipe and continues northwards until the discharge point. There is also a surface water pipe running through the site which serves the retail development on the Headford Road to the east of the proposed development which discharges into this surface water pipe.

It has not been possible to establish the exact discharge point of the main surface water pipe, however GCC have confirmed the surface water drainage does discharge into the Terryland Stream. The last known invert level is 3.22m, approximately 140m upstream of the expected discharge point. The anticipated discharge point lies within a wetlands area, as illustrated in

***Figure** 15-2*, from here it discharges to the Terryland Stream.

Based on the record drawings from Uisce Éireann and a utility survey, the existing Black Box Theatre is serviced by a gravity foul sewer that runs south to a pumping station (“Black Box WWPS”) located close to the current main entrance to the Dyke Road car park. From there, with a chamber invert level of 2.3m, the sewage is pumped further south along Dyke Road until it joins a combined sewer network on Headford Road at a level of 6.8m.

Refer to

Figure** 15-2* and ***Figure 15-3 for the layout of existing surface water and wastewater infrastructure in the vicinity of the site. The utility records and utility survey are included in Appendix D, of the Infrastructure Report.

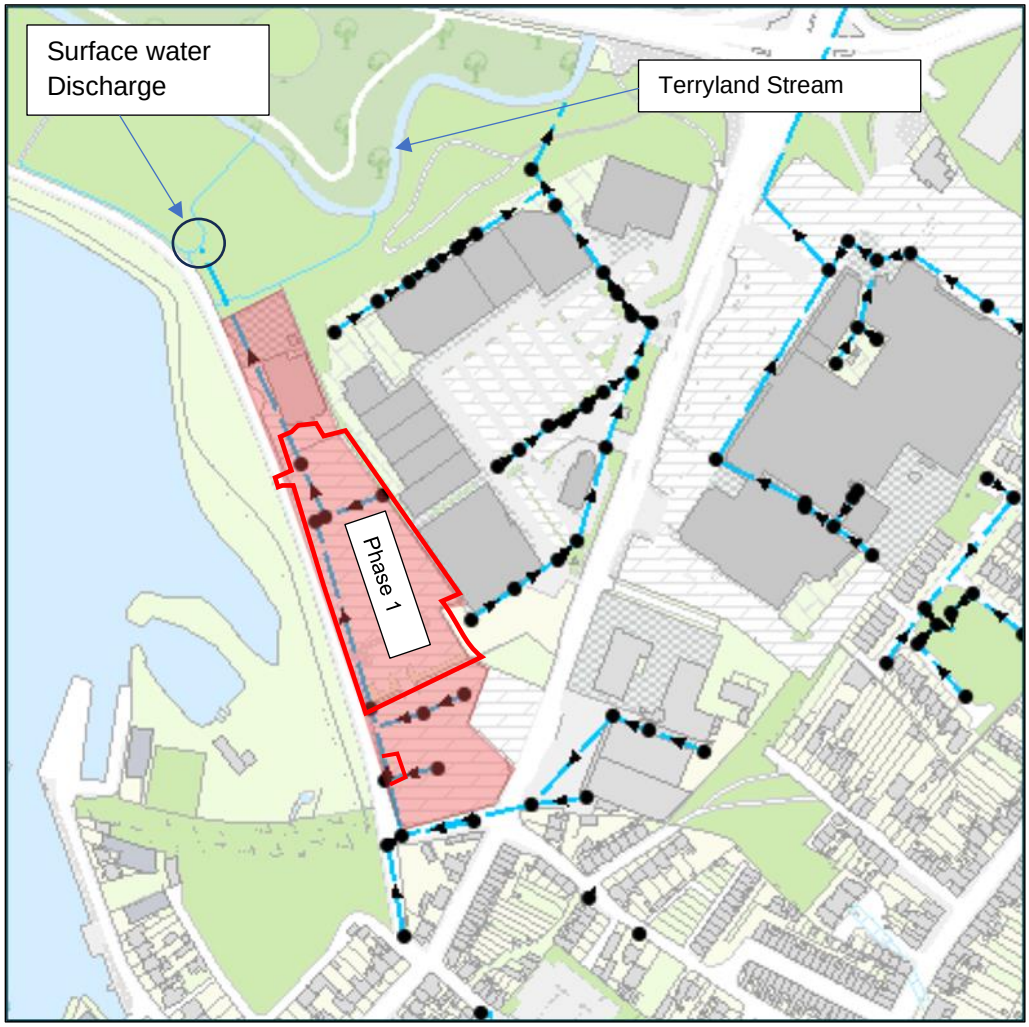

Figure 15-2 Existing Surface Water Infrastructure, UÉ 2024

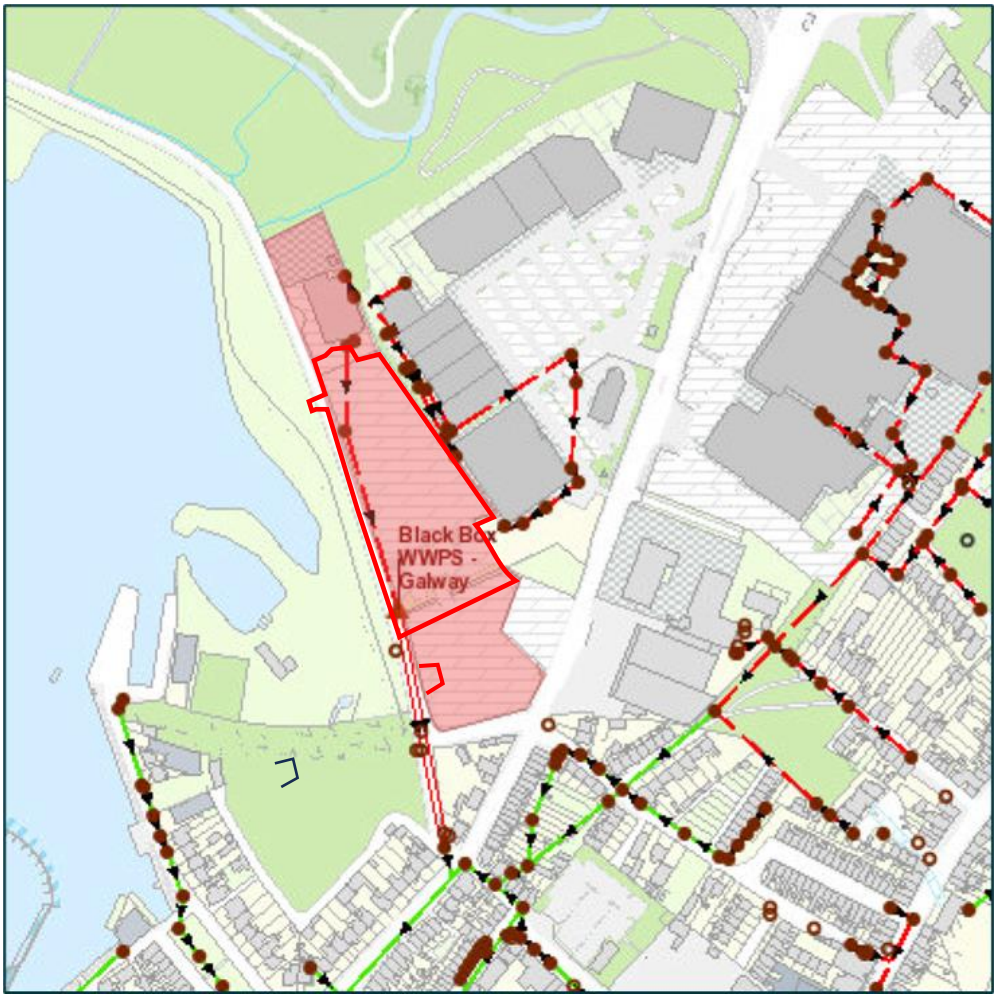

Figure 15-3 Existing Foul Water Infrastructure, UÉ 2024

15.3.2.2 Regional Hydrology

The proposed site is located adjacent to Dyke Road, Galway. The proposed site is situated ±140 m east from the River Corrib and ±205 m south from the Terryland Stream. The existing site levels range from 6.91 m OD Malin to 4.72 m OD Malin.

The Corrib River generally flows in southernly direction and connects Lough Corrib to the Atlantic Ocean at Galway. Although one of the shortest rivers in Europe at just over 6 kilometres it is reportedly the second fastest on the continent and in terms of volume of water displaced second only in Ireland to the Shannon. The catchment upstream of Galway is greater than 3,000 km^2. There are three major lakes that contribute to the catchment and that is Lough Corrib, Lough Mask and Lough Carra.

The Terryland River is a distributary of the Corrib River. The Terryland River is a distributary of the River Corrib and has a rather unusual flow regime in so much as it is a bi-directional flowing river, which either:

- Flows out of the River Corrib and disappears underground (acts as a sink),
- Or rises and flows to the Corrib, via two estavelles (acts as a spring).

It is believed that the general groundwater flow direction is from the Ballindooley Lough area southwards into an underground conduit system. The two estavelles noted above (Eastern and Western) are located within the karst depression. It is understood that the estavelles are connected to Galway Bay or Lough Atalia via the underground conduit system, however, the precise discharge locations into the Galway Bay or Lough Atalia remain unidentified.

The Terryland River (European Code IE_WE_30T010500) is designated for several sensitivities including:

- Hydromorphology pressures
- Urban run-off pressures
- River waterbody risk ('At risk') under the Water Framework Directive

15.3.3 Flood Risk

The Historic 6" mapping available on OSi.ie and included as Figure 15-4 indicates that a large area of land in the Terryland of Galway area is historically liable to flooding as indicated by the blue hatch.

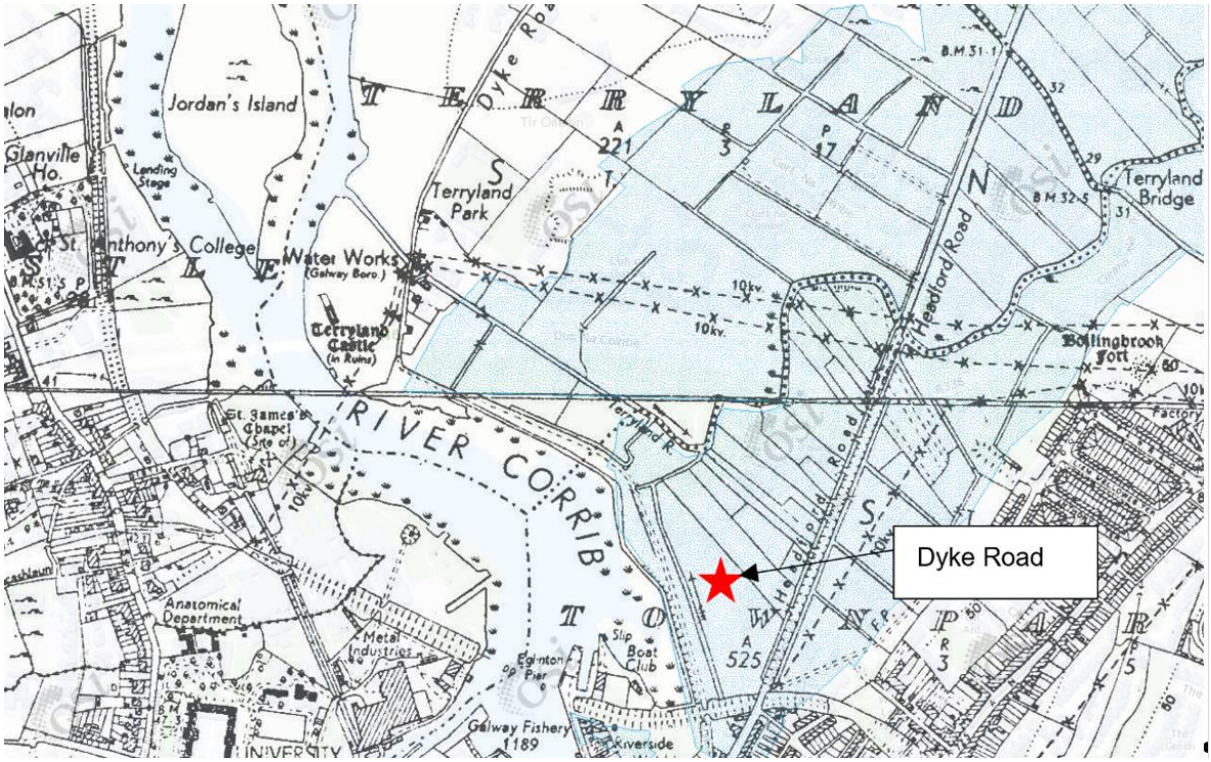

Figure 15-4 Historical flood plains indicated in blue hatch

The predominant flood risk to the Proposed Development is associated with fluvial flooding as the Terryland and Corrib Rivers are adjacent to the site. While coastal flooding has occurred in and around Galway City in the past, it has been noted that water levels associated with fluvial storm surges are generally higher. Therefore, it is considered that fluvial storm surges pose the primary risk in the vicinity of the Proposed Development.

Refer to Chapter 8 of this EIAR for further details.

15.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

The Infrastructure Report accompanying the planning application includes greater detail on the design criteria and proposals. The infrastructure report also contains the design calculations and correspondence with Uisce Éireann including Confirmation of Feasibility Letters and Statement of Design Compliance.

15.4.1 Foul Drainage

Existing Foul Water Drainage

Based on the record drawings from Uisce Éireann and a utility survey, the existing Black Box Theatre is serviced with a foul sewer that runs south to a pumping station ("Black Box WWPS") located close to the current main entrance to the Dyke Road car park. From there, with a chamber invert level of 2.3m, the sewage is pumped further south along Dyke Road until it joins a combined sewer network on Headford Road at a level of 6.8m.

Estimated Wastewater Loading

Based on a dry weather flow (DWF) of 150 litres per day person for the apartments and a DWF of 50 litres per day per occupant of the creche facility the DWF has been calculated as 1.132 l/s while the peak daily flow (taken as 6 times the Dry Weather Flow) has been calculated as 6.800 l/s. Refer to table 15-4.

Table 15-4 Estimated Loading

Source	Unit	Quantity	Flow	Daily	AVG. Demand	Peak Factor	Peak Demand
			(l/p/d)	(l/d)	(l/s)		(l/s)
219 Units	residents	646	150	96,900	1.12	6	6.730
Creche	occupants	20	50	1,000	0.012	6	0.069
			Total	**97,900**	**1.132**		**6.800**

Proposed Foul Water Drainage

It is proposed to relay the gravity foul sewer serving the Black Box Theatre and install a new gravity sewer network to serve the Proposed Development. The existing wastewater pumping station (WWPS) that serves the Black Box Theatre is to be decommissioned and a new WWPS constructed. Confirmation of Feasibility for the diversion of the wastewater pipework serving the Black Box Theatre and decommissioning of the existing Dyke Road wastewater pumping station has also been received and is included in Appendix A of the Infrastructure Report accompanying the planning application.

The new WWPS will be positioned based on the flood extents within the site and to maximize the separation from buildings. An emergency tank with 24-hour storage capacity at DWF will be provided to serve the Phase 1 Proposed Development and the Black Box Theatre.

The existing 150mm rising main serving the existing WWPS is to be retained and reused. Uisce Éireann confirmed in the Confirmation of Feasibility letter received that a 20m upgrade of a 150mm diameter sewer from Dyke Road to Wood Quay will be required. These works will be undertaken by UÉ. The confirmation of Feasibility for Feasibility letter is included in Appendix A of the Infrastructure Report accompanying the planning application.

15.4.2 Storm Water Drainage

Existing Storm Water Drainage

Based on the record drawings supplied by Uisce Éireann and a utility survey of the site, the main surface water pipe running south to north along the western boundary of the site is a 450mm Ø concrete pipe. The pipe starts at an invert level of 5.8m on Bóthar Na Dige Road and falls to an invert level of 3.73m around the middle of the site, where it increases in size to a 525mm Ø concrete pipe and continues northwards until the discharge point. There is also a surface water pipe running through the site which serves the Retail development on the Headford Road to the east of the proposed development which discharges into this surface water pipe.

As noted in section 15.3.2.1 above, it has not been possible to establish the exact discharge point of the main surface water pipe, however GCC have confirmed the surface water drainage does discharge into the Terryland Stream. The last known invert level is 3.22m, approximately 140m upstream of the expected discharge point. Two

The existing carpark site is nearly 100% impermeable and unattenuated flows discharge to the Terryland Steam. The unattenuated run-off rate from the Proposed Development site at 80mm/hour is estimated to be 216 l/s.

Proposed Storm Water Drainage

It is proposed to install a new separate gravity surface water drainage network to serve the Proposed Development which will discharge to the existing GCC 525mm Ø concrete pipe network which runs from south – north along the western boundary of the site and ultimately discharges to the Terryland Stream. It is also proposed to incorporate SuDS measures including an area of Intensive Green Roof, exfiltration permeable paving and lengths of raingarden / swales.

Separate connections to the existing surface water network will be provided on the downstream end of each of the two proposed attenuation tanks.

Further, it is proposed to divert the surface water sewer which serves the retail development on the Headford Road around the new building and then reconnect it to the 525mm Ø concrete pipe. It is also proposed to relay /realign circa ±155m of the GCC 525mm Ø concrete trunk surface water pipe that runs through the site.

Preliminary investigations undertaken by GCC in 2025 indicate sections of the pipe north of the Phase 1 site (on Phase 3 lands) may require repairs. GCC has confirmed it will carry out

any repairs (as may be required) to ensure the Phase 1 development can connect to the existing surface water infrastructure.

Hydraulic Capacity

The proposed surface water drainage network has been designed to convey run-off associated with a 1 in 5-year return period event without surcharge and a 1 in 100-year return period event without flooding.

Attenuation of Run-off

All surface water runoff generated by the proposed development will be attenuated and discharged at a restricted rate equal to 25 l/s as agreed with representatives of GCC at a surface water strategy meeting on 18th June 2024. The forward flow rate from the site will be restricted to 10 l/s and 15 l/s, respectively, downstream of the proposed attenuation tank one (1) and two (2). During rainfall events where the flow rate into the attenuation tank exceeds the forward flow rate, the attenuation tank will store flows in excess of 10l/s and 15 l/s, respectively.

The rationale for restricting flow to 25 l/s as opposed to 2/sec/ha as per the GCCDP or Qbar = 9.3 l/s relates to the site constraints and ground conditions.

The ground conditions are extremely poor, resulting from a combination of high-water table, and very soft silts and peat to depths of circa 6m. The ground conditions therefore preclude the use of infiltration systems.

The invert level of the existing surface water drainage and bed depth of the Terryland Stream are both relatively shallow. The limited cover precludes the use of crate systems or hydro chamber systems.

A c 1,799m^2 intensive green roof will be provided. The intensive green roof will provide a maximum storage volume of 131.2 m^3 with a maximum outflow discharge rate of 3.9 l/s.

The development proposal also includes exfiltration permeable paving car parking spaces and extensive linear rain gardens (incorporating impermeable liner).

Treatment of Run-Off

The quality of the surface water run-off will be much improved from the current situation with the inclusion of the green roofs, exfiltration permeable paving and lengths of raingarden / swales. In addition to these measures, it is proposed to provide a Class I By-Pass hydrocarbon separator upstream of the main development attenuation tank to remove any hydrocarbons suspended in the site run-off prior to connection to the 525mm Ø concrete pipe.

15.4.3 Water Supply

Existing Water Supply

Utility records were obtained from Uisce Éireann (UÉ) to indicate existing watermains in the vicinity of the Proposed Development site. The location of the watermain was verified with a utility survey.

A 9" cast-iron watermain runs along Dyke Road. From this watermain, a water connection feeds the Black Box theatre and the Headford Road shopping centre. A 300mm asbestos-cement watermain runs in Headford Road and Bóthar Na Dige Road, while a shorter section of 100mm uPVC water distribution main runs along a short section of Headford Road. Refer to ***Figure 15-5*** for the layout of potable water infrastructure in the vicinity of the site.

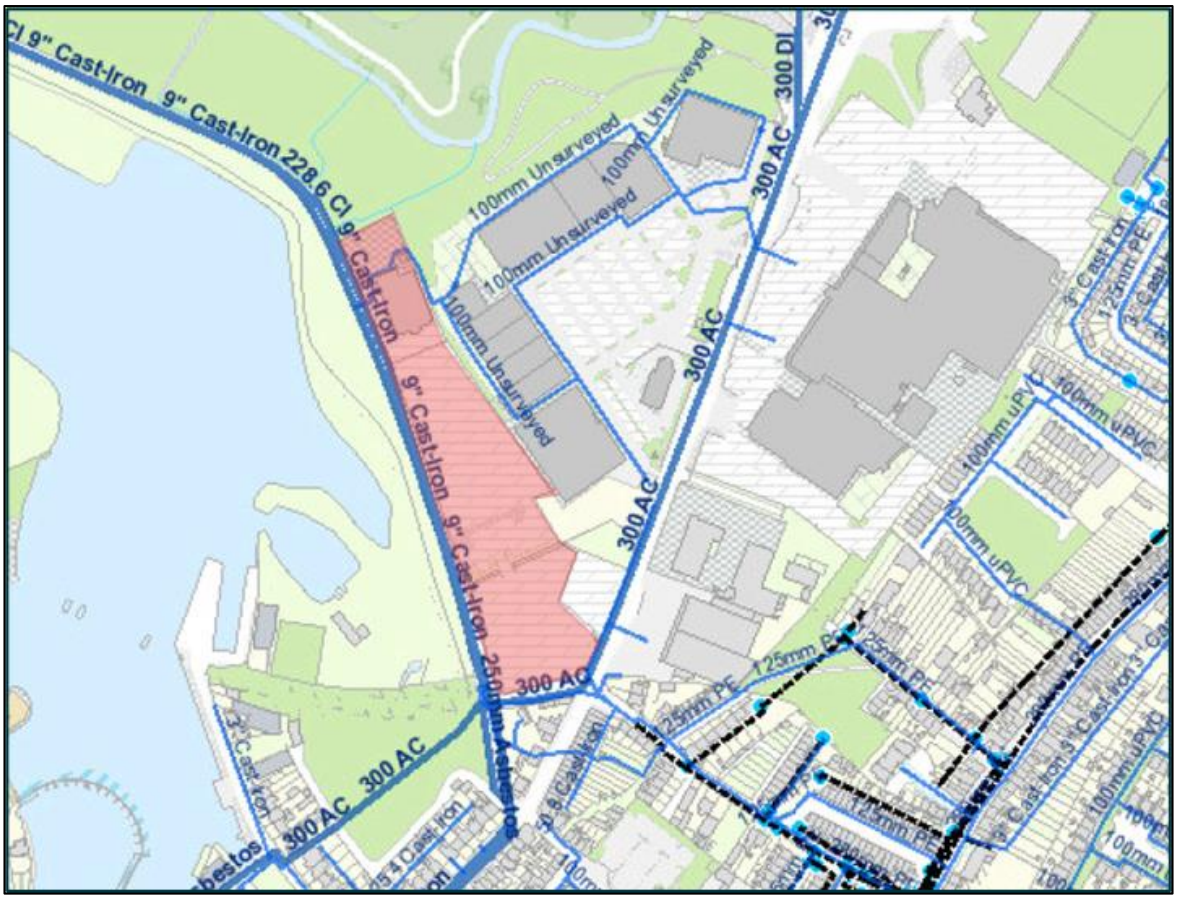

Figure 15-5 Existing Watermain Infrastructure, UÉ 2024.

Proposed Water Supply

It is proposed to take a connection off the 250mm asbestos watermain on the Dyke Road. The new watermain will pass through the phase 1 Proposed Development lands and loop around 3 sides (south, east, and north) of the development.

The following drawings which accompany the planning application illustrate the proposed watermain network within the site:

- 60710277-ACM-XX-XX-DR-CE-00-2700,
- 60710277-ACM-XX-XX-DR-CE-00-2701, and
- 60710277-ACM-XX-XX-DR-CE-00-2702.

The internal water supply network is based on the requirements of the Uisce Éireann Code of Practice for Water Supply and the Technical Guidance Document – Part B of the Building Regulations 2006:

- Hydrants are positioned within 46m of the proposed buildings.
- A bulk water meter has been provided at the connection to the existing Uisce Éireann distribution watermain at the site entrance.
- No new watermain up to and including 150mm in diameter shall be laid within 3m of an existing or proposed structure. See Section 3.5.9 of Water Code of Practice.

Uisce Éireann will be consulted with regard to any network upgrades to accommodate future demand and consolidate the resilience of the local network.

Firefighting water supplies and fire hydrants will be provided as required in accordance with the Building Regulations and the requirement of Galway City Fire Service.

15.5 Potential Impact of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

15.5.1 Construction Phase

The civil works which may potentially impact the water environment will include the following activities:

- Preliminary works, including clearance, levelling, site roads / pedestrian access, establishment of lay-down and fabrication area;
- Excavation of poorly graded material;
- Laying of foundations for plant and buildings;
- Ground improvement
- Excavation of Attenuation Tanks and WWPS;
- Laying of Services;
- Diversion of services;
- Landscaping and reinstatement.

The risk of potential significant impacts occurring during the construction phase (in the absence of adequate management and mitigation measures) can arise from several activities. These typically could include:

- Discharge of vehicle wash-down water to surface and ground waters;
- Discharge of construction materials, e.g. uncured concrete;
- Uncontained spillage of wastewater effluent;
- Uncontrolled sediment erosion and contaminated silty runoff;
- Refuelling facilities, chemical and waste storage, or handling areas;
- Polluted drainage and discharges from site;
- Discharge of groundwater to surface water;
- Increased runoff from cleared and capped areas (relative to Greenfield values);
- Works within water; and,
- Construction of outfall points.

During construction, pollution from mobilised suspended solids would generally be the prime concern, but spillage of fuels, lubricants, hydraulic fluids, and cement from construction plant

may also lead to incidents, especially where there are inadequate pollution mitigation measures.

Sedimentation (Suspended Solids)

Pollution of surface waters by mobilised suspended solids (SS) can have significant adverse impacts on receiving waters. Various construction activities have the potential to release sediment and increase SS levels in nearby watercourses. Site stripping and excavation works during construction would leave the ground exposed to erosion by wind or rain and this could potentially lead to increases in sediment loading of the existing networks or nearby watercourses.

Runoff containing high concentrations of suspended solids could potentially adversely impact on surface water. This could result in significant long-term negative impact on the water quality and quantity within the adjacent watercourses if appropriate controls are not put in place. The impact is considered a direct effect of negative nature and temporary duration given it only poses a risk during the construction stage. In the absence of mitigation measures this could result in a negative significant medium term quality impact The highest risk is during the ground works which are estimated to have a duration of circa 6 months. Refer to Table 15-5 Summary of Likely Significant Effects and Section 15.6 for mitigation measures.

Accidental Spillage and Leaks

Any construction activities carried out close to surface waters involve a risk of pollution due to accidental spillage and leaks. While liquids such as oils, lubricants, paints, bituminous coatings, preservatives and weed killers present the greatest risk, fuel spillages from machinery operating close to watercourses also present a risk. The refuelling of general construction plant also poses a significant risk of pollution, depending on how and where this activity is carried out. Pollution as a result of accidental spillage could potentially affect fish, aquatic flora and invertebrate communities.

Possible contamination of bedrock by leakage or spillage from machinery and associated equipment, may occur during the construction phase. Leakages or spillages associated with any temporary waste water facilities would have a negative short term moderate impact on ground water quality.

Accidental spillage may potentially result in the indirect impact to surface water at the proposed development site should contaminants enter surface waters directly or migrate through the subsoils and underlying groundwater to surface waters. The impact is considered an indirect effect of negative nature and temporary given it is only associated with the construction stage. Accidental spillages and leaks are considered unlikely to occur and are should they occur are likely to be rare. Any accidental spillage would have a negative short-medium term moderate impact on water quality at the Proposed Development site.

Use of Concrete and Lime

Lime and concrete (specifically, the cement component) is highly alkaline, and any spillage could enter surface water or migrate through subsoils and groundwater impacting surface water quality. The activities most likely to result in contamination include concreting during building construction, pipeline construction, construction of attenuation tanks, and waste water pump station (WWPS) works.

The impact is considered an indirect effect of a negative nature and of a temporary duration given it is only associated with the construction stage, which is temporary in nature. In the absence of mitigation measures this could result in a negative significant medium term quality impact. Refer to Table 15-5 Summary of Likely Significant Effects and Section 15.6 for mitigation measures

Swales /sedimentation ponds have the potential to store contaminated surface water run-off from the hardstanding areas and associated drainage network. If not properly constructed and maintained there is a potential for seepage through the unlined bases and sidewalls and / or bank overflow to infiltrate into the underlying aquifer. This potential seepage into the underlying ground water in the absence of mitigation measures could result in a negative significant medium term quality impact. Refer to Table 15-5 Summary of Likely Significant Effects and Section 15.6 for mitigation measures

15.5.2 Operational Phase

The potential adverse impacts during the operational phase, in the absence of adequate management and mitigation measures are as follows:

- Excessive demand on the water network resulting in surcharging of foul drainage manholes, increased demand on the wastewater treatment plant or reduced water supply as a result of loss of pressure in the surrounding area. In the absence of mitigation measures this could result in a negative significant long term impact on quality
- Potential contamination of flood waters in the event of flooding on the site. In the absence of mitigation measures this could likely to result in a negative significant short term quality impact;
- Increase in the rate of runoff from the site during rainfall events, which could result in higher water levels or flow rates downstream of the site. In the absence of mitigation measures this could result in a negative significant medium term quality impact;
- Increase in the concentration of hydrocarbons in run-off from the site. In the absence of mitigation measures this could result in negative significant medium term quality impact and,
- Infiltration of contaminated groundwater into surface water network, which discharges to the Terryland River. In the absence of mitigation measures this could result in a negative significant long term impact on quality.

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Refer to Table 15-5 Summary of Likely Significant Effects and Section 15.6 for mitigation measures

<u>Bedrock and subsoils.</u>
There is not expected to be any impacts on the bedrock or subsoils during the operational phase.

<u>Groundwater</u>
Possible contamination of the groundwater by leakage or spillage from machinery and associated equipment, fuel tanks or back-up generators may occur during the operational phase. Any accidental hydrocarbon spillage would have a negative short-medium term moderate impact on groundwater quality at the spillage location and downgradient if not

quickly contained and removed. In the absence of mitigation measures this could likely to result in a negative significant long term impact on quality

15.5.3 Potential Cumulative Impacts

Application Reg. Ref. and Applicant Name	Address	Development Proposal	Distance from the Proposed Development	Decision
GCC planning ref. 2460108 **Summix BNM Developments Limited**	Corner of Lough Atalia Road and Bóthar na Long, Galway, H91 HY45	The development will include demolition of a vacant industrial structure (115 sq m), the external canopy structure (170 sq m) and the boundary walls along the southern, western and north-western boundaries of the site; and the construction of a 15 No. storey hotel (including part mezzanine at ground floor level) providing 189 No. bedrooms (7,514 sq m), incorporating food and beverage areas and provision of a single storey service building to the northwest of the site on a 0.2217 Ha site.	0.9km southeast	Lodged 15/04/2024 Permission has been refused on 06/06/2024. Currently under appeal with An Bord Pleanála and no decision available to date
ABP- 314597-22 **Galway City Council**	University Road to Dublin Road, Galway City	BusConnects Galway Cross-City Link Scheme	0.2km south	Lodged 09/09/2022 Permission granted 27/09/2024
GCC planning ref. 20184 **(Amended by ref. 22259)** **Cleverson Ltd**	Headford Road, Townparks, Galway	Demolition of an ESB enclosure and construction of a seven/eight storey development comprising 4 retail units, a gymnasium and student accommodation 7 storeys in height (272 beds).	Directly adjacent (east)	Grant permission 12/07/2021
GCC planning ref. 1847 **(amended by ref. 20235)** **K. King Construction Claregalway Ltd.**	33-35 Saint Brendan's Avenue, Woodquay, Galway	Construction of 27 no. duplex / apartments including 3 to 6 storey apartment block and all associated site development works and services.	0.3km south	Grant permission 14/12/2020
GCC planning ref. 19107 **Irish Water**	Dyke Road, Terryland, Galway	Permission for development which comprises of a new raw water intake works located on the east bank of the River Corrib, 100m downstream of Quincentenary Bridge to supply the Terryland Water Treatment Plant.	0.5km northwest	Grant permission 24/02/2020
GCC planning ref. 2047	Lands to the rear of Ceannt	Large-scale, mixed-use development consisting of 376 no. apartments, retail	0.8km southeast	Grant permission

Application Reg. Ref. and Applicant Name	Address	Development Proposal	Distance from the Proposed Development	Decision
Seagullpoint Limited	Train Station, Station Road, Galway City	units, café/restaurant/bar units, hotel, office use, childcare facility, car parking and other services and associated site works.		24/05/2021
N/A **Galway City Council with Failte Ireland**	Woodquay Park, Terryland, Galway	Woodquay Park Landscape Upgrade: Included in the plans is the creation of accessible, public, green space, with biodiversity-friendly planting, age and mobility-friendly pathways, sheltered seating niches and spaces for play and for rest. The project will also involve traffic calming upgrades and improved pedestrian facilities to the surrounding streets.	0.3km southwest	This scheme is currently under the consideration of An Bord Pleanála with a decision due on 25/03/2025..
N/A **Galway City Council**	Across the River Corrib, adjacent to Dyke Road	Clifden Railway Bridge Pedestrian and Cycle Bridge: Construction of a pedestrian and cycle bridge which will span the River Corrib connecting the University of Galway (UG) campus to the City Centre via Riverside and Woodquay.	0.2km southwest	Intended lodgement date unknown

In addition to the above planning applications, the Proposed Development is a three-phase development, with the intention of phase two (2) and three (3) to be completed in the future. This will require the proposed infrastructure (surface water, foul and water networks) to be able to accommodate for the required demand expected to serve the additional phases.

The design of the Phase 1 infrastructure has been developed to take full recognisance of the future phase 2 and 3 developments. The pipework and wwps have been sized to cater for all 3 phases of development, noting that separate foul emergency storage provision will be required to be provided to serve the phase 2 and 3 developments.

Construction Phase cumulative Impacts

Cumulative impacts on the water environment and existing infrastructure during construction are associated with spillage and leakage of oils and fuels, disturbance of land and service infrastructure disruptions.

Individual impacts from the Proposed Development are generally considered to be medium impacts to a medium sensitivity environment and the significance of the impacts has been assessed as moderate. As outlined in section 15.5.4 below, mitigation measures proposed to manage and control potential impacts during development will further reduce the magnitude and significance of impacts.

The cumulative effects of Proposed Development on Material Assets have been assessed taking other planned, existing, and permitted developments in the surrounding area into account. Good construction management practices will minimise the risk of pollution and nuisance arising from construction activities at the site.

The works will be carried out in such a way that inconvenience to the public arising from increase in traffic flows and disruptive effects of construction traffic on local and main roads is limited wherever practical. Each of the developments that have been permitted in the vicinity of the site are subject to conditions, and each will have connections agreements with UÉ hence, when considered in conjunction with the Proposed Development, it is predicted that the cumulative effects the Proposed Development on surface water, foul water and water supply will be negligible.

Operational Phase Impacts

Uisce Éireann has confirmed that subject to a valid connection agreement being put in place, a connection to the Uisce Éireann network can be facilitated for both foul and potable water. The Confirmation of Feasibility letter is included in Appendix A of the Infrastructure Report.

The surface water runoff from the Proposed Development will be limited to a discharge rate of 25 l/s and will discharge to existing drainage infrastructure.

The individual impacts from the Proposed Development to water range from slight to moderate and mitigation measures proposed to manage and control potential impacts during operation will further reduce the magnitude and significance of impacts. Potential impacts primarily relate to accidental releases which on independent sites cannot be considered to be cumulative.

Therefore, the cumulative operational impact of the Proposed Development and other consented developments are considered to be insignificant.

15.5.4 Summary of effects

Table 15-5 Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Site clearance Excavation of poorly graded material Ground Improvement Excavation of Attenuation Tanks and WWPS, laying concrete for foundations	Surface and ground water quality / WFD Status	Pollution of surface waters by mobilised suspended solids (SS)	Negative	Significant medium-term negative impact on the water quality and quantity within the adjacent watercourses if appropriate controls are not put in place	Medium Term Ground works Estimated at 6 months	Direct / Worst Case	Refer to section 15.6.1 below	Residual impacts will be not-significant following implementation of mitigation measures.
Laying & Diversion of Services;	Surface and ground water quality / WFD Status	Pollution of surface waters by mobilised suspended solids (SS)	Negative	Significant medium-term negative impact on the water quality within the adjacent watercourses if appropriate controls are not put in place	Medium Term Estimated at 6 months	Direct / Worst Case	Refer to section 15.6.1 below	Residual impacts will be not-significant following implementation of mitigation measures.

Operational Phase								
Excessive demand on the water infrastructure	Surface and ground waters, Mutton Island WWTP	Surcharging of sewers, over capacity of, Mutton Island WWTP	Negative	Significant	Long Term	Direct / Worst Case	UÉ confirmation of feasibility has been received. Works won't progress without a UÉ connection agreement	Residual impacts will be not-significant following implementation of mitigation measures.
Contamination of flood waters in the event of flooding on the site	Surface and ground water quality / WFD Status	Pollution of surface waters by mobilised suspended solids (SS)	Negative	Significant long-term negative impact on the water quality and watercourses if controls are not put in place	Short Term	Direct / Worst Case	Flood risk management plan will be put in place	Residual impacts will be not-significant following implementation of mitigation measures.
Increase in the rate of runoff from the site during rainfall events	Surface and ground water quality / WFD Status	Increased risk of flooding,	Negative	Significant long-term negative impact on the water quality and watercourses if controls are not put in place	Medium Term	Direct / Worst Case	Run-off from the site will be limited to 25 l/s	Residual impacts will be not-significant following implementation of mitigation measures.
Increase in the concentration of hydrocarbons in run-off from the site	Surface and ground water quality / WFD Status	Pollution of surface waters by mobilised suspended solids (SS)	Negative	Significant long-term negative impact on the water quality and watercourses if controls are not put in place	Medium Term	Direct / Worst Case	Development included a Class I By-Pass hydrocarbon separator upstream of the attenuation tank	Residual impacts will be not-significant following implementation of mitigation measures.
Infiltration of contaminated groundwater into surface water network	Surface and ground waters	Pollution of surface waters by mobilised suspended solids (SS)	Negative	Significant long-term negative impact on the water quality and watercourses if controls are not put in place	Long Term	Direct / Worst Case	Development incorporates permeable paving, linear rain gardens, green roofs and Class 1 Bypass interceptor .	Residual impacts will be not-significant following implementation of mitigation measures.

15.5.5 "Do Nothing" Impact

In the "Do -Nothing" scenario, where the proposed development does not proceed as planned, the existing land use and material assets in the study area will remain in the current state.

Further to the above, the site is currently a live car parking site, which contains tarmacadam surfacing and other buildings (The Black Box Theatre). The site has the potential to a certain degree of contamination; as noted above, the site is covered by hardstanding / tarmacadam surfacing and is drained by surface water drainage, the long-term effect of the current scenario on water and hydrology is imperceptible.

15.6 Avoidance, Remedial and Mitigation Measures

15.6.1 Construction Phase

It will be the Contractor's responsibility to ensure a hierarchy of environmental impact avoidance, reduction and mitigation is applied and adhered to onsite throughout the construction phase. The required approach id set out in the AECOM outline CEMP and RWMP.

15.6.1.1 Construction Stage Controls

The Contractor will take all precautions to prevent the pollution or silting of watercourses from the construction of the proposed development.

The Contractor will apply the following mitigation:

- During the construction of the new sewers, surface water networks and associated structures arising from the Proposed Development will continue to discharge to the respective existing networks. Surface water collected will be treated by sedimentation prior to discharge to the existing surface water sewer. Total Suspended Solids (TSS) and colour will be monitored daily by a handheld multi parameter sonde.
- Maintain and monitor the performance of the surface water drainage network throughout the construction of the Proposed Development.
- Cover all temporary stockpiles generated during construction to minimise run-off.
- Locate spoil and temporary stockpiles in locations which are at least 15 m from drainage systems.
- Neither ground water or surface water runoff from the working areas will be permitted to discharge directly to the Terryland River or Corrib River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily by a handheld multi parameter sonde. In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.
- Avoid direct or indirect discharges of untreated surface or ground water generated during the Proposed Development, to any surface water.
- Dewater all working areas at the end of each working day, if necessary, using pumping and transport of water off site in tankers if volumes prevent effective treatment prior to discharge.

- Where the Contractor utilises pumping to drain works areas, a backup pump and generator must be provided on site for use in the event of the primary pump failing.
- Use wheel washers and dust suppression on site roads (to be captured within the proposed SUDS system) and undertake daily plant maintenance checks and corrective actions where required.
- Establish contingency measures to cater for impacts to unknown services underlying the construction site (for example, old sewers or culverts).
- Identify whether shallow groundwater monitoring wells on site will be maintained and protected during construction works; decommissioned; or removed completely as part of excavation works, to prevent them from acting as direct pathways for contamination to enter the groundwater body beneath the site.
- Ready mixed concrete will be brought to the Proposed Development site by truck.
- The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil/ground water media.
- Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite or where onsite wash out will be captured, for disposal off-site.

All design and construction will be carried out in accordance with the Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

Daily monitoring of the excavation/earthworks, the water treatment and pumping system will be completed by a suitably qualified person during the removal of the carpark surfacing, wearing course and base courses, as well as site excavation to achieve the proposed ground levels and to facilitate ground improvements, and construction phases. Preventative measures will be implemented to ensure no entrained sediment, or deleterious matter directly into any drains or watercourses.

If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied.

The Contractor shall take note of when fluvial flooding warnings are issued for the Galway City area. In the event that a flood warning is issued, all plant and construction materials must be moved and stored in parts of the site that are located within Flood Zone C or above the estimated 1 in 1000-year return period fluvial flood event (CFRAM). Therefore, in the event of floodwaters inundating the site, no materials will be washed from the site into nearby watercourses.

Spill Control Measures

No oils/ fuels will be stored on the Proposed Development site for the purpose of refuelling on the site.

On-site plant will be refuelled by an external Contractor who will call to site as required. Road vehicles will not be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.

Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection.

Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce the risk of spillages entering the sub-surface or groundwater environment; booms shall be held on site for works near drains or dewatering points.

The Contractor will train all operatives in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences or accidental spillage.

The following steps provide the procedure to be followed by the Contractor(s) in the event of any significant spill or leak:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains or watercourses;
- If possible, clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately;
- Verify, if necessary, measures are in place to contain and clean up the spill and prevent further spillage from occurring, where necessary proposing additional the necessary; and,
- The Contractor will notify Galway City Council and (if GCC deem it appropriate) Inland Fisheries Ireland.

15.6.1.2 Material Handling and Storage

Materials will be stored within the site compound and outside of areas identified as being at risk of flooding.

Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains are as outlined above.

Disposal of Material

All material to be disposed of off-site will be disposed of to a disposal facility licensed in accordance with Irish Waste Management Legislation. Where material is to be stockpiled on site prior to disposal, the contractor will control all run-off to prevent contamination of surrounding watercourses.

Contaminated soil will be assessed to determine its constituents and disposed of offsite in accordance with Irish Waste Management Legislation.

Control of Concrete

Ready-mixed concrete will be brought to the Proposed Development site by truck. Measures for protection of watercourses from wet concrete shall be included in the Construction Methodology and Phasing Management Plan (CMPP). This will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil / groundwater or nearby surface watercourses.

The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil / groundwater media. Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite where possible, alternatively, where wash out takes place on-site, it shall be carried out in carefully managed on- site wash out areas.

Foul Drainage

Foul sewage arising from temporary toilets and sanitary facilities on the Proposed Development site will initially be discharged to an on-site receptacle which will be emptied by tanker on a regular basis for disposal. This arrangement will be in place until the construction of on-site facilities connected to the existing Irish Water wastewater network.

It is anticipated that due to the scale of the Proposed Development that a canteen will be provided on site during construction. Provisions will be made for a grease trap at the canteen drain outlet and this drain will connect to the on-site receptacle and later to the foul sewer. Drumming of waste cooking oil within the canteen will also be provided.

15.6.2 Operational Phase

Water Supply

The water system will be metered to determine water consumption and facilitate leakage detection.

Flood Risk

The proposed development is located within Flood Zone A and the associated water level indicated in the CFRAM fluvial flood maps is 6.48 m OD Malin.

The flood levels determined by the hydraulic modelling for the Q100 current day flow is slightly higher than the 1% AEP event level of 6.48m taken from the CFRAM fluvial flood maps. However, a conservative approach was adopted in with regards climate change and in turn in determining the proposed residential Finished Floor Level (FFL) of 7.28m OD. Applying the flood level determined for Q100_MFRS flow and including a 300mm freeboard would result in a minimum recommended FFL of 7.09m. Hence the adopted FFL of 7.28m is conservative. In addition, the proposed residential FFL of 7.28m also provides protection against the 0.1% AEP_MRFS flood level (6.98m) plus 300mm freeboard.

All critical infrastructure within the buildings will be at a minimum level of 7.28 m OD Malin. External services and chambers will be watertight and flood-proof and foul, and storm anti flood valves will be installed on connections below the 7.28m level. The finished slab level of

the wwps is set at 6.9m which above the 1:1000 year flood level and electrical control room equipment is also set at 6.9m which is above the 1:1000 year flood level.

Storm Water Drainage

The proposed surface water drainage system includes two attenuation tanks which will store run-off when the inflow rate exceeds 10l/s and 15 l/s, respectively. The system also includes a Class I Bypass Hydrocarbon Separator to remove hydrocarbons which may be suspended in runoff. To minimise sediment, build up within the storm water drainage network, trapped inlets will be used at all points of entry and key manholes will have sumps to collect material.

A regular maintenance regime, including monitoring, will be put in place to remove any excess build-up of material. A Class I Bypass Hydrocarbon Separator has also been provided to treat surface water collected in the new gullies on Dyke Road.

LDA shall establish a maintenance company that will be responsible for the regular maintenance and monitoring of all infrastructure installed as part of the Proposed Development. This includes the surface water drainage, and gullies on Dyke Road. Future third party Connection to the infrastructure in Dyke Road will only be permitted if the same standard can be given with regards maintenance and monitoring.

Foul Drainage

All foul water from the Proposed Development will discharge to the existing Uisce Éireann sewer network. Uisce Éireann have issued confirmation of feasibility to receive the discharge and for the proposed diversion of the Black Box Theatre drainage. Uisce Éireann have also provided a statement of design acceptance for the proposal. Connection agreements, including for taking in charge the wwps will be advanced at the next stages of the project.

15.6.3 "Worst Case" Scenario

In the worst case scenario, improvements to the Dyke Road flood defence embankment are not advanced as part of the Coirib go Cósta Flood Relief Scheme (CgC GCFRS) or the improvements only provide a standard level of protection, or the improvements fail to consider hydraulic connectivity between the Corrib and the Terrylands.

Based on the design flood hydrographs (present day) included in AECOM Site Specific Flood Risk Assessment which accompanies this planning application, it has been estimated that the threshold for out of bank flooding from the River Corrib will be exceeded for circa 9 and 27 days during the Q100 and Q1000 events respectively.

The predicated flood depths during the Q100 MRFS flood event and the Q1000 present day flood event are in excess of 1m and as such the below ground services will be inaccessible for the duration of extreme flood events.

15.7 Residual Impacts

15.7.1 Construction Phase

Residual impacts will be non-significant following implementation of mitigation measures noted above and good construction practices.

15.7.2 Operational Phase

Residual impacts will be non-significant following implementation of mitigation measures noted above and good construction practices.

15.8 Monitoring

15.8.1 Construction Phase

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures.

Monitoring

It will be the responsibility of the Contractor and the Ecological Clerk of Works (ECoW) to provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the construction phase. The results of which shall be available upon request and shall be reported to the client on a monthly basis. Any exceedances will be reported to the client upon occurrence along with details of what caused the exceedance and how it was rectified. The Contractor will also provide a location plan of monitoring points for dust, noise and vibration, and water quality and will include a monitoring methodology as an appendix to the Contractors CEMP.

The frequency of monitoring and the monitoring parameters (such as noise limits) will be in line with best practice and guidance and will be agreed with Galway City Council prior to the commencements of works.

Survey

The Contractor will ensure all required pre-construction surveys are carried out prior to commencement of works and that the Contractors CEMP is updated with any mitigation or monitoring measure identified within the survey report. The list of surveys will be agreed with the project Ecological Clerk of Works (ECoW).

Refer to Chapter 3 of the OCEMP Report compiled by AECOM for more detail.

Water Quality

The Contractor will produce and commence a Water Quality Monitoring Programme (WQMP) at least one month in advance of the construction programme including any enabling works to

establish a baseline dataset and continue throughout construction. The regularity of, and specification for water quality monitoring in this section will need to be agreed following consultation.

The baseline water quality dataset will include sampling within the Corrib River, within the Terryland River, and (where possible should such events overlap with the pre-construction monitoring period) periods of elevated rainfall.

The WQMP will sample surface water discharge upstream and downstream from the proposed outfall to the Terryland River, in similar habitat and flow conditions, to enable siltation and other contaminants from the Proposed Development to be detected and distinguished from 'background' levels (including natural and man-made activities).

The WQMP will include relevant parameters from the European Communities (Quality of Salmonid Waters) Regulations, 1988 S.I. No. 293 as amended including Suspended Solids, pH, Dissolved Oxygen, Biochemical Oxygen Demand, hydrocarbons, Nitrites, Nitrates and heavy metals.

Testing for pH, turbidity and/or Total Suspended Solids will be carried out daily in-situ sing a calibrated multi-parameter sonde (to 0.1 NTU accuracy), and fortnightly for all other parameters.

The WQMP will inform the Contractor's adaptive management of the temporary construction-phase drainage works, having regard for any consents or planning conditions.

The Contractor will provide WQMP results to the Ecologist and GCC at least fortnightly (but immediately after a known silt release or other pollution incident), along with a record of any corrective actions taken by the Contractor to improve or repair performance of silt fencing or other surface water protection measures.

15.8.2 Operational Phase

Emergency planning and evacuation procedures are to be monitored and coordinated with the relevant emergency services once developed. As part of the evacuation procedure residents will be able to evacuate, if required, to the southernmost part of the site which is above 7.28m OD Malin. In addition, flood warning communication systems to be monitored with real time water levels of the Corrib River and Terryland River (https://waterlevel.ie/).

15.9 Interactions

There is an interaction between the utilities and the hydrology of the area in terms of services network connections. Further details on these subjects are also presented in Chapter 8 of this EIAR, the Infrastructure Report, the Site-Specific Flood Risk Assessment and Construction and Environmental Management Plan prepared by AECOM Engineers, that is included with this application for approval.

15.9.1 Population and Human Health

The material assets on the site provide services which are used by the general population, during construction, there may be requirements to turn off services to facilitate connections.

The general population must be aware of these breaks in services, and they must be timed to minimise effects on the local population.

A flood risk assessment has been completed for the proposed development and to minimise effects of flooding associated with site operation, the finished floor level for the new buildings within the development is 7.28m OD Malin. The design for the development also incorporates mitigation measure as set out in the relevant reports to prevent flood water entering the main building.

15.9.2 Biodiversity

Neither ground water or surface water runoff from the working areas will be permitted to discharge directly to the Corrib River or Terryland River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. To minimise the potential for this type of effect, the monitoring parameters have been identified within Chapter 8 mitigation and have been carried through into the CMPP.

15.10 Difficulties Encountered when Compiling

No difficulties were encountered during the assessment.

15.11 References

Office of Public Works' (OPW) national flood hazard mapping (www.floodmaps.ie);

OPW Western Catchment Flood Risk Assessment and Management (CFRAM) Study (www.cfram.ie);

Environmental Protection Agency (www.epa.ie);

Geological Survey of Ireland (GSI)(www.gsi.ie), and

BS EN 752-4: 1997 – Drain and Sewer Systems Outside Buildings, Part 4: Hydraulic Design and Environmental Considerations,

Uisce Éireann (formally Irish Water) Standard Details and Specifications, Revision 4

Uisce Éireann (formally Irish Water) Code of Practice for Wastewater Infrastructure, Revision 2

Uisce Éireann (formally Irish Water) Code of Practice for Water Infrastructure, Revision 2

Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments,

Galway City Council City Development Plan (2023-2029) (May 2023) – Interim Version,

Galway City Council City Development Plan (2023-2029) (January 2022) – Draft Strategic Flood Risk Assessment Report,

EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022).

15 MATERIAL ASSETS: UTILITIES

15.1 Introduction

Material assets have been defined as "*Resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reason*"' (EPA 2002).

This definition was further expanded by the EPA in 2022 in 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' which states:

> '*The meaning of this factor is less clear than others. In Directive 2011/92/EU it 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 roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils*.'

The scope and definition of Material Assets within the context of the EIA process has been defined by the EIA Directive as including Architectural and Archaeological Heritage or Cultural Heritage. These elements are assessed separately in Chapter 16 under Cultural Heritage.

This Chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the potential impacts of the Proposed Development on Material Assets or physical resources in the environment of human origin including built services and infrastructure comprising:

- Electricity Supply,
- Gas Supply,
- Information and Communications Technology,

15.1.1 Quality Assurance and Competency of Experts

This Chapter was prepared by Brian Homan Joint Managing Director of Homan O'Brien Associates Consulting Engineers. Brian has a Batchelor of Science Engineering (Honours) Degree from Trinity College Dublin and a Post Graduate Diploma in Project Management from Trinity College Dublin. He is a Chartered Engineer and a member of the Chartered Institute of Building Services Engineers, Engineers Ireland and the Association of Consulting Engineers of Ireland.

15.2 Study Methodology

Methodology adopted for the assessment takes cognisance of the relevant guidelines.

The scope of work undertaken for the impact assessment included a desk-based study of built services and utilities within the sites red line boundary. The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area, including published information and details pertaining to the Proposed Development provided by the Applicant and the Design Team.

Information on built assets in the vicinity of the site of the Proposed Development was assembled by the following means:

- ESB Networks Utility Maps;
- Gas Networks Ireland Service plans;
- EIR E-Maps;
- Virgin Media Maps
- Planning Application Services Report (Homan O'Brien Associates, 2023)

All phases of the Proposed Development were considered in the assessment of potential impacts on Material Assets within the study area. Assessment of the likely impact of features of the Proposed Development, was carried out in accordance with the following codes of practice, guidelines, legislation, and plans:

- ESB Networks National Code of Practice for the Customer Interface Version 5 (2021);
- ESB Networks Construction Standards for MV Substation Buildings (2019);

15.2.1 Prediction and Assessment of Impacts

Impacts were predicted and assessed based on the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022), and by using the definitions detailed in Tables 15-1 to 15-5. Impacts vary from negative to neutral or positive, and also vary in significance on the receiving environment.

15.3 The Existing and Receiving Environment (Baseline Situation)

15.3.1 Site Location

The Proposed Development site is located within Galway City and adjacent to Galway Retail Park.

The main vehicular entrance location for the site is off Dyke Road.

15.3.2 Land Use History

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2023) were reviewed and key observations on-site and off-site are summarised elsewhere in this report.

15.3.3 Immediate Surroundings

The Proposed Development is bound by Galway Retail Park to the east, the Black Box Theatre to the North which will remain operation. To the west of the site is Dyke Road itself and beyond that some scrub land and the river Corrib. To the south of the site is Dyke Road with commercial units beyond that.

15.3.4 Local Settlement and Land Use

Land use surrounding the site consists of commercial and civic buildings. There are Residential dwellings located nearby but do not adjoin the site.

The Proposed Development phase 1 master plan for the complete site consists of a mixed development of residential, commercial, civic and retail.

15.3.5 Power Supply

15.3.5.1 Electricity Supply

EirGrid develop and operate the national electricity grid and are responsible for taking electricity from the power generators and delivering it to the distribution network, which is operated by ESB Networks. The high-voltage Irish electricity transmission grid comprises of a nationwide infrastructure with 6,800 km of power lines and operates at 400 kV, 220 kV and 110 kV. Substations provide entry points to, and exits from, the transmission grid.

Galway 110kV substation is the closest substation to the Proposed Development and is located approximately 3km south (Eirgrid Group, Transmission System). The closest 220 kV transmission system is Cashla situated approximately 30km east of the Proposed Development.

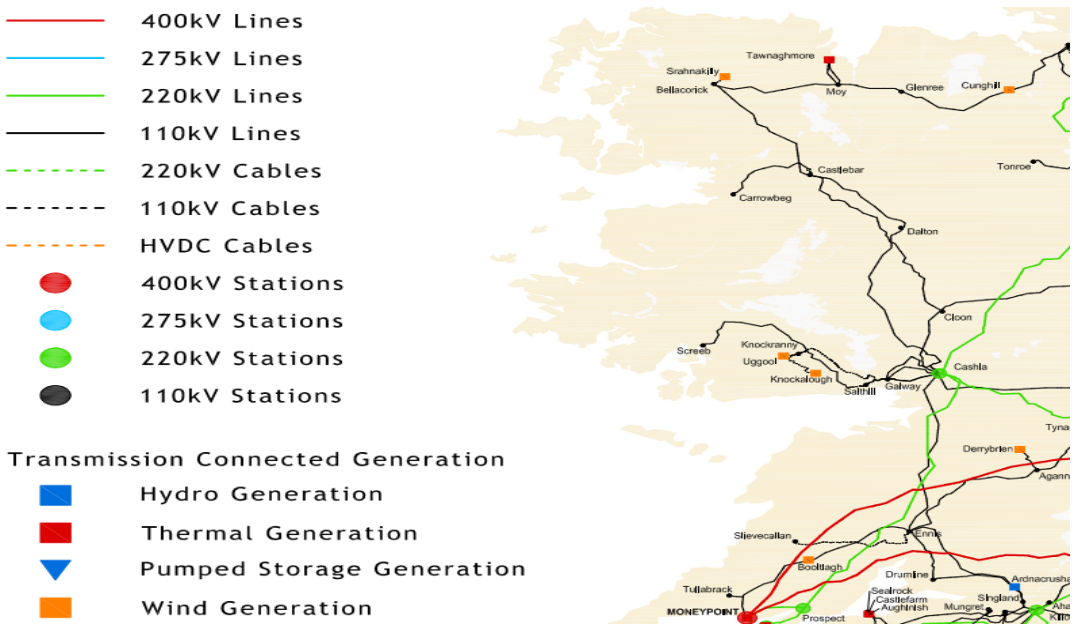

Figure 15-2 County Power Supply surrounding the Proposed Development

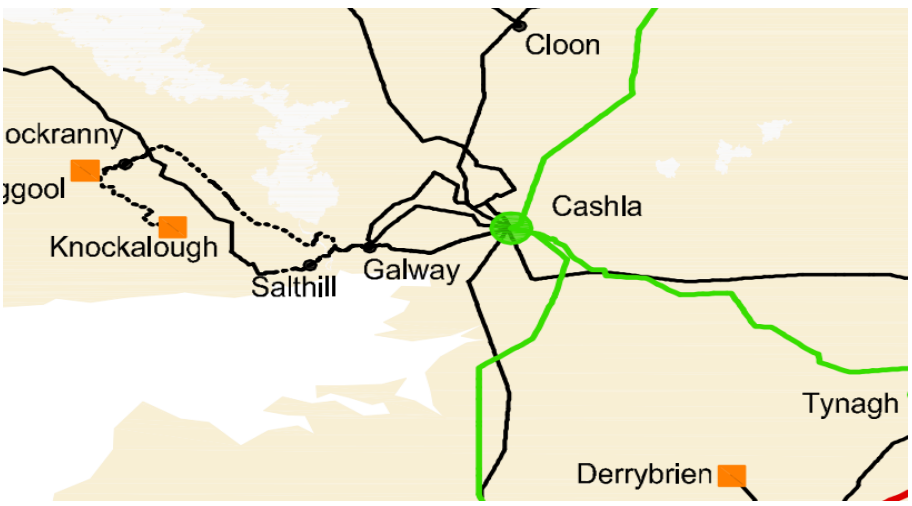

Figure 15-3 Local Power Supply surrounding the Proposed Development

15.3.5.2 Gas supply

Gas Networks Ireland builds, develops and operates Ireland's gas infrastructure, maintaining over 14,521 km of gas pipelines and two sub-sea interconnectors. Gas Networks Ireland is responsible for connecting all new gas customers to the network, and for work on service pipes and meters at customer's premises, on behalf of all gas suppliers in Ireland.

The Gas Networks Ireland map indicates that connections to the natural gas network are available in the Dyke Road area.

The site is currently an existing car park and there is currently no onsite consumption or use of natural gas. The nearest gas supply serves the adjacent Galway Shopping Centre as indicated on the extract from the Bord Gais Map below. It is to be noted that it is not proposed to serve the Proposed Development with gas.

Figure 15-4 Local Gas Supply surrounding the Proposed Development

15.3.6 Information and Communications Technology (ICT)

In terms of broadband two of the main utility companies are available adjacent to the site namely Open Eir and Virgin. Open Eir is routed along the Headford Road while Virgin is available in St Bridget's Place. See below Figure 15-5 for Open Eir and Figure 15-6 for Virgin

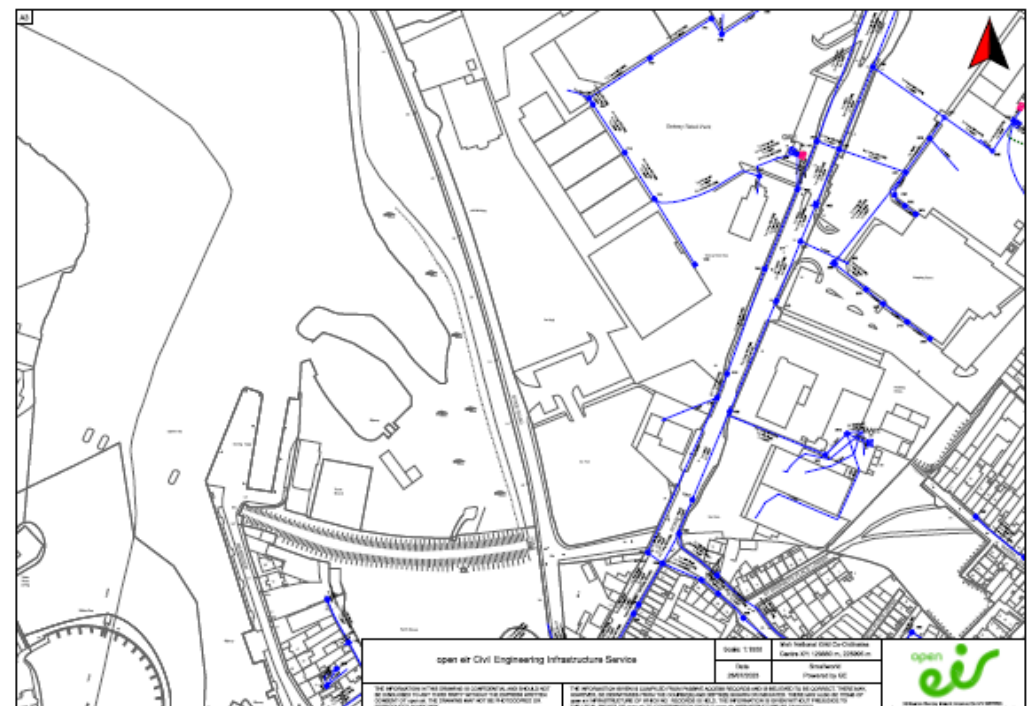

Figure 15-5 Local Open Eir Supply surrounding the Proposed Development

Figure 15-6 Virgin Supply surrounding the Proposed Development

15.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

15.4.1 Construction Phase

The Proposed Development will consist of the construction of 219 no. apartments on part of the site at Dyke Road in Galway City.

Works can be summarized as follows,

a. Site excavation works to facilitate the proposed development to include excavation and general site
b. Preparation works.
c. The provision of 219 apartments.
d. The provision of a standalone ESB Substation Building comprising of 2 Substations with associated switchrooms including incoming underground ducts to Substations and ducts from Substations to buildings.
e. Provision of associated car parking at surface level
f. Provision of electric vehicle charge points with associated site infrastructure ducting to provide charge points for residents throughout the site.
g. Provision of associated bicycle storage facilities at surface level throughout the site and bin storage facilities.
h. Incoming ducted Telecom Utilities will be provided for both Open EIR and Virgin.

15.4.2 Operational Phase

The Operational Phase of the Proposed Development will consist of the normal day-to-day operations necessary for the management of residential dwellings and the ongoing maintenance of these units along with the public and communal amenity space.
Electricity will be required to provide public lighting, domestic lighting, power supply and heating for each individual unit for the Proposed Development

15.5 Potential Impact of the Proposed Development

This section assesses the potential impact of the Proposed Development on the Material Assets of the study area.

15.5.1 Power Supply

15.5.1.1 Construction Phase

Construction related activities will require temporary connection to the local electrical supply network. The Main Contractor will apply for a power supply from ESB Networks to power both the compound and the construction site. The size of supply will be calculated to ensure it is sufficient to power both the site compounds and construction site activities.

Connecting a new multi-unit housing development to the electricity distribution system must be carried out in accordance with ESB Networks specifications, and in particular with the guidance provided in the ESB Networks National Code of Practice for the Customer Interface Version 5 (2021) and ESB Networks Construction Standards for MV Substation Buildings (2019). The developer must undertake the preparatory work such as installation of ducting and provision of substation plinth or building. Once the preparation work has been completed to a satisfactory standard, ESB Networks will commence installation of the electricity cabling/lines and any other necessary equipment. A temporary suspension of the network locally to facilitate the connection works may be required during the Construction Phase, and an additional temporary suspension will also occur when power is provided to the Site of the Proposed Development. These temporary suspensions will be controlled by ESB Networks as the statutory undertaker and in accordance with standard protocols.

The potential impact from the Construction Phase of the Proposed Development on the local electrical supply network is likely to be slight, temporary and negative to neutral, depending on the length of temporary network suspensions. The significance of the effect is not yet known.

15.5.1.2 Operational Phase

Electricity will be required to provide public lighting, domestic lighting, power supply and heating for each individual unit for the Proposed Development. Electric car charging facilities will be provided in the car park in line with Government policy. Two ESB Substations will be provided. It is to be noted that these two sub stations are positioned on one of the highest point on the site to mitigate against any likelihood of future flooding.

A Building Lifecycle Report has been prepared for the Operational Phase of the Proposed Development, which provide details on the mechanical and electrical services that will be installed at the Proposed Development. Low Energy Technologies Considered are listed in this report including:

- Charging Points;
- Centralised Air to Water Heat Pump;
- Individual MVHR system for each apartment.
- Low Energy LED Lighting.
-

The impact of the Operational Phase of the Proposed Development on the electricity supply network is likely to be an increased demand to the existing supply. The potential impact from the Operational Phase on the electricity supply network is likely to be neutral, long term and not significant.

15.5.2 Gas Supply

15.5.2.1 Construction Phase

There are no gas requirements during the Construction Phase and there will be no connections made to the natural gas network as part of the Proposed Development. As such, the potential impact from the Construction Phase on the gas supply network is likely to be permanently neutral and imperceptible.

15.5.2.2 Operational Phase

The Proposed Development will not be connected to the natural gas network. Heat Pumps (exhaust air heat pump and air source heat pump) powered by electricity will be used for space heating and domestic hot water during the Operational Phase. As such, the potential impact from the Operational Phase on the gas supply network is likely to be permanently neutral and imperceptible.

15.5.3 Information and Communications Technology (ICT)

15.5.3.1 Construction Phase

Connections may be required to the existing ICT network during the Construction Phase of the Proposed Development. New connections will be controlled by the network provider in accordance with standard protocols. Due to the temporary nature of the Construction Phase, the likely effect of the Construction Phase on the local telecoms network will be neutral, imperceptible, and temporary.

15.5.3.2 Operational Phase

The likely effect of the Operational Phase of the Proposed Development on the local telecommunications network is to be a marginal increase in demand. The Site of the Proposed Development is partially located within an area where high speed broadband is available. (Should the telecoms towers proposed to be installed on the roof be discussed here?)

The likely effect of the Operational Phase on the local telecoms network will be neutral, and imperceptible in the long term.

15.5.4 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

The cumulative effects of Proposed Development on Material Assets have been assessed taking other planned, existing, and permitted developments in the surrounding area into account (as detailed in Chapter 2 of this EIAR). Good construction management practices will minimise the risk of pollution and nuisance arising from construction activities at the site. The works will be carried out in such a way that inconvenience to the public arising from increase in traffic flows and disruptive effects of construction traffic on local and main roads is limited wherever practical. Each of the developments that have been permitted in the vicinity of the site are subject to conditions, which, when considered in conjunction with the Proposed Development, it is predicted that the cumulative effects the Proposed Development on natural gas supply, electrical supply and telecoms will be negligible.

15.5.5 Summary of Effects

Table 15-1 Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Use of Electricity	Local supply and users	Connection to the local electrical supply	Negative to neutral	Slight	Temporary	Direct	New connections for electricity and telecommunications will be coordinated with the relevant utility provider and Galway County Council	Slight
Use of ICT Network	Local supply and users	Connections to the existing ICT network	Neutral	Imperceptible	Temporary	Direct	New connections will be controlled by the network provider in accordance with standard protocols.	Imperceptible
Operational Phase								
Use of Electricity	Local supply and users	Increase demand on electrical supply	Neutral	Not significant	Long term	Direct	The Management Company will be responsible for the provision of a leaflet to all new tenants encouraging energy efficient operation of their system	Not significant
Use of ICT Network	Local supply and users	Increased demand on the local telecommunications network	Neutral	Imperceptible	Long term	Direct	N/A	Imperceptible

15.5.6 "Do Nothing" Impact

If the Proposed Development is not advanced, the site will remain as a car park. A "Do-Nothing" scenario would result the lands remaining undeveloped, which would cause no significant adverse impact on the Material Assets in the surrounding area.

15.6 Avoidance, Remedial & Mitigation Measures

15.6.1 Construction Phase

New connections for electricity and telecommunications will be coordinated with the relevant utility provider and Galway County Council and will be carried out and tested by approved contractors, as per standard protocols.

15.6.2. Operational Phase

The Management Company will be responsible for the provision of a leaflet to all new tenants encouraging energy efficient operation of their system.

15.6.3. "Worst Case" Scenario

In the event that the Proposed Development was to proceed, a worst-case scenario in relation to built services and infrastructure (electricity, telecommunications, gas, water supply infrastructure, and sewerage), would be where the works involved during construction resulted in an extended power or telecommunications outage, or disruption to water supply or sewerage systems for existing properties in the area due to unforeseen delays on site.

However, taking account of the avoidance and mitigation measures, the worst-case scenarios are deemed to be an unlikely scenario.

15.7 Residual Impacts

Residual impacts are defined as "*effects that are predicted to remain after all assessments and mitigation measures*". They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, no significant residual impacts are anticipated.

15.8 Monitoring

15.8.1 Construction Phase

The installation of the utilities during the Construction Phase of the Proposed Development will be monitored by the Main Contractor and inspected by the Design Team.

15.8.2 Operational Phase

The building management company, residents, tenants and creche operators will be required to maintain all utilities as required by the Utility Providers i.e. pay their respective utility bill as they arise.

15.9 Interactions

Material Assets - Utilities interact with other environmental receptors as follows.

15.8.1 Population and Human Health

In the absence of mitigation, extended power or telecommunications outages for existing properties in the area could negatively impact on the surrounding human population and their overall health. Elsewhere in this report it has concluded that no long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.

15.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter.

15.11 References

Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements.

ESB Networks (2021) National Code of Practice for the Customer Interface Version 5

ESB Networks (2019) Construction Standards for MV Substation Buildings

Health and Safety Authority (2010) Code of Practice for Avoiding Danger from Underground Services

https://siteviewer.comreg.ie/#site/1318/53.3334867275/-6.2920326981/1/Site%201318 viewed online 26.07.2024

https://www.gov.ie/en/publication/5634d-national-broadband-plan-map/#interactive-map viewed online 26.07.2024

16 CULTURAL HERITAGE

16.1 Introduction

Moore Group was commissioned to complete a cultural heritage impact assessment of the potential impact of a proposed development at Dyke Road, Galway City. The proposed development comprises the construction of a new residential development of 219 no. apartment units and a childcare facility in the form of 1 no. new residential block with associated car parking, bicycle parking, public and communal open spaces, and all ancillary works on a site area of 1.0877 ha. The proposed development of the site would be on a phased basis, subdivided into three distinct phases. Phase 1 lands are designated for residential development (with commercial/retail at ground floor level). Phase 2 is anticipated to comprise of commercial development and Phase 3 would subsequently comprise the relocation of the Black Box Theatre and development of this final portion of the site.

There are no monuments recorded by the National Monuments Service (NMS) within the boundary of the subject site. There are no recorded archaeological sites in the immediate vicinity of the proposed development. The nearest recorded monument is located roughly 250m to the southwest of the subject site (GA094-100059--, Quay). There is no NIAH or RPS sites within the immediate vicinity of the subject site. The nearest RPS comprises a terrace of Residential Buildings, associated railings and two IHS tiles on St. Brendan's Road roughly 240m to the south.

16.1.1 Quality Assurance and Competency of Experts

This chapter has been prepared by Declan Moore, Managing Director of Moore Archaeological and Environmental Services Ltd. Declan Moore studied Archaeology and English at University College Galway, graduating in 1991. He obtained a Certificate in Management Studies in 1994 and became a licence eligible archaeologist in 1999. He has over 30 years' experience as a field archaeologist and consultant. Declan is a Member of the Institute of Archaeologists of Ireland and the European Association of Archaeologists.

16.2 Study Methodology

16.2.1 Scope of Work

This study aims to assess, as far as reasonably possible from existing records, the archaeological and cultural heritage environment (hereafter referred to as cultural heritage environment or cultural heritage resource), to evaluate the potential or likely impacts that the proposed development will have on this environment and, where appropriate, to suggest mitigation measures to ameliorate potential impacts, in accordance with the policies of:

- The Department of Housing, Local Government and Heritage.
- The National Monuments Acts (1930-2023), the UNESCO World Heritage Convention (1972), the Heritage Act of 1995 and the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023.
- Galway City Development Plan (2023-2029).

- Best practice guidelines, including the TII Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects.

Following on from this, the residual impact that the proposed scheme will have on the baseline environment is identified and evaluated.

16.2.2 Terms and Definitions

Cultural Heritage

The phrase ‘cultural heritage’ is a generic term used to identify a multitude of cultural, archaeological, and architectural sites and monuments. The term ‘cultural heritage’, in Environmental Impact Statement in compliance with Section 2(1) of the Heritage Act (1995), is used throughout this report in relation to archaeological objects, features, monuments and landscapes as well as all structures and buildings which are considered to have historical, archaeological, artistic, engineering, scientific, social, or technical significance/merit. For the purposes of this report the definition of “cultural heritage” is taken broadly from the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972, which considers the following to be “cultural heritage”:

- Tangible cultural heritage.
- movable cultural heritage (artefacts).
- immovable cultural heritage (monuments, archaeological sites, etc).
- underwater cultural heritage (shipwrecks, underwater ruins, and cities); and
- Intangible cultural heritage (oral traditions, folklore etc).

World Heritage Sites

Although not formally recognised in Irish legislation, impacts on World Heritage Sites will nonetheless be a material consideration for developments in their wider vicinity. To be included on the World Heritage List, sites must be of outstanding universal value and meet at least one out of ten selection criteria. A World Heritage Site is a landmark or area with legal protection by an international convention administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO). World Heritage Sites are designated by UNESCO for having cultural, historical, scientific, or other form of significance. The sites are judged to contain "cultural and natural heritage around the world considered to be of outstanding value to humanity".

National Monuments

On a national level, the highest degree of protection granted to archaeological monuments are those afforded National Monument status, which are protected under the National Monuments Act of 1930 and its various amendments. The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023, once fully commenced, will replace the National Monuments Act 1930, and subsequent amending acts. Under the new legislation, finds of newly discovered archaeological sites will be protected, and existing sites and structures will be afforded greater legal protection.

These are the pre-eminent archaeological sites in Ireland and fall into several categories including:

- Sites that are in the ownership or guardianship of the state.

- Monuments that are the subject of Preservation Orders.
- Monuments in the ownership of a local authority; and
- Walled towns.

Generally National Monuments in state care are numbered amongst the best preserved and most impressive monuments in the country.

Record of Monuments and Places/Archaeological Survey Database

The legislation that affords protection to the archaeology of Ireland has seen several amendments since the first National Monuments Act of 1930 and there is a legacy of several different registers and associated terminology.

A feature recorded in the 'Record of Monuments and Places' (RMP) refers to a recorded archaeological site that is granted statutory protection under the National Monuments Act 1930-2003 The RMP is the most widely applying provision of the National Monuments Acts. It comprises a list of recorded monuments and places (resulting from the Archaeological Survey of Ireland [ASI]) and accompanying maps on which such monuments and places are shown for each county. The information contained within the RMP is derived from the earlier non-statutory Sites and Monuments Record (SMR). However, some entries were not transferred to the statutory record as they refer to features that on inspection by the Archaeological Survey were found not to merit inclusion in that record or could not be located with sufficient accuracy to be included. Such sites however remain part of the SMR. The record is a dynamic one and is updated to take account of on-going research.

The most up-to-date record of archaeological monuments, the Archaeological Survey Database (ASD), is available for viewing and download on the www.archaeology.ie website. This record is continually revised and indicates several additional sites that do not feature in the RMP. The National Monuments Service also makes available SMR Zones of Notification on the website.

Sites and Monuments Record

The Sites and Monuments Record (SMR) is an inventory of the known archaeological monuments in the State. There are more than 150,800 records in the database and over 138,800 of these relate to archaeological monuments.

An 'area of archaeological potential' refers to an area of ground that is deemed to constitute one where archaeological sites, features or objects may be present in consequence of location, association with identified/recorded archaeological sites and/or identifiable characteristics.

Register of Historic Monuments

Section 5 of the National Monuments Act, 1930 states that the Minister is required to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded in the Register without the permission of the Minister is illegal, and two months' notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. This list was largely replaced by the Record of Monuments and Places following the 1994 Amendment Act. No registered Historic Monuments were identified.

Architectural Conservation Areas

The Planning and Development Act 2000, as amended, provides that all Development Plans must now include objectives for preserving the character of Architectural Conservation Areas (ACAs). An ACA is a place, area, group of structures or townscape of special architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest, or which contribute to the appreciation of protected structures.

In these areas, the protection of the architectural heritage is best achieved by controlling and guiding change on a wider scale than the individual structure, to retain the overall architectural or historic character of an area.

Record of Protected Structures/National Inventory of Architectural Heritage

The importance of our built heritage is enshrined in the Planning and Development Act, 2000 (Part II, Section 10) which places a statutory obligation on local authorities to include in their Development Plans objectives for the protection of structures, or parts of structures, which are of special interest. The principal mechanism for the protection of these structures is through their inclusion on the Record of Protected Structures (RPS). This list provides recognition of the importance of a structure, protection from adverse impacts and potential access to grant aid for conservation works. The record of Protected Structures is an ongoing process and can be reviewed and added to. In considering additions to the Record of Protected Structures local authorities have recourse to the National Inventory of Architectural Heritage (NIAH) which provides a source of guidance on the significance of buildings in their respective areas.

Designed Landscapes-Demesnes, Historic Gardens & Country Estates

The Architectural Section of the DHLGH is in the process of a multi-phase study looking at Designed Landscapes and Historic Gardens that appear as shaded areas on the First Edition Ordnance Survey Maps, circa. 1830.

‘The objective of this survey is to begin a process of understanding of the extent of Ireland's historic gardens and designed landscape. Sites were identified using the 1st edition Ordnance Survey maps. These were compared with current aerial photography to assess the level of survival and change.’

16.2.3 Methodology

16.2.3.1 Introduction

The general methodology used in the preparation of the assessment aligns with guidance provided in the EPA’s Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022, Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects (TII, 2024) and other relevant guidelines.

This chapter addresses Cultural Heritage under the two headings of archaeology and architectural/built heritage.

16.2.3.2 Desktop Assessment

All known cultural heritage sites were reviewed on the Archaeological Survey of Ireland (ASI) along with aerial photography and Ordnance Survey Ireland (OSI) mapping. Sites mapped included the following:

- UNESCO World Heritage Sites including the tentative list of candidate sites.
- National Monuments, be they in the ownership or guardianship of the State, in the ownership of a local authority or monuments under preservation orders.
- Record of Monuments & Places (RMP) and Sites and Monuments Record (SMR) from www.archaeology.ie.
- Demesnes Landscapes and Historic Gardens indicated on the OSI First Edition Mapping.

All townlands located within 1km of the proposed development site were listed and crossed referenced with:

- National Monuments, a list for Galway available from www.archaeology.ie.
- Preservation Orders, a list available from the National Monuments Service, and

The Galway City Development Plan (2023-2029) was reviewed to obtain a comprehensive understanding of the cultural heritage of the area. The development plans contain lists of cultural heritage sites including national monuments, recorded monuments, architectural conservation areas, protected structures, and protected views as well as baseline assessments of the landscape character of the city.

The plans also outline the city's heritage policies and objectives that aim to protect and promote the archaeological, architectural, and cultural heritage resource. This evaluation was carried out with due regard to these policies and other relevant information contained within the plans.

To assess the potential impact of the proposed works the following sources were also consulted or reviewed:

- Excavations Bulletin. The Excavation Bulletin is both a published directory and an online database that provides summary accounts of all the excavations carried out in Ireland and Northern Ireland from 1970 to 2024. The database gives access to over 15,000 reports and can be browsed or searched using multiple fields, including Year, County, Site Name, Site Type, Grid Reference, Licence No., Sites and Monuments Record No. and Author.
- Topographical files of the National Museum of Ireland. The topographical files of the NMI identify all recorded finds held in the NMI archive that have been donated to the state in accordance with national monuments legislation. The files sometimes include reports on excavations undertaken by NMI archaeologists in the early 20th century. Valuable information that can be gleaned might include the exact location, ground type, depth below ground level and condition when found, of each find. However, the amount and the usefulness of the information available on each find can vary considerably. The topographical files are listed by county and townland and/or street name.
- Cartographic Sources. Analysis of historic mapping shows how the landscape has changed over time. The comparison of editions of historic maps can show how some landscape features have been created, altered, or removed over a period. Sometimes features that appear on these early maps are found to be of potential archaeological significance during fieldwork.
- Toponyms. Townland names are a rich source of information for the land use, history, archaeology, and folklore of an area. The placename can have a variety of language origins such as, Irish, Viking, Anglo-Norman and English. The names can provide

information on families, topographical features, and historical incidents. In terms of the built environment many names reference churches, fords, castles, raths, graveyards, roads and passes etc. In compiling the following data, several resources were consulted including the Placenames Database of Ireland www.logainm.ie and Irish Names of Places by P.W. Joyce (Joyce, 1913).

- Aerial photographs. The usefulness of aerial photography is that it allows for a different perspective - 'the distant view'. Archaeological sites may show up on the ground surface, depending on their state of preservation, by light and shadow contrasts (shadow marks), tonal differences in the soil (soil marks) or differences in height and colour of the cultivated cereal (crop marks). It is also a useful aid in pinpointing existing features and can assist in ascertaining their extent and degree of preservation.
- Published archaeological inventories; and
- Documentary Sources: several literary references were consulted.

16.2.3.3 Field Inspection

In addition to documentary and archival research and analysis, a detailed surface-based inspection of the area of the proposed development area was undertaken by the author. Field inspection is necessary to determine the extent and nature of archaeological, architectural, and historical remains and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

16.3 The Existing and Receiving Environment (Baseline Situation)

16.3.1 Location Details

The site is in Townparks townland in Galway City and is located to the northeast of the city centre, within the Headford Road area. The subject site comprises a public surface car park and the Black Box Theatre to the north.

Table 16-1 Location Details

Location	
County	Galway.
Barony	Galway.
Parish	Saint Nicholas.
Town/City	Galway City.
Townland	Townparks.
Road	Headford Road/R886.
Recorded Archaeological Sites within 100m	None.
Architectural Conservation Area	None.
Recorded Architectural Sites within 100m of works	None.
ITM	529860/725968

16.3.2 Archaeological and Architectural Baseline Data

16.3.2.1 General Archaeological and Historical Background

Galway lies at the mouth of the river Corrib which drains Lough Corrib into the northern side of Galway Bay. Traditionally a village called *Baile an Sruthán* stood here prior to the Anglo-Norman invasion and given its strategic position and importance as a crossing to west county Galway, this is probable. “The name Galway is believed to have derived from the river Corrib, which was once known as *Abhainn na Gaillimhe*, the Galway River, or from a mythical character, *Gailleamh*, who drowned in its waters. The earliest reference to this place name mentions an earthwork fortification erected by the native Irish in 124, *Dún Gallimh*, the fort of Galway. Nowadays *Gaillimh* is accepted as a derivative of *gall* and *amh*, two words that seem to denote ‘a stony river’ (Spellissey, 1999, 29). The town is first recorded in 1124 as the castle of *Bun Gaillimhe*, built by Turlough O’ Connor, the King of Connaught, at the crossing point. Little is known about the form or location of this structure, but it is likely that it was replaced by the Anglo-Norman Castle (Walsh, 2001, 10). In 1230, Richard de Burgo, came to take possession of Connaught, lands he had been granted. He met the O’Flaherty’s and the O’Connor’s at the river crossing and was repelled but returned two years later and succeeded in building a castle, but this was retaken in 1233 by Felim O’Connor. De Burgo returned in 1235 and subdued Felim with a much larger army and established a base, dividing his lands amongst his followers but retaining the plains of Galway and Mayo for his own use. The town, as part of the manor of Loughrea grew up around the castle, acting both as an important crossing but also as a centre of trade. The castle, which stood off present day Flood Street, was partially excavated in 1999 by Dominic Delany.

In 1247 the town was burnt by the Irish although the nature of the settlement at this time is not clear. Both castle and town were burnt again around 1266-70. Around 1270 a murage charter was granted by Richard’s son Walter, allowing the citizens the right to levy tolls on goods to pay for the construction of town walls. Murage returns dating to 1272-75 and 1277-80 indicated that murage charges were being collected and used for the purchase of lime and tools and the payment of tradesmen and labourers engaged in the making of walls. The requirement for fortification was strongest along the east side of the settlement which did not have the same natural topographical advantages and was in fact overlooked by rising ground giving advantage to an enemy force. In time the walled town would enclose an area of almost eleven hectares.

Two stretches of these walls survive, the first within the Eyre Square shopping centre and the second close to the ‘Spanish Arch’. Stretches of the foundation of this wall have been excavated. Walter’s son, Richard the Red Earl, was one of the most powerful Anglo-Norman magnates and built the Hall of the Red Earl which was a prominent landmark in the town until the seventeenth century. The remains of this were excavated in the late 1990s and can be seen now in Flood Street.

Richard’s cousin William DeBurgo reputedly brought the Franciscan Friars to Galway who established ta foundation on the small St Stephen’s Island just outside the town. In the fourteenth century, the grip of the de Burgos on the city was lessened. Infighting and disputes arose between Macwilliam Oughter who controlled the lands around Galway and the crown, who took the lands in 1381, to the opposition of the townsfolk. There were disturbances in 1385 and open revolt three years later. Richard II visited the town in the winter of 1394-95 and knighted Oughter, pardoning the town and granting privileges which wrested influence from

the de Burgos. In November 1395 Richard granted the town a new and perpetual murage charter and the town's first Royal Charter, raising the town to the status of Royal Borough. This move allowed the townspeople to elect a Sovereign and gave them a greater independence. MacWilliam sacked the town in 1349 and in a placatory measure by Henry IV was granted deputy of Connaught in 1402.

Galway continued to grow through the 15th century importing mainly wine, iron, and salt with exports of hides, cloth, and fish. In 1461 it was granted the right by Edward IV to mint coins as well as a further charter sealing the existing privileges and granting the right to exclude from the town anyone, they wanted including the MacWilliam Burkes (formerly de Burgo).

In 1484 Richard III (1452-1485) emancipated Galway from the control of the descendants of the de Burgos, who had effectively adopted native mores. This charter allowed the election of a mayor and two bailiffs. This effectively gave Galway considerable self-government. Later Pope Innocent VIII (reign 1484-1492) issued a Bull freeing Galway from diocesan control and investing power in a Warden to be elected by the 14 families. Thus by 1484 Galway had both civil and ecclesiastical independence, and its remote location guaranteed it the status of a city state (Hardiman 1820). At this time the town was effectively controlled by a small number of wealthy families known as the Tribes of Galway'" who strengthened their ties by intermarrying. The wealth of these self-styled merchant princes was reflected in the splendour of their domestic housing, Lynch's castle being a notable example (GA094-100043-).

The late 15th and following 16th century were both periods of growth in Galway. The Augustinian and Dominican orders arrived and there was an increase in construction of new buildings, much of it allowed by the fire of 1473 (Walsh, 2001, 19). In 1505 some of the streets of Galway were paved and in 1545 a new charter extended its jurisdiction to the Aran Islands, a city hospital (St. Brigid's) was built, and Elizabeth I (1533-1603) granted a charter for a town gaol in 1578, and a garrison was set to defend the town. At that time a writer said: 'The town is well built and walled with an excellent good harbour and is replenished with many wealthy merchants.'

The prevailing threat during this period was from the Spanish and in 1588 following the failure of the armada 12 ships were wrecked on the coast of Connacht, and 1,100 survivors were put to death by order of the Governor of Connacht, Richard Bingham (Ellis 1985).

During the Nine Years War (1594-1603) fought between the forces of the Gaelic chieftains Hugh O'Neill of Tír Eoghain, Hugh Roe O'Donnell of Tír Chonaill and their allies, against English rule in Ireland, Galway town was left relatively unharmed. O'Donnell raided Connacht in 1599, destroying the town of Athenry, and laying waste to much of County Galway, on being refused entry to Galway, he burned its suburbs.

In the early 17th century business continued to flourish. In 1610 the county of the town of Galway was incorporated under a charter granted by King James I. The ruling families benefited from being members of an exclusive Guild of Merchants of the staple under a new governor of the County. The first appointee was the Earl of Clanricarde, a member of the de Burgo family.

The Irish Confederate Wars of 1641-1653 saw Galway siding with the Catholic cause. Throughout the conflict the town's defences were improved in anticipation of a counterattack by English forces. This eventually materialised when the New Model Army under the command of Sir Charles Coote invaded the town by land and sea, and in 1652 following a nine-month

siege, starvation forced a surrender on apparently favourable terms which were not adhered to (Hardiman 1820, 132). The harsh terms of the Act of Settlement in 1652 caused major upheavals, as peoples from east of the Shannon were transplanted to Connacht and land was confiscated from both participants and bystanders of the Irish Rebellion of 1641. All Catholics were expelled from the town, and the great town houses of the 14 families were confiscated and given to soldiers of the occupying forces in lieu of pay. They quickly fell into ruin as the prosperity of the town declined.

One on the most significant artefacts of this period is the Pictorial Map of Galway. The beautifully illustrated map provides a bird's eye view of a showing the course of the river and waterways, the town defences and the medieval street pattern detailing individual structures.

After the demise of the English Commonwealth and the English Restoration in 1660, the economy of Galway recovered somewhat. In the next crisis, centred around the deposition of the Catholic King James II, in 1689, Galway supported the Jacobite side. Following the defeat at the Battle of the Boyne and the subsequent annihilation of the main Jacobite army at the nearby battle of Aughrim, the Williamites under Ginkell marched on the town Galway. With no stomach for a fight and little hope of being relieved the town surrendered under the Articles of Galway of 1691.

With the signing of the Treaty of Limerick and the introduction of the Penal laws, Galway's fortunes declined. The old merchant families persecuted for their former allegiances were a spent force and lacking their entrepreneurship trade declined. By the turn of the eighteenth-century Galway was a provincial backwater, its harbour in disrepair, its traders reduced to smuggling and its community divided.

Several maps survive from this period and show little in terms of the urban area's development. Trade was now dominated by a small Protestant elite abetted by Catholic traders who still largely controlled the networks. Developments of the period include the construction of the mud dock and Mayoralty house on Flood Street and the laying out of Merchants Road. The second half of the eighteenth century saw a period of rapid decay in the walls of Galway and by the end of the century almost all the fortifications had been demolished. Sections of the city wall were built upon and property along the wall was let by the corporation or taken over by private individuals.

At the start of the new century, following the Act of Union Galway saw a rapid period of expansion buoyed by a growing population, increased agricultural activity and a relenting in the Penal Laws. Within the town many old buildings were demolished to widen the streets. Significant projects dating to this boom include the County and town courthouse (1812-1825), the Salmon Weir Bridge (1818), the Franciscan church (1836), The Presbyterian Church (1835), St. Patricks Church (1842) and the development of the University (1846-9). In 1851 the section of the wall from Williamsgate Street to the Lion Tower, together with a portion of the bastion was demolished to make way for Eglington Street. This vigour was tempered by the Famine Years (1845-49) that greatly reduced the population. Public works provided much needed employment for a starving workforce and much of the canals and waterways date to this time.

The railway reached Galway in 1850. Despite this the late nineteenth century was a period of stagnation. During the 20th century Galway revived. By 1950 it had about 21,000 inhabitants.

Galway was still a busy port. Exports included farm produce, wool, and marble. Industries in Galway in the 20th century included iron, milling, furniture making and hat making.

Roughly 80m north of the subject site flows the Terryland or Sandy River, which itself enters a swallow hole (Pollavourleen or *Poll an Mhuirlín*) before emptying into the sea near Oranmore. The area along the south of this river where the subject site is located was known as Suckeen bogs. Beginning with the construction of an embankment along its western side in the early nineteenth century (which gave its name to the Dyke Road), the bogs have gradually been reclaimed and built over. The site is bordered on the western boundary by the river Corrib.

Nearby Terryland Castle (located approx. 560m to the northwest of the subject site), a 17th century gabled house, is located on the east side of the river Corrib, close to a known fording point south of Jordans Island. The present-day ruins in all probability were built on the site of an earlier castle that was referenced in 1574 as being in the possession of 'Domynick Lynch' (Nolan 1901, 115). From the available sources (O'Flanagan 1927a, Vol. 1, 166-7) it would appear that the gabled house was built by the fourth Earl of Clanricard, Richard Burke (1572-1635). This new fortified house was the scene of several military engagements throughout the 17th century. Hardiman records that during the Confederate wars (1641-1653), when the inhabitants of the town were in dispute with a garrison at Forthill, the fifth Earl, Ulick, dispatched his Lieutenant, Dermott O'Daly, along with three companies and thirty musketeers to take charge of the castle at Tirellan. At the time the castle was described as being situated on a neck of land commanding the river Corrib (Hardiman 1820, 112). From this position O'Daly was able to assist the townspeople in preventing supplies being delivered to relieve the Forthill garrison.

16.3.2.2 Archaeological Heritage

16.3.2.2.1 World Heritage Sites

There are no World Heritage Site or potential World Heritage Site contained in the Tentative List of Candidate Sites within 5km of the study area.

16.3.2.2.2 National Monuments in State Care, Guardianship or under Protection Order

There are no National Monuments in State Care (Ownership or Guardianship) or Monuments that are subject to a preservation order within the vicinity of the proposed development. The nearest national Monument is Merlin Park castle to the east of the city (Nat. Mon. No. 609). The conjectural line of the defences relating to the walled town of Galway is located roughly 360m to the south.

16.3.2.2.3 Record of Monuments and Places/Archaeological Survey Database/Register of Historic Monuments

The following sections contain information relative to the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP) and the Archaeological Survey Database (ASD). Archaeological monuments are general registered by the National Monuments Service using a Sites and Monuments Record (SMR) number.

Archaeological monuments listed in the ASD that are within 300m of the proposed development are listed below.

GA094-100059--

Class: Quay

Townland: TOWNPARKS (Galway By., St. Nicholas Par.)

Description: Not available.

GA094-100----

Class: Historic town

Townland: TOWNPARKS (Galway By., St. Nicholas Par.)

Description: On E bank of the river Corrib at its outflow into Galway Bay. Its foundation dates from the 1230s when Richard de Burgh erected a castle on the site of the O'Flaherty stronghold of Bun Gaillimhe (Lynn 1986, 101). The construction of its defence's dates from the 1270s and it was confirmed as a royal borough in 1396. The walled town covered an area of c. 60 hectares, but an extra mural suburb also existed at the Claddagh, on W bank of the river (see GA094-091002-). Three friaries (GA094-091----, GA094-099003-, GA094-102----), a hospital, a (nunnery and an infirmary (GA094-105----, GA094-106----, GA094-113----) also stood outside the walls. The visible remains comprise substantial portions of the town walls, the collegiate church of St Nicholas, and the remains of c. 20 late medieval houses (Higgins 1984-6). In the 17th century a series of artillery fortifications (GA094-032----, GA094-057----, GA082-083----, GA094-099002-, GA094-112----, GA094-022----) were erected around the town. (Killanin and Duignan 1967, 284-8; Hardiman 1820; Casey 1988b)

The above description is derived from the published 'Archaeological Inventory of County Galway Vol. I - West Galway'. Compiled by Paul Gosling (Dublin: Stationery Office, 1993).

Figure 16-1Showing nearby recorded monuments.

16.3.2.2.4 Map Regression

For this study, the following historic maps were consulted:

- Barnabe Gooche's Map of Galway (1583).
- John Speed's Map of 1610.
- The Pictorial Map of Galway (1651).
- The coloured town plan and prospect of Galway drawn in 1685, by Captain Thomas Phillips
- J. Bellins's map of Galway and environs (1764).
- The First Edition OS Maps (1840).
- The Second Edition OS Maps.

Barnabe Gooche's 1583 map showing Galway city, depicts well the medieval walled town. The area now occupied by the subject site lies outside the walled town. Nothing is shown on the map of any structures at the subject site.

In 1610, John Speed visited the city and described it as "the principal city of the province, and that, which may worthily be accounted the third in Ireland, is Galway, in Irish Gallive, built in like manner to a tower, it is dignified by a Bishops See, and is much frequented with merchants, by reason whereof, and of the benefit of the road and haven, it is gainful to the inhabitants, through traffic and exchange of rich commodities, both by sea and land". Speeds map of 1610 depicted the medieval walled form of the city and excludes any structures which lay outside this side of the city.

Galway was, by the early 17th century, completely enclosed by walls, with fourteen gates and two forts. The Pictorial Map of Galway (1651) shows suburbs that grew up outside the walls to the north-east (Eyre Square), north-west (Mary Street) and in the Claddagh (Dominick Street). Their foundation date is unknown; however, they may have begun to develop before 1500. Again, the map does not extend to the subject site.

Thomas Phillips 1685 map is not very detailed and does not show any structures at the subject site. The bogs of Suckeen are depicted at the subject site and the mudflats to the south together with those on the western side of the river are realistically depicted with meandering streams and watercourses.

The Down Survey was undertaken from 1656-8 under the direction of William Petty. The map depicts the subject site as unoccupied.

The 1764 'Plan de Galloway et ses environs' published in Jacque Bellin's Petite Atlas Maritime appears to depict the subject site as unoccupied.

The First Edition Ordnance Survey 6" Map surveyed in 1838 depicts the subject area in pre-famine times. There are no evident structures at the subject site and the Headford Road and Dyke Road have not yet been constructed. The general area is marked as 'liable to flooding'.

The Second Edition OS maps depict the site as unoccupied. The Headford Road and Dyke Road have been constructed (The Headford Road was laid out in 1863, while an embankment along the western side of the Corrib in the early nineteenth century gave its name to the Dyke Road) and to the immediate south of the site the line of the Galway to Clifden branch of the railway is depicted. The line opened on New Year's Day 1895, but by the 1930s it was in bad repair and doomed to closure. It finally closed in 1935.

The Irish Historic Towns Atlas notes the existence of a Plague hospital (mid-17th cent.) located

16.3.2.2.5 Aerial Photography

A review of available aerial photographs was undertaken to identify any previously unrecorded anomalies of historical potential. Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995-2013), Google Earth (2002-2020) and Bing Maps was completed. Significant development has occurred by 1994 with the construction of carparking and a large commercial development (Galway Retail Park) to the west. Nothing of archaeological significance was noted.

No previously unrecorded archaeological sites were noted.

16.3.2.2.6 Topographical Files of the National Museum of Ireland

A review of the online resource www.heritagemaps.ie was completed. No finds are recorded in the vicinity of the subject site.

16.3.2.2.7 Previous Archaeological Fieldwork in the vicinity

There are numerous records relating to Galway City. The closest record, listed below, is located on St. Brendan's Avenue, roughly 190m south of the subject site.

Licence number: 20E0023

County: Galway Site name: 33-35 St. Brendan's Avenue, Galway

Sites and Monuments Record No.: None

Author: Anne Carey

Site type: Adjacent to Galway City

ITM: E 529915m, N 725643m

Archaeological pre-development testing was undertaken at the site of the proposed development at Nos 33-35 St. Brendan's Avenue, Townparks, Galway, on 27 and 28 January 2020, in compliance with Conditions of Planning. The mechanical excavation of five trenches through the area of the proposed development did not result in the discovery of heretofore unknown or unrecorded archaeological material. All five trenches were excavated to undisturbed natural, and no artefacts of archaeological significance were recovered during the testing.

16.3.2.2.8 Townlands and Townland Boundaries

The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word baile refers to a place. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch.

The proposed development area is located within the townland of Townparks.

16.3.2.2.9 Toponym Analysis

The townland name 'Townparks' is derived from the Irish *Páirceanna an Bhaile*. *Baile* meaning 'town, homestead' and *páirc* meaning 'field'.

16.3.2.3 Architectural Heritage

16.3.2.3.1 Architectural Conservation Areas (ACA)

There are no ACAs in the immediate vicinity. The closest ACA is the City Core of Galway city which, at its nearest is roughly 370m southeast of the subject site. The ACA comprises the medieval core of Galway and is a mix of streetscape and buildings of many periods.

16.3.2.3.2 Record of Protected Structures (RPS)/National Inventory of Architectural Heritage (NIAH)/Industrial/Vernacular Heritage

There are no NIAH or RPS sites within the immediate vicinity of the subject site. The nearest concentration of RPS sites comprises a terrace of Residential Buildings, associated railings and two IHS tiles on St. Brendan's Road roughly 230m to the south. The nearest NIAH site is Eglinton Dock (Reg. No. 30309003) which is located roughly 150m west of the subject site. The nearby Rivers/Waterways of Galway City, Including Bridges, Weirs, Walls, Embankment, Piers, and Other Associated Infrastructure is also listed on the Galway City RPS (RPS No. 8501).

16.3.2.3.3 Designed Landscapes-Demesnes, Historic Gardens & Country Estates

There are no demesne landscapes of historic gardens located in the vicinity of the subject site.

16.3.3 Fieldwork

A field inspection was carried out on the 22nd of August 2023 which entailed walking the proposed development site and its immediate environs, noting, and recording the terrain type and land usage, the presence of features of archaeological or historical significance and visually investigating any suspect anomalies observed to determine their nature and provenance where possible.

The site comprises a public surface car park with c. 510 spaces and the Black Box Theatre to the north. The site is accessed by the Dyke Road running parallel to the Lough Corrib Special Area of Conservation (SAC). The site adjoins the Galway Retail Park to the east, with the wider area comprising of predominantly low density, low grade commercial buildings with extensive surface car parking. Nothing of archaeological significance was noted during the site inspection.

16.4 Characteristics of the Proposed Development

Chapter 3 of this EIAR includes a detailed description of the Proposed Development. The proposed site layout is also detailed in Appendix 1-1.

16.5 Potential Impact of the Proposed Development

16.5.1 Construction Phase

16.5.1.1 Potential Direct Effects

Direct negative impacts may occur where sites of archaeological and cultural heritage significance are located within the footprint of the proposed development, which would potentially be impacted upon by ground disturbances.

In relation to the proposed development, direct, physical impacts on the archaeological and cultural heritage can manifest themselves in the following ways:

- Where an archaeological or cultural heritage site, structure, monument, or feature is located within an area where works takes place and the works either intentionally or unintentionally entail the alteration or removal of all or part of the site, structure, monument or feature a direct, physical impact will occur.
- Direct, physical impacts can also occur in gaining access to the site. Where archaeological, architectural, or cultural heritage sites, structures, monuments, or features are intentionally or unintentionally removed or altered when transporting and/or facilitating access for machinery, equipment and/or materials to or from site a direct physical impact will occur; and
- There is the potential for direct, physical impacts on previously unrecorded archaeological and architectural sites, structures, monuments, or features.

If these effects cannot be remediated, for example if archaeological deposits are destroyed during excavations, then the impacts will be permanent.

16.5.1.2 Potential Direct Effects on Recorded Archaeological Monuments

The proposed development will have no direct physical effect on known archaeological sites and monuments.

16.5.1.3 Potential Direct Effects on Unrecorded Archaeological Monuments or Features

The footprint of the proposed development is located on already developed lands and has been significantly disturbed in the past. The potential for direct impacts on previously unrecorded archaeological material at this location was assessed as low.

16.5.1.4 Potential direct Impacts Architectural Sites

The proposed development will have no direct physical effect on known architectural sites.

16.5.2 Operational Phase

16.5.2.1 Potential Effects on the Setting/Operational Effects

Effects on the Setting are primarily visual and examine the effect of the proposed works upon the setting of a site within the wider landscape. Impacts on the Setting can be reduced with sensitive site development and screening. The impact of the development is usually proportional to the extent to which that development is visible to and from the extant recorded monuments and features.

16.5.2.2 Archaeological Sites

The proposed development will not impact the visual amenity of any known monuments. The developed nature of the surrounding landscape means that the operation of the development will not affect the setting of recorded monuments.

16.5.2.3 Architectural Sites

The proposed development will not impact the visual amenity of these sites/features. The developed nature of the surrounding landscape means that the operation of the development will not affect the setting of recorded architectural sites.

16.5.3 Potential Cumulative Impacts

The permitted and proposed developments within a 500m study area have been considered as part of the cumulative impact assessment. No cumulative impacts upon the archaeological resource have been identified, as any remains that may be identified within the proposed development area will be fully excavated and recorded. As the proposed development will not result in any impacts on the architectural heritage resource, no cumulative impacts have been identified.

16.5.4 Summary of effects

Table 16-2 Summary of Likely Significant Effects

Activity	Receptor	Predicted Impact	Quality	Significance	Duration	Type	Mitigation Measures	Residual Effect
Construction Phase								
Excavation works	Cultural Heritage	Impact on previously unknown archaeological sites.	Neutral	Low	Short Term	Direct	Archaeological monitoring of initial groundworks/site investigation works to establish the extent of previous ground disturbance at the subject site. Based on the results of this work further mitigation such as intermittent inspections may be recommended if deemed required.	None
Operational Phase								
NA	Cultural Heritage	None	NA	None	NA	NA	None	None

16.5.5 "Do Nothing" Impact

If the proposed works were not to proceed, there would be no effect upon the archaeological, architectural, or cultural heritage resource.

16.6 Avoidance, Remedial and Mitigation Measures

16.6.1 Construction Phase

The mitigation strategies outlined in this section detail the measures to be adopted to ameliorate the effects that the proposed works may have on features of archaeological, architectural, or cultural heritage within the study area during both the construction and operational phases of the scheme. The residual effects that will remain once these mitigation measures have been implemented are also identified.

It is recommended that a suitably qualified archaeologist monitor initial groundworks/site investigation works to establish the extent of previous ground disturbance at the subject site. Based on the results of this work further mitigation such as intermittent inspections may be recommended if deemed required.

A suitably qualified archaeologist will be appointed to advise the design team on archaeological matters, liaise with the relevant authorities, prepare an archaeological licence application and method statement, and complete the archaeological monitoring work. Monitoring should be carried out under licence to the National Monuments Service at the DHLGH. The application for such a licence requires a detailed method statement, outlining the procedures to be adopted to monitor, record, and recover material of archaeological interest during such work.

Should archaeological material be uncovered at any location, the feature will be summarily investigated to determine the form, age, nature, depth, and extent of the feature. The feature will be planned, photographed, and recorded to best professional standards.

Adequate funds to cover excavation, post-excavation analysis, and any testing or conservation work required will be made available if required. Upon completion of the works dissemination of the results will take the form of a stratigraphic report and full report to publishable standard lodged with the licensing section (NMS) and the Planning Section (NMS) and the National Museum of Ireland. A summary of the report will also be submitted to the Excavations Bulletin within six weeks of the end of fieldwork. Should results warrant it, wider dissemination in the form of a full publication may be recommended.

The above recommendations are subject to approval by the National Monuments Service at the DHLGH and other relevant authorities.

16.6.2 Operational Phase

There will be no operational phase impacts on the cultural heritage resource if the above-described mitigation is implemented. No operational phase mitigation is recommended.

16.6.3 "Worst Case" Scenario

Under a worst-case scenario, the works would disturb previously unrecorded deposits, features or objects without proper excavation and recording being undertaken.

16.7 Residual Impacts

There will be no residual impacts on the cultural heritage resource if the above-described mitigation is implemented.

16.8 Monitoring

Not applicable to cultural heritage.

16.8.1 Construction Phase

Not applicable to cultural heritage.

16.8.2 Operational Phase

Not applicable to cultural heritage.

16.9 Interactions

There are no interactions with cultural heritage and other specialist chapters.

16.10 Difficulties Encountered When Compiling

No difficulties were encountered in compiling this chapter.

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17 RISK MANAGEMENT

17.1 Introduction

This chapter sets out the assessment of the vulnerability of the Proposed Development to risks of major accidents and/or disasters. It assesses the expected effects of the project to risk of major accidents and disasters including the methodology used for the assessment. The interactions and mitigation and monitoring measures are included in Chapters 15 and 16 respectively.

17.1.1 Quality Assurance and Competency of Experts

This chapter was prepared by Louise Hewitt, Environmental Consultant within Enviroguide's EIA team. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021.

This chapter has been reviewed and approved by Catherine Keogan, Technical Director and EIA Lead at Enviroguide. Catherine is an environmental consultant with over 20 years' experience in consultancy, specialising in EIAs for a range of developments, working closely with a range of developers, planning consultants and architects within the public and private sector.

17.2 Study Methodology

17.2.1 Scope and Context

The relevant legislation that applies to this chapter is the Planning and Development Regulations 2001 as amended, and in particular Schedule 6 – Information to be contained in EIAR. The following paragraph of Schedule 6, Paragraph 2(e)(i)(IV), specifically refers to "*a description of the likely significant effects on the environment of the proposed development resulting from … the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)*".

Paragraph 2(h) further expands with "*a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events*."

Additionally, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), which

implement the Seveso III Directive (2012/18/EU), and which revoked the 2006 Major Accident Regulations also applies to this Chapter.

17.2.2 Guidelines and Reference Material

Cognisance has been taken of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022). This document follows the requirements laid out in the Directive 2014/52/EU.

Specifically, the EPA Guidelines state that the EIAR must take account of "*the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk)… 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 plants. 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. The EIAR should refer to those separate assessments while avoiding duplication of their contents*."

Reference has also been made to the Department of the Environment, Heritage & Local Government (DoEHLG) Publication 'Guide to Risk Assessment in Major Emergency Management 2010' and the Office of Emergency Planning, Department of Defence (DOD) Publication 'A National Risk Assessment for Ireland 2020'. A consolidated list of national hazards for Ireland identified in the DOD document are identified in Table 17-1.

Table 17-1 Consolidated List of National Hazards (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

Hazard: Civil	**Hazard: Natural**
• Large Crowd Event • Pandemic • Water Supply Distribution and Contamination • Food Chain Contamination • Animal Disease • Terrorist Incident	• Storm • Snow and Ice (including pro-longed low temperature) • Flooding (including pluvial, flu-vial and coastal)
Hazard: Transportation	**Hazard: Technological**
• Maritime Incident • Air Incident • Transport Hub (including Air-ports, Ports and Rail Stations)	• Structural Collapse (including Dam, Tunnel, Bridge and Build-ing) • Nuclear Incident (Abroad) • Cyber Incident • Disruption of Energy Supply (including oil, gas, electricity and communications)

17.2.3 Risk Assessment Methodology

The risk assessment methodology has been supported by general risk assessment methods. Hazard analysis and risk assessment are accepted internationally as essential steps in the process of identifying the challenges that may have to be addressed by society, particularly in the context of emergency management. Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard (DoEHLG, 2010).

Table 17-2: Classification of National Likelihood Criteria (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

National Likelihood Criteria		
Rating	**Classification**	**Average Recurrence Interval**
1	Extremely Unlikely	500 or more years between occurrences
2	Very Unlikely	100-500 year between occurrences
3	Unlikely	10-100 years between occurrences
4	Likely	1-10 years between occurrences
5	Very Likely	Less than 1 year between occurrences

17.3 Predicted Impacts

The chapters within this EIAR identify that the Proposed Development has been designed in accordance with best practice and that the Proposed Development can be safely undertaken without risk to health and the environment.

In order to understand the potential consequences and predicted impacts of any major accident or disaster due to the Proposed Development and the vulnerability of the project a desk study was undertaken. The assessment reviewed:

- The vulnerability of the project to major accidents or disasters.
- The potential for the project to cause risks to human health, cultural heritage and the environment, as a result of that identified vulnerability.

A methodology has been used including the following phases:

Phase 1: Assessment

The DOD Consolidated List of National Hazards was used to identify a preliminary list of potential major accidents and disasters. Receptors covered by legislation were not included within the assessment, for example, the quarry operatives.

Phase 2: Screening

The list was screened and major events caused by geological faults or natural phenomena were not included given the unlikely event of one occurring. Elements already addressed as a key part of the design e.g. risks of building collapse, are not repeated.

Phase 3: Mitigation and Evaluation

In the event that mitigation measures included did not mitigate against the risk, then, the potential impacts on receptors are identified in the relevant chapter. Table 17-3 lists the major accidents and/or disasters reviewed.

Table 17-3: Major Accidents and/or Disasters Reviewed

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Civil				
Large Crowd Event (An event with over 5,000 people)	N	Not considered vulnerable due to the nature of the Proposed Development i.e., a residential development including 219 no. units and 1 no. childcare facility.	N/A	N/A
Water Supply Contamination	Y	Waterborne diseases can be caused by consuming contaminated drinking water. No public health issues have been identified for the Proposed Development.	Local water users	Chapter 8 Hydrology of this report identifies the control measures required to avoid contamination of water supplies.
Food Chain Contamination	N	Not considered vulnerable	N/A	N/A
Animal Disease	N	Not considered vulnerable	N/A	N/A
Terrorist Incident	N	Not considered vulnerable	N/A	N/A
Transportation				
Maritime Incident	N	The closest port is Galway Port which is located approximately 1.2km southeast.	N/A	N/A
Air Incident	N	Th closest airport is Shannon airport located approximately 66km south.	N/A	Public Safety Zones are assessed in Section 17.4.2 of this chapter.
Transport Hub (Includes Airports, Ports and Rail Stations)	N	Not considered vulnerable. The site is not considered a transport hub.	N/A	N/A
Natural				

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Cultural, Archaeological and Architectural Heritage	N	Not considered vulnerable as no known archaeological, architectural, or cultural heritage remains were found during the desk top survey.	Cultural Heritage	Chapter 17 Cultural Heritage of this EIAR assesses impact of the Proposed Development on the Archaeological and Cultural Heritage and proposes mitigation measures where required.
Landslides	N	Geological Survey Ireland (GSI) does not have site specific information on landslide susceptibility however the site is surrounded by an area of Low susceptibility.	Residents, service users, members of the public and nearby properties.	Chapter 7 Land and Soils of this EIAR assessed the vulnerability of the Proposed Development to landslides.
Earthquakes	N	Earthquakes are not likely to occur in the vicinity of the site at a sufficient intensity to pose a risk for the Proposed Development.	N/A	N/A
Floods/ Storm surge/tidal flooding	Y	The site is located adjacent to the River Corrib and is located in Flood Zone A where the risk of flooding is deemed to be high.	Future residents, surrounding roads, residents, commercial and retail properties.	A Site-Specific Flood Risk Assessment has been prepared which is detailed in Chapter 8 Hydrology and summarised in Section 17.4.4 of this chapter.
Severe weather such as storms, blizzards, droughts, tornados, heatwaves	N	Not considered vulnerable. In the event of severe weather events, the national meteorological service, Met Éireann, provides advance notice of severe weather, usually several days in advance. When appropriate, colour-coded weather warnings are issued. The Office of Emergency Planning works with the government departments and other key public authorities in order to ensure the best possible use of resources and compatibility across different emergency planning requirements.	N/A	N/A
Air Quality events	Y	Dust emissions during the construction phase and vehicular emissions during the construction and operational phase.	Residents/ workers	Chapter 10 Air Quality of this EIAR identifies the impact of the construction and operation of the development on ambient air quality.
Wildfires	N	Not considered vulnerable to wildfires.	N/A	N/A

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Fire	N	The risk of fire may lead to loss of life.	Residents, service users, members of the public and nearby properties.	Section 17.4.1 of this chapter details fire prevention measures.
Invasive species	N	Invasive species surveys were carried out during the habitat survey on the 17th of July 2023. No invasive species were noted during the survey.	Local biodiversity	Due to the lack of invasive species identified on site, no mitigation for their removal is required. Chapter 6 Biodiversity has proposed a confirmatory pre-construction invasive species survey, in case any invasive species have spread to the site since the initial site visit.
Technological				
Structural Collapse (Building)	N	The design criteria of the buildings will be in accordance with all relevant building de-sign standards. No further assessment is required.	N/A	N/A
Structural Collapse (Dam, Bridge, Tunnel)	N	Not considered vulnerable as no dams, bridges or tunnels are proposed as part of the development.	N/A	N/A
Flood defence failure	N	Appropriate drainage design, SuDS and attenuation design, have all been included in the design of the Proposed Development and will be installed according to appropriate regulations and guidelines.	Residents, service users, members of the public and nearby properties.	Chapter 8 Hydrology of this EIAR and the Site-Specific Flood Risk Assessment identifies the vulnerability of the project to flooding.
Nuclear incident	N	Not considered vulnerable.	N/A	N/A
Cyber incident	N	Not considered vulnerable.	N/A	N/A
Disruption of energy supply (oil, gas, electricity)	N	Not considered vulnerable. ESB Networks maintain the electricity network in Ireland. Gas Networks Ireland maintain the natural gas network in Ireland.	N/A	Chapter 15 Material Assets – Utilities contains information on energy supply

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Utilities failure (communications)	N	Not considered vulnerable. In Ireland, the fixed-line communications market is dominated by Eir; while Eir, Three, and Vodafone own Ireland's mobile telecommunications infrastructure.	N/A	Chapter 15 Material Assets – Utilities contains information on communications
Utilities failure (water supply)	N	Not considered vulnerable	N/A	Chapter 8 Hydrology and Chapter 15 Material Assets – Utilities contains information on water supply
Utilities failure (wastewater, sewage)	N	Not considered vulnerable	N/A	Chapter 8 Hydrology and Chapter 15 Material Assets – Utilities contains information on wastewater management
Utilities failure (solid waste)	N	Not considered vulnerable	N/A	Chapter 14 Material Assets – Waste contains information on waste management
Industrial accidents (defence, energy, oil and gas refinery, food industry, chemical industry, manufacturing, quarrying, mining)	N	There are no Upper Tier Seveso sites located near the Proposed Development. The closest is the Circle K Oil Depot located 1.5km southeast of the site.	N/A	N/A

17.4 Management Plans

17.4.1 Fire Safety and Emergency Response Plan

The design criteria of the buildings are in accordance with all relevant building and fire safety standards. Fire alarms, fire extinguishers and fire blankets will be installed in all internal areas. All fire alarms will be in accordance with the current IS3218:2013 + A1 2019 and the Fire Certificate, and all fire extinguishers will meet the requirements of IS291:2015 – Selection, Commissioning, Installation, Inspection and Maintenance of Portable Fire Extinguishers.

A fire evacuation strategy will be put in place in advance of occupancy. Appropriate means of escape in case of fire involving multiple escape stairs, ventilated corridors and sprinkler systems have been designed into each of the warehousing units. Fire safety checks and fire drills will be employed by the Management Company once the Proposed Development is operational. Access routes serving the Proposed Development have been designed to provide adequate space for the Fire Brigade.

17.4.2 Public Safety Zone

Public Safety Zones (PSZs) are mapped out around airport runways to protect the public on the ground from possible aircraft crashes in populated areas. PSZs are used to prevent inappropriate use of land where the risk to the public is greatest, e.g., by limiting the type and allowable height of buildings and structures within the zones.

The closest airport to the site is Shannon Airport which is approximately 66km south. Ireland West Airport Knock is also located approximately 72km north. There are no PSZs directly over the site of the Proposed Development. Considering the distance between the Proposed Development and the nearest airport and associated PSZs, an aircraft strike disaster is not considered relevant to the Proposed Development.

17.4.3 Potential Major Emergency Management Sites and Seveso Sites

The site is located in the Garda Division of Galway City.

The site is not located in close proximity to any Upper or Lower Tier Seveso Sites. The following Upper Tier Seveso Sites are located within 30km of the Proposed Development (Figure 18-1).

- Circle K Oil Depot located 1.5km southeast.
- Cold Chon Galway Ltd. Located 8.2km east.
- Chemoran located 8.5km east.

There are no Lower Tier Seveso Sites located within 30km of the site.

Based on the distance of the Proposed Development from any Seveso Sites the risk of a potential major emergency is not considered relevant to this Proposed Development.

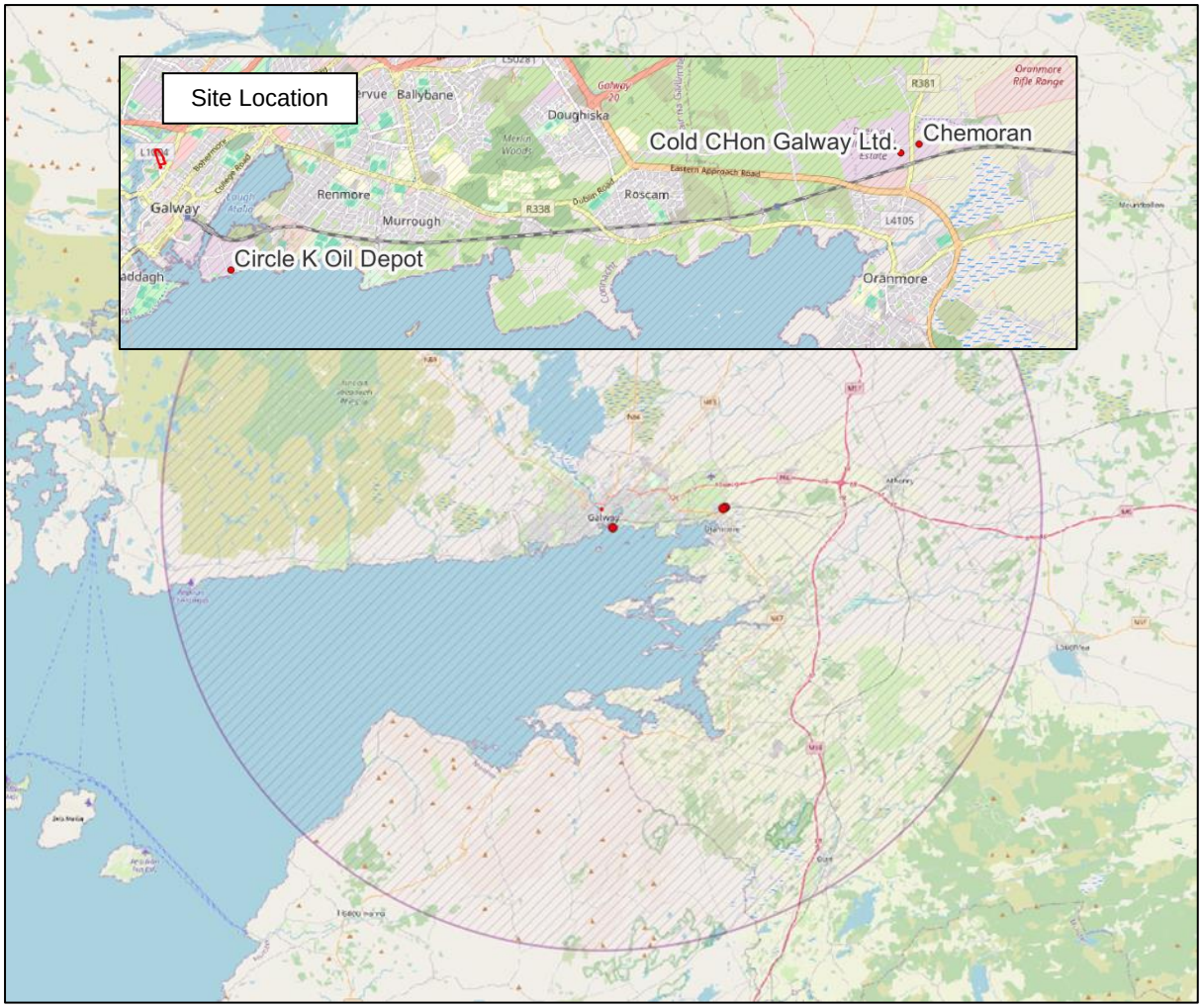

Figure 17-1 Seveso Sites located within 30km of the Proposed Development (Seveso Site Locations, GardaMappingSection, 2024)

17.4.4 Flood Risk

A Site-Specific Flood Risk Assessment has been prepared by AECOM. The *Planning System and Flood Risk Management Guidelines* classify vulnerability of different types of development from a flood risk perspective. Residential development is classified as '*Highly Vulnerable Development*' and should be located within Flood Zone C. The Proposed Development, however, is located within Flood Zone A.

A Development Management Justification Test has been carried out in accordance with Box 5.1 of the *Planning System and Flood Risk Management Guidelines for Planning Authorities*. The proposed development meets the requirements of the Development Management Justification Test, and the flood risk to the development can be adequately managed, and the proposed development will not have an adverse impact elsewhere.

Flood mitigation measures proposed include the following:

- The adoption of a residential Finished Floor Level (FFL) of 7.28m
- External services and chambers to be watertight and flood-proof.
- Critical infrastructure including the substation and the wastewater pumping station are above the 0.1% AEP flood level

- Foul and Storm anti flood valves installed on connections below the 7.28m level.
- Any infrastructure/ objects below the design flood level are at risk in a flood event. Mitigation measures are included as part of the evacuation / emergency strategy.
- The provision of emergency evacuation routes above the 7.28m level.

By minimising changes to the natural ground profile and providing compensatory storage for any loss of flood plain storage, the Proposed Development will ensure minimal third-party risk by displacement of flood water to other locations as a result of the Proposed Development.

In addition, emergency planning and evacuation procedures, coordinated with the relevant emergency services have been developed. As part of the evacuation procedure, residents will be able to evacuate, if required in both the 1% AEP_MRFS flood event and the 0.1% AEP_MRFS flood event. Consideration has also been given to how the Proposed Development will be serviced in both the 1% AEP_MRFS flood event and the 0.1% AEP_MRFS flood event. (AECOM, 2025).

17.4.5 Dust Management Plan

Strategies for dust management during the Operational Phases of the Proposed Development are detailed in Chapter 10 Air Quality. With respect to the potential impacts from uncontrolled dust emissions identified in Chapter 10, the key objective of the Proposed Development is to manage activities to ensure any significant increase in dust emissions are minimised.

17.4.6 Noise Management Plan

Strategies for noise management during the Operational Phases of the Proposed Development are detailed in Chapter 9, Noise and Vibration. With respect to the potential noise impacts identified in Chapter 9, the key objective of the Proposed Development is to manage activities to ensure any significant increase in noise emissions are minimised.

17.5 Residual Impacts

Control measures will put in place for health and safety and environmental management as per conditions of the planning permission, relevant code of practices and relevant legislation. The residual impacts will be negligible once all control, mitigation and monitoring measures have been implemented. The potential for dust or noise from the site operations to cause any nuisance to nearby receptors is deemed to be negligible and the adherence and full implementation of the appropriate control and mitigation measures will ensure there is no potential for cumulative effects to arise.

17.6 Monitoring

There is no monitoring required with regards to risk management. All monitoring proposals for the interacting chapters have been detailed in the relevant technical chapters and are included in Chapter 20 Mitigation Measures and Monitoring.

17.7 Difficulties Encountered When Compiling

No difficulties were encountered in completing this chapter.

17.8 References

AECOM Ireland Limited (2025) Site Specific Flood Risk Assessment;

Chapters 5 to 16 of Volume 2 of this EIAR;

Environmental Resources Management Ireland Ltd (2005) Public Safety Zones Report;

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;

Garda Mapping Section – Seveso Sites Ireland WebMap https://www.arcgis.com/home/item.html?id=a01b5a0a6ff24f10adff30beaa3b6fd0;

Irish Water Greater Dublin Area water restrictions chart https://www.water.ie/help/supply/water-shortages/;

Office of Emergency Planning (2020) 'A National Risk Assessment for Ireland 2020' Department of Defence Publication;

Statutory Instrument (SI). No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018; and

18 INTERACTIONS

18.1 Introduction

As a requirement of Planning Regulations and the Environmental Protection Agency's '*Guidelines on information to be contained in Environmental Impact Assessment Reports'* (2022, interrelationships between various environmental aspects must be considered when assessing the impact of the Proposed Development, as well as individual significant impacts. The significant impacts of the Proposed Development and the proposed mitigation measures have been detailed in the relevant chapters of this report. However, as with all developments that pose potential environmental impacts, there also exists potential for interactions/interrelationships between the impacts of different environmental aspects. The results may exacerbate or ameliorate the magnitude of impacts. This chapter of the EIAR addresses the interactions between the various environmental factors of the Proposed Development.

The following Section is directed by Article 3 section 1(e) of the EIA Directive. The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022), Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015) and OPR Practice Note PN02 Environmental Impact Assessment Screening (June 2021) were also considered.

Article 3 of the Directive states:

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
    a) population and human health;
    b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
    c) land, soil, water, air and climate;
    d) material assets, cultural heritage and the landscape;
    e) the interaction between the factors referred to in points (a) to (d)

18.1.1 Quality Assurance and Competency of Experts

This chapter was prepared by has been prepared by Lakshmi Priya Mohan, Environmental Consultant within the EIA Team at Enviroguide.

Lakshmi has a Master of Science degree in Environmental Science degree from University College Dublin, Master of Science degree in Zoology from Ethiraj College for Women, India, and Bachelor of Science in Zoology from Madras Christian College India. Lakshmi has worked as a Graduate Environmental Consultant with Enviroguide since 2023 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Effects Interactions and Mitigation and Monitoring chapters of the EIARs.

This chapter was reviewed by Catherine Keogan, Technical Director and EIA Lead at Enviroguide. Catherine is an environmental consultant with 37 years' experience in

consultancy, specialising in EIAs for large-scale residential, commercial developments, pharmaceutical, BESS and solar projects working closely with a range of developers, planning consultants and architects within the public and private sector. Catherine has a B.Sc. (Hons) in Analytical Science and a Post Graduate Diploma in Renewable Energy Technology Systems.

18.2 Study Methodology

The interactions between impacts on different environmental factors have been addressed throughout this EIAR. Close co-ordination and management with the EIAR team was carried out to ensure that all likely relevant interactions were addressed at the scoping stage of the EIAR, and interactions have been adequately assessed.

Following an assessment of the EIAR, a matrix was produced to display where interactions between impacts on different factors have been addressed. This has been carried out by use of chapter headings included in the EIAR and details of any interaction during all phases of the Proposed Development.

18.3 Interactions

The following matrix has been produced to show where potential significant interactions between effects on different factors have been addressed, see Table 18-1.

As this EIAR has been prepared by a number of specialist consultants, an important aspect of the EIA process was to ensure that interactions between the various disciplines have been taken into consideration. The principal interactions requiring information exchange between the environmental specialists and the design team are summarised in Table 18-2 to Table 18-13.

Table 18-1: Interactions between Factors

Interaction	5. Population and Human Health	6. Biodiversity	7. Land and Soils	8. Hydrology and Hydrogeology	9. Noise and Vibration	10. Air Quality and Climate	11. Wind and Microclimate	12. The Landscape	13. Traffic and Transport	14. Material Assets- Waste Management	15. Material Assets- Utilities	16. Cultural Heritage
Population and Human Health		x	✓	✓	✓	✓	✓	✓	x	✓	✓	x
Biodiversity	x		✓	✓	x	x	x	✓	x	✓	✓	x
Land and Soils	x	✓		✓	x	x	x	✓	✓	✓	x	x
Hydrology and Hydrogeology	✓	✓	✓		x	x	x	x	x	x	x	x
Noise and Vibration	✓	✓	x	x		x	x	x	✓	x	x	x
Air Quality	✓	✓	✓	x	x		x	x	✓	x	x	x
Wind and Microclimate	x	x	x	x	x	x		x	x	x	x	x
The Landscape	✓	x	✓	x	x	x	✓		x	x	x	x
Traffic and Transport	✓	x	✓	x	x	✓	x	x		✓	x	x
Material Assets – Waste Management	x	x	✓	x	x	x	x	x	x		x	x
Material Assets – Utilities	x	x	x	✓	x	x	x	x	x	x		x
Cultural Heritage	x	x	x	x	x	x	x	x	x	x	x	

	Potential Interaction
	No Interaction
	N/A

Table 18-2 Population and Human Health

Population and Human Health	
Summary	
Chapter 5 of this EIAR, *Population and Human Health,* details the direct and indirect effects of the Proposed Development on Population and Human Health; and sets out any required mitigation measures where appropriate.	
Interactions	
Hydrology	Contamination events can impact the water quality and thus impact the human health of the surrounding population. Appropriate surface water control measures will be implemented as part of the Proposed Development. No public health issues associated with the water conditions at the site have been identified for the Construction Phase or Operational Phase of the Proposed Development.
Air Quality and Climate	Interactions with air quality during the construction and operational phase has the potential to cause issues relating to dust and traffic emissions impacting human health. However, Chapter 10 has concluded that there will be no significant air quality impacts. All ambient air quality legislative limits will be complied with and therefore the predicted impact is not significant with a neutral effect on human health.
Noise and Vibration	Construction activities such as site clearance, building construction works, and trucks and vehicles entering and exiting the site have the potential to interact with the surrounding population and human health and cause noise disturbance. The impact assessment of noise and vibration has concluded that additional noise associated with the construction and Operational Phase will not cause a significant adverse effect.
Landscape and Visual	The Proposed Development will alter the visual appearance of the site which is predominantly a brownfield site. It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the suburban nature of the surrounding landscape, will cause any significant impacts and as such there will be no significant impact on population and human health.
Traffic and Transport	Construction and operational activities will result in an increased number of HGV and car movements. There is a potential impact on

	population and human health in relation to the capacity and operation of the surrounding road network. The overall impact of the Proposed Development on the transportation infrastructure in the local area will not be significant and subsequently there will be no significant impact on population and human health.
Conclusions	
Potential impacts have been outlined in the respective Chapters specified above. Mitigation measures employed at the Proposed Development will ensure that no significant impacts occur.	

Table 18-3: Biodiversity

Biodiversity	
Summary	
Chapter 6 of this EIAR, Biodiversity, details the direct and indirect effects of the Proposed Development on the local flora and fauna; and sets out any required mitigation measures where appropriate.	
Interactions	
Land and Soil	Interactions between land and soils and biodiversity can occur through the spread of any hazardous material/contaminated land which may occur during the construction stage which could result in habitat degradation of habitats within the Proposed Development site and adjacent/downstream designated sites and their associated QIs. Following the implementation measures outlined within the CEMP, impacts to habitats, flora and fauna from soils and land interactions are not predicted to be significant.
Hydrology	Interactions between hydrology and biodiversity including potential changes to habitats, flora and fauna can occur through impacts to water quality either arising from an accidental pollution event or increased sedimentation during the construction stage, or an accidental pollution event during the operational stage. This interaction has the potential to result in significant impacts on hydrologically connected habitats and sensitive fauna that rely on these habitats. However, for reasons outlined in the relevant sections impacts to downstream sensitive habitats and fauna are not predicted to be significant post mitigation.
Air Quality and Climate	Interactions between air quality and flora and fauna in adjacent habitats and designated sites can occur during the construction stage due to dust emissions arising from construction works. This interaction has the potential to result in significant impacts on biodiversity. However, once the dust minimisation measures prescribed in the CEMP are implemented, impacts to flora and fauna are not predicted to be significant.
Noise and Vibrations	Interactions between noise and sensitive fauna, namely birds, bats and badgers can arise from increased noise levels during the construction stage. This interaction has the potential to result in significant impacts and has been assessed when considering disturbance impacts during construction. However, for reasons

	outlined in the relevant Section 6.6 impacts to fauna from noise interactions are not predicted to be significant post mitigation.

Conclusions

Potential significant impacts have been identified for Land and Soils, Hydrology, Air Quality and Climate and Noise and Vibration. Mitigation measures have been outlined in Chapter 7, 8, 9 and 10.

Table 18-4: Land and Soils

Land and Soil	
Summary	
Chapter 7 of this EIAR, *Land and Soil*, details the direct and indirect effects of the Proposed Development on the local land, soils, and geology; and sets out any required mitigation measures where appropriate. There are a number of potential pollutants associated with the construction and operational phases which have the potential to impact on the environment.	
Interactions	
Population and Human Health	There is a potential risk of dust generated from excavation and stockpiling of soil during the Construction Phase of the Proposed Development posing a human health risk in the absence of standard avoidance and mitigation measures which will be implemented to be protective of human health. Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of site workers. While no evidence of karst features was identified during the ground investigation (GII, 2024), the geophysical survey undertaken for the site (Minerex, 2024) indicated the potential presence of karstified rock. In karst-prone areas, alterations in groundwater flow, exacerbated by additional water such as rainfall infiltration, can lead to increased rock erosion and the formation of voids. The design and specification for all buildings will be in accordance with current Building Regulations and therefore avoiding any potential risks associated with karst features.
Biodiversity	An assessment of the potential impacts of the Proposed Development on the Biodiversity of the site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the site are included in Chapter 6 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.
Hydrology and Hydrogeology	An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is included in Chapter 8 of this EIAR. In the absence of avoidance, remedial and mitigation measures, piling during the construction phase of the

	Proposed Development, may potentially create pathways for potential sources of contamination in shallow soils to enter underlying groundwater. Procedures for the protection of receiving water environment are set out in Chapter 8 of this EIAR.
Air Quality and Climate	The excavation of soils across the Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the Construction Phase of the Proposed Development. An assessment of the potential impact of the Proposed Development on air quality and climate is included in Chapter 10 of this EIAR.
Landscape and Visual	During the construction phase and into the operational phase of the Proposed Development, the site landscape will undergo a change from undeveloped lands to commercial / industrial with associated landscaping. An assessment of the potential impact of the Proposed Development on the receiving landscape is included in in Chapter 12 of this EIAR.
Material Assets: Waste and Traffic and Transport	Where possible, it is intended to retain and re-use the excavated soil and subsoil on the site for engineering fill and landscaping. However, it is anticipated that surplus material will require removal offsite. There is also a requirement to import aggregates during the construction phase of the Proposed Development. An assessment of the potential impact of the Proposed Development on the Material Assets (Traffic and Transportation) and Material Assets (Waste) are included in Chapter 13 and Chapter 14 of this EIAR respectively.
Conclusions	
Potential impacts have been outlined in the respective chapters specified above. The mitigation measures outlined in the CEMP and the respective chapters outlined above, will ensure that there will be no significant adverse impacts on the receiving land, soil and geology associated with the construction phase and the operational phase of the Proposed Development.	

Table 18-5: Hydrology and Hydrogeology

Hydrology and Hydrogeology	
Summary	
Chapter 8 of this EIAR, *Hydrology and Hydrogeology*, provides an assessment of the potential impacts of the Proposed Development on hydrology, water and hydrogeology and sets out any required mitigation measures where appropriate. Consideration is given to habitats and species protected by national and international legislation or considered to be of particular conservation importance.	
Interactions	
Population and Human Health	Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of site workers. The Proposed Development will increase the amount of people in close proximity to flood-prone areas. This increased population density could heighten the potential for flood-related health impacts, particularly during construction. Residual risk will be mitigated by monitoring weather forecasts to optimize construction planning.
Biodiversity	An assessment of the potential impacts of the Proposed Development on the Biodiversity of the site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the site are included in Chapter 6 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.
Lands, Soil and Geology	During the construction earthworks, heavy rainfall events have the potential to mobilise contaminated run-off and impact on the usability of materials stored onsite. This could therefore require the importation of additional material from external sources. Mitigation measures to reduce the risk of damage of construction materials from heavy rainfall and flood events is outlined in Chapter 8 above.
Material Assets - Utilities	There is a risk of excess silts from construction runoff accumulating in the existing drainage network, potentially compromising its capacity. To mitigate this, standard pollution control measures will

	be employed to manage contaminated runoff and preserve the integrity of drainage channels during construction.

Conclusions

The protective/avoidance/mitigation measurements that will be applied as set out in the CEMP, will ensure that the Proposed Development will not give rise to any likely significant impacts.

Table 18-6: Noise and Vibration

Noise and Vibration	
Summary	
Chapter 9 of this EIAR, *Noise and Vibration*, provides a description and assessment of the likely impact of the proposed activities from noise, and sets out appropriate mitigation measures where necessary. Noise-generating activities during the Construction Phase are expected not to have adverse implications for biodiversity. Noise associated with the operation of on-site machinery will not create any major negative impacts beyond the site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation from the Proposed Development.	
Interactions	
Population and Human Health	The most significant interaction is between human beings (future residents) and predicted noise levels at the Proposed Development. The mitigation measures that will be put in place at the Proposed Development will ensure that the future residents will experience noise levels that are in accordance with recommended guidelines in terms of internal living space and external amenity space noise levels.
Conclusions	
Noise associated with the operational plant or machinery will not create any significant adverse impacts beyond the site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation from the Proposed Development.	

Table 18-7: Air Quality and Climate

Air Quality and Climate	
Summary	
Chapter 10 of this EIAR, *Air Quality and Climate*, provides an assessment of the potential impacts of the Proposed Development on ambient air quality and climate, and sets out appropriate mitigation measures where necessary.	
Interactions	
Population and Human Health	An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the Proposed Development will ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings.
Traffic and Transport	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 considered to be imperceptible. Additional traffic as a result of the Proposed Development is predicted to cause an increase in NOx concentrations within Lough Corrib SAC. However, this increase is below the assessment criteria stipulated in the TII and DMRB guidance and therefore is not considered significant.
Conclusions	
Mitigation measures employed at the Proposed Development will ensure that no significant impacts occur.	

Table 18-8: Wind and Microclimate

Wind and Microclimate	
Summary	
Chapter 11 of this EIAR, *Wind and Microclimate*, provides a description and assessment of the likely impact of the proposed activities from wind, and sets out appropriate mitigation measures where necessary. Mitigation and monitoring measures will be incorporated to further reduce the potential for wind generation from the Proposed Development.	
Interactions	
Population and Human Health	The wind microclimate analysed in this chapter has considered the location of the building entrances, balcony spaces, courtyard spaces, public open spaces, creche play areas and the boardwalk area. These areas will be utilised by the future residents and therefore an interaction between microclimate and population and human health has been identified. No exceedance of the criterion for sensitive pedestrian safety has been identified and therefore there will be no significant effects associated with the interaction between microclimate and human health.
The Landscape	The wind and microclimate assessment has also considered the landscape design when determining the potential effects of the Proposed Development. No significant effects associated with the interaction between microclimate and Landscape have been identified.
Conclusions	
There is no exceedance of criteria for wind and microclimate in the Proposed Development. Mitigation and monitoring measures will be incorporated to further reduce the potential for wind generation from the Proposed Development.	

Table 18-9: Landscape and Visual

Landscape and Visual	
Summary	
Chapter 12 of the EIAR, The *Landscape*, provides a description and assessment of the likely impact of the Proposed Development on the landscape and visual amenities of the area.	
Interactions	
Population and Human Health	It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the suburban village and residential nature of the surrounding landscape, will cause any issues for the residential local population.
Biodiversity	The proposed landscaping of the site interacts with its biodiversity and ecology through the changes that will occur to the existing habitats and flora at the site. The landscaping proposals will entail losses and contributions in terms of vegetation at the site, which in turn will affect the ecology of the site. The site in its current condition is not of high ecological value, and the proposed landscaping will not result in significant adverse effects in this regard.
Land and Soil	As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.
Conclusions	
No significant effect interactions identified for Landscape and Visual aspects of the surrounding environment are expected from the Proposed Development.	

Table 18-10: Transport and Traffic

Material Assets – Traffic and Transport	
Summary	
Chapter 13 of the EIAR, *Material Assets*, provides an assessment of the potential impacts of the Proposed Development on Material Assets including traffic, built services and infrastructure.	
Interactions	
Land and Soil	Traffic also interacts with Land and Soils as estimated construction excavation volumes have informed the construction traffic volume estimations.
Air Quality and Climate	There can be a significant interaction between air quality and traffic. This is due to traffic-related pollutants that may arise. In the current assessment, traffic derived pollutants which may affect Air Quality and Climate have been deemed as negligible. Therefore, the impact of the interaction between air quality and traffic is insignificant.
Noise and Vibration	Predicted traffic volumes for the surrounding road network have been provided for the Noise and Vibration Chapters. Traffic has the potential to increase noise impacts on nearby sensitive receptors. The Proposed Development will have no significant impact on overall traffic volumes and therefore traffic will not result in any significant increases of noise at sensitive receptors
Conclusions	
With the implementation of all mitigation measures detailed in the respective Chapters, there will be no negative residual impacts upon theTraffic and Transport.	

Table 18-11: Material Assets- Waste Management

Material Assets - Waste Management	
Summary	
Chapter 14 of the EIAR, *Material Assets*, provides an assessment of the potential impacts of the Proposed Development on Material Assets including built services and infrastructure.	
Interactions	
Population and Human Health	The improper removal, handling and storage of hazardous waste could negatively impact on the health of construction workers. Potential impacts on population and human health are addressed in Chapter 5.
Biodiversity	The improper handling and storage of waste during the construction and operational phases could negatively impact on biodiversity. Potential impacts on biodiversity are addressed in Chapter 6 (Biodiversity).
Land and Soil	Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the site. Potential impacts on land and soils are addressed in Chapter 7.
Material Assets: Traffic and Transportation	Waste collection activities at the Proposed Development have the potential to impact upon traffic movements in the Galway City area. Potential impacts on traffic are addressed in Chapter 13.
Conclusions	
With the implementation of all mitigation measures detailed in the respective Chapters, there will be no negative residual impacts upon the Material Assets: Waste Management.	

Table 18-12: Material Assets- Utilities

Material Assets - Waste Management	
Summary	
Chapter 15 of the EIAR, *Material Assets*, provides an assessment of the potential impacts of the Proposed Development on Material Assets including built services and infrastructure.	
Interactions	
Population and Human Health	The material assets on the site provide services which are used by the general population, during construction, there may be requirements to turn off services to facilitate connections. The general population must be aware of these breaks in services, and they must be timed to minimise effects on the local population. A flood risk assessment has been completed for the proposed development and to minimise effects of flooding associated with site operation, the finished floor level for the new buildings within the development is 7.28m OD Malin. The design for the development also incorporates mitigation measure as set out in the relevant reports to prevent flood water entering the main building. In the absence of mitigation, extended power or telecommunications outages for existing properties in the area could negatively impact on the surrounding human population and their overall health. Elsewhere in this report it has concluded that no long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.
Biodiversity	Neither ground water or surface water runoff from the working areas will be permitted to discharge directly to the Corrib River or Terryland River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. To minimise the potential for this type of effect, the monitoring parameters have been identified within Chapter 8 mitigation and have been carried through into the CMP.
Conclusions	
With the implementation of all mitigation measures detailed in the respective Chapters, there will be no negative residual impacts upon the Material Assets: Utilities.	

Table 18-13: Cultural Heritage

Archaeology and Cultural Heritage	
Summary	
Chapter 16 of the EIAR, *Cultural Heritage,* provides information on the known architectural, archaeological, and cultural heritage sites in the study area.	
Interactions	
N/A	No interactions have been identified.
Conclusions	
No interactions have been identified.	

19 MITIGATION AND MONITORING MEASURES

19.1 Introduction

This EIAR has assessed the impacts and resulting effects likely to occur as a result of the Proposed Development on the various aspects of the receiving environment.

The Proposed Development will be operated in a manner that will ensure that the potential impacts on the receiving environment are avoided where possible. In cases where impacts or potential impacts have been identified, mitigation measures have been proposed to reduce the significance of particular impacts. These mitigation recommendations are contained within each chapter exploring specific environmental aspects.

This chapter of the EIAR collates and summarises the mitigation commitments made in Chapter 5 to Chapter 16.

19.2 Summary of Mitigation Measures

19.2.1 Population and Human Health

19.2.1.1 Construction Phase

19.2.1.1.1 Mitigation

No specific mitigation measures are required during the construction phase of the Proposed Development in relation to population and human health, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air quality, noise, traffic, waste etc. are identified in their respective chapters in this EIAR.

19.2.1.1.2 Monitoring

No specific monitoring measures are proposed or required in relation to Population and Human Health for the construction phase of the Proposed Development.

Monitoring activities will be implemented for the for the construction phase in accordance with the Construction and Environmental Management Plan (CEMP) submitted as part of this planning application.

19.2.1.2 Operational Phase

19.2.1.2.1 Mitigation

The Proposed Development has been designed to avoid negative impacts on population and human health through;

- The inclusion of a childcare facility within the proposed development;
- Landscaping to mitigate against issues arising from microclimate conditions;
- The inclusion of a comprehensive foul and surface water management system;

- Energy efficiency measures; and,
- High quality finishes and materials.

No specific mitigation measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air emissions, noise, traffic etc. are identified in their respective chapters in this EIA Report.

19.2.1.2.2 Monitoring

No specific monitoring measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, monitoring in relation to air emissions, water, noise and traffic are identified in their respective Chapters in this EIAR.

19.2.2 Biodiversity

19.2.2.1 Construction Phase

19.2.2.1.1 Mitigation

A suitably experienced and qualified ecologist (Ecological Clerk of Works (ECoW) will be employed by the appointed contractor to advise on ecological matters during construction, communicate all findings in a timely manner to statutory authorities, acquire any licences or consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Development.

19.2.2.1.1.1 Designated Sites

19.2.2.1.1.1.1 European sites

Mitigation measures intended to avoid or reduce any harmful effects of the Proposed Development on European sites are outlined in the NIS (Scott Cawley Ltd., 2025b). Following a consideration and assessment of the Proposed Development on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction;
- Measures to protect groundwater impacts during construction;
- Measures to prevent disturbance and displacement of QI species from European sites and *ex-situ* sites; and
- Measures to prevent habitat degradation as a result of changes to air quality.

The mitigation measures within the NIS are presented in the CEMP within Volume 3 of this EIAR.

19.2.2.1.1.1.2 National sites

The mitigation measures in relation to potential impacts arising from the Proposed Development on pNHAs within the ZoI are as per those for European sites as the boundaries coincide with the SACs and SPAs. Therefore, the mitigation measures outlined above in Section 6.6.1.1.1, and as detailed in the NIS (Scott Cawley Ltd., 2025b), will prevent the Proposed Development resulting in a significant effect on these pNHAs at the national geographic scale.

It should be noted that the full suite of mitigation measures proposed are set out in full in the CEMP.

19.2.2.1.1.2 Habitats

19.2.2.1.1.2.1 Retention and Protection of Vegetation during Construction

Any vegetation (including trees, hedgerows or scrub adjacent to, or within, the Proposed Development boundary) which is to be retained shall be afforded adequate protection during the construction phase in accordance with the "*Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes* "(TII, 2006b), as follows:

- All trees along the Proposed Development boundary that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area

of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist.

- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it.
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines.
- A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Development boundary but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist.
- A buffer zone of at least 5m will be maintained between construction works and retained hedgerows to ensure that the root protection areas are not damaged.

19.2.2.1.1.2.2 Preventing spread of non-native invasive plant species

While there were no non-native invasive species recorded in the Proposed Development site, there is potential for species to spread to the site during the interim between the original surveys and commencement of construction following grant of planning permission (if received). A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence, and/or extent of any Third Schedule non-native invasive species that may have become established in the interim within the Proposed Development site. If the presence of any of these species is confirmed within the Proposed Development site, the implementation of an Invasive Species Management Plan prepared by a suitably qualified professional in line with TII guidelines (2020b) will be required.

19.2.2.1.1.2.3 Habitat Degradation – Surface Water Quality and Groundwater Quality

During the Construction Phase, all works will be undertaken in accordance with the Construction Environmental Management Plan (CEMP) (AECOM, 2025c). Following appointment, the contractor will be required to further develop the CEMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. Mitigation works will be adopted as part of the construction works for the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of surface water runoff;
- Control and management of shallow groundwater during excavation and dewatering;

- Management and control of soil and materials;
- Appropriate fuel and chemical handling, transport and storage; and,
- Management of accidental release of contaminants at the site.

Surface water runoff management will be required to prevent runoff entering excavations during construction. Surface water will require diversion around the open excavations using standard temporary drainage methods to ensure that surface water is effectively conveyed around works areas.

The dewatering methodology to be implemented by the appointed Contractor will ensure that any dewatering is confined to the localised zone and does not extend towards the site boundaries.

There will be no authorised discharge of water to ground during the construction phase. Where water must be pumped from the excavations, water will be discharged by the contractor, following appropriate treatment (e.g., settlement or hydrocarbon interceptor) to sewer in accordance with the necessary discharge licences issued by UÉ under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from FCC under Section 4 of the Local Government (Water Pollution) Act 1977, ~~as amended in 1990~~ for discharges to surface water. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite. Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers.

Where required, standard design and construction measures (i.e., groundwater drainage around impermeable subsurface structures) will ensure that groundwater flow across the site is maintained and that there will be no impact on groundwater levels.

During the construction phase, fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP in a designated area of the Site away from any watercourses and drains (where not possible to carry out such activities onsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines ‘Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities’ (EPA, 2013). The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing.

Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Proposed Development Site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site. There may also be the requirement for use of portable generators or similar fuel containing equipment during the construction phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times.

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures in the event of accidental fuel

spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements. The emergency procedures shall be cognisant of the following:

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

Pumping of concrete will be monitored to ensure that there is no accidental discharge. All work will be carried out in the dry and effectively isolated from any onsite drains. A suitable risk assessment for wet concreting will be completed prior to works being carried out. There will be no mixer washings or excess concrete discharged onsite. All excess concrete is to be removed from site and all washout of concrete chutes to be captured in a tank which shall be removed offsite for disposal at an authorised waste facility.

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2025), it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology will give cognisance to the Environment Agency's (EA) guidance on '*Piling into Contaminated Sites'* (EA, 2002) and '*Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention'* (EA, 2001), in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

All below ground drainage infrastructure will be constructed in accordance with current UE requirements to ensure that there are no potential impacts to groundwater quality. Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will either be discharged to temporary holding tank(s), the contents of which will periodically be tankered offsite to a licensed facility, or discharged to public sewer in accordance with the necessary temporary discharge licences issued by UÉ. The Galway WWTP is operated in accordance with relevant

statutory approvals issued by UÉ. The increased discharge to the Galway WWTP as a result of the Proposed Development is considered to be insignificant in terms of the overall scale of the facility. The increased load does not have the capacity to alter the effluent released from the WWTP to such an extent as to result in likely significant effects on its receiving waters.

19.2.2.1.1.2.4 Habitat Degradation – Air Quality

Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest sensitive ecological receptors will be controlled to ensure impacts are of negligible significance.

Using the IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the ecological impacts are low risk for earthworks and are high risk for construction and trackout.

In accordance with the IAQM Guidance, the highest risk category should be applied when determining proposed mitigation measures. Therefore, the mitigation measures applicable to a High-Risk site will be applied:

<u>General Measures</u>

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.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which shall include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 logbook.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, 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.

Preparing and maintaining the site

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

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles will be permitted;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; and,
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

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

Waste Management

- Avoid bonfires and burning of waste materials;

The IAQM Guidance Mitigation Measures applicable to the specific works undertaken are as follows:

Measures specific to earthworks

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

Measures specific to construction

- 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; and,
- For smaller supplies of fine power 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 logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from dust sensitive receptors.

19.2.2.1.1.3 Otter

Otter are listed on Annex II and Annex IV of the Habitats Directive and are strictly protected under the Birds and Habitats Regulations. Otter, and their breeding and resting places, are also protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure an otter or to wilfully interfere with or destroy their breeding or resting places (holts / couches).

19.2.2.1.1.3.1 Disturbance/Displacement

Security lighting in active works areas in close proximity to watercourses with known otter activity will be designed in conjunction with a suitably qualified ecologist to minimise light spill. Similarly, where any new or amended lighting design is required at a watercourse crossing, it should be cognisant of downward light-spill onto watercourses. Measures to reduce light spill may include the following:

- The use of sensor/timer triggered lighting;
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- Column heights should be considered to minimise light spill; and
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.

19.2.2.1.1.3.2 Habitat Degradation – Surface Water Quality

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

19.2.2.1.1.4 Badger and Other Protected Mammals

As the usage of the Proposed Development site by badgers and other protected mammals can change over time, a confirmatory pre-construction check of the Proposed Development site for potential new burrow entrances, resting places and signs will be carried out within 10-12 months before commencement of construction immediately prior to construction works commencing to confirm their usage by badger or other potential protected mammals.

Although unlikely, any new badger setts (or resting places) identified will be afforded protection in line with the requirements set out in the Transport Infrastructure Ireland (2005) guidance document as follows:

- Badger setts if encountered will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage.
- In the season June to November, no heavy machinery will be used within 30m of badger setts; lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.

- During the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts, nor blasting or pile driving within 150m of active setts.
- Where works need to be undertaken within these zones, or where works directly affect newly identified badger setts, consultation with an ecologist with relevant badger management experience is required, and could include advanced badger mitigation measures such camera trapping to confirm sett status and sett closure / destruction, which must be undertaken outside the breeding season as per specialist advice, and will all be conducted under the supervision of an ecologist with experience in badger mitigation.
- Any potential new constraints (other protected mammals) identified will also be afforded protection in line with the requirements set out in the TII guidance documents and mitigated in line with the advice and supervision of an experienced ecologist as needed.

19.2.2.1.1.4.1.1 Protection of Badgers from Accidental Harm during Construction (Excavations)

Uncovered deep excavations could be potentially hazardous for badgers commuting and foraging in the area. Badgers could fall into these excavations, becoming trapped and potentially hurt and distressed.

To protect foraging badgers from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, or fenced off where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow badgers to safely exit should they fall in.

19.2.2.1.1.5 Bats

19.2.2.1.1.5.1 Lighting Plan

Lighting proposals for the construction phase will adhere to the advice provided in Bats and Lighting – Guidance for Planners, Engineers, Architects and Developers (Bat Conservation Ireland 2010), Guidance Note GN08/23 Bats and Artificial Lighting At Night (Institution of Lighting Professionals & Bat Conservation Trust, 2023) and Guidance Note GN01/21 The Reduction of Obtrusive Light (Institute of Lighting Professionals, 2021). Construction stage lighting details will be reviewed by a qualified bat ecologist. If necessary, the bat ecologist will recommend adjustments to directional lighting (e.g. through cowls, shields or louvres) to restrict light spill in sensitive areas.

19.2.2.1.1.6 Breeding Birds

Where feasible, vegetation (e.g. hedgerows, trees, scrub and grassland) will not be removed, between the 1st of March and the 31st of August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required. Should nesting birds be encountered during surveys, the removal of vegetation will be required to be delayed until after the nesting has finished.

19.2.2.1.1.7 Wintering Birds

19.2.2.1.1.7.1 Habitat degradation – Surface Water Quality

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

19.2.2.1.1.8 Aquatic Species

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

19.2.2.1.1.9 Marine Mammals

In terms of mitigation, the mitigation measures in Section 6.6.1.2.3 detail the controls and management measures for avoiding, preventing, or reducing any significant negative effects on the surface water environment during the Construction Phase of the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 8 (Water).

19.2.2.1.2 Monitoring

A suitably experienced and qualified Ecological Clerk of Works (ECoW) will be retained by the appointed contractor. The ECoW will advise the appointed contractor on ecological matters during construction, give toolbox talks, undertake pre-construction surveys as necessary, communicate all findings in a timely manner to the appointed contractor and statutory authorities, acquire any licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Development.

Pre-construction surveys for habitats, badger, bats and breeding birds will be carried out as described in the respective sections.

19.2.2.2 Operational Phase

19.2.2.2.1 Mitigation

19.2.2.2.1.1 Designated Sites

19.2.2.2.1.1.1 European sites

As discussed in the NIS (Scott Cawley Ltd., 2025b) Operational Phase impacts on European sites are not predicted to adversely affect the integrity of any European site, and therefore mitigation measures are not required.

19.2.2.2.1.1.2 National Sites

Operational Phase impacts on national sites are not predicted to adversely affect the integrity of any national site, and therefore mitigation measures are not required.

19.2.2.2.1.2 Habitats

There are no operational phase impacts on habitats, and therefore mitigation measures are not required.

19.2.2.2.1.3 Badger

Operational impacts on badger are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.4 Otter

Operational impacts on otter are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.5 Other Small Mammals

Operational impacts on small mammals are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.6 Bats

Operational impacts on bats are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.7 Breeding Birds

Operational impacts on breeding birds are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.8 Wintering Birds

Operational impacts on wintering birds are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.9 Fish

Operational impacts on fish are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.10 Freshwater Pearl Mussel

Operational impacts on freshwater pearl mussel are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.1.11 Marine Mammals

Operational impacts on marine mammals are not considered to be significant at any geographic scale, and therefore mitigation measures are not required.

19.2.2.2.2 Monitoring

A landscape monitoring plan will be undertaken post implementation to ensure establishment of planting and success of habitat management.

While the success of the proposed bat enhancement will not be measured by occupancy of roosts by bats, it is considered to be best practice and appropriate to implement a monitoring plan to gather information and assess whether the bat population has responded favourably to mitigation measures. A three-year post-installation monitoring programme will be undertaken. The bat boxes will be checked for presence of bats or signs of bats on a biennial

basis between August and September in years 1, 3 and 5 post-installations by an appropriately licensed and qualified ecologist. The results of the monitoring surveys will be recorded and shared with the local authority and the NPWS.

19.2.3 Land and Soils

19.2.3.1 Construction Phase

19.2.3.1.1 Mitigation

During the Construction Phase, all works will be undertaken in accordance with the Construction Environmental Management Plan (CEMP) (AECOM, 2025). Following appointment, the contractor will be required to further develop the CEMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development.

Import of Aggregates and Materials

Contract and procurement procedures will ensure that all imported aggregates and materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates and materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

Airborne Dust

Excavated soils will be carefully managed and maintained in order to minimise potential impact on soil quality and soil structure. Handling of soils will be undertaken in accordance with documented procedures that will be set out in order to protect ground and minimise airborne dust. As outlined in the CEMP (AECOM, 2025), the measures required to prevent airborne dust emissions and associated nuisance arising from site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the site. Potential impacts and avoidance and mitigation measures associated with generation of dust are addressed in Chapter 10 of this EIAR.

Reuse of Soil

Soil and subsoil materials to be reused within the Proposed Development (i.e., for landscaping on site) will be subject to assessment of the suitability of the soil for use in accordance with engineering and environmental specification for the Proposed Development.

As documented in the CEMP (AECOM, 2025), the appointed contractor will, as part of their RWMP, prepare a project-specific Excavated Material Management Plan, which will detail the following as a minimum:

- Detail in-situ (prior to excavation) and ex-situ (post excavation) methodologies to classify waste soil for appropriate disposal, in accordance with relevant Irish and EU legislation and guidance.
- Identify reuse requirements and soils suitable for reuse on site in consultation with the design team, including assessment methodology to determine which soils are suitable for re-use onsite.
- Site management procedures, including waste minimisation, stockpile management, temporary storage procedures, waste license requirements, and Waste Management documentation, including waste generation record keeping, waste transfer notes, confirmation of appropriate disposal and details of any rejected consignments.

The RWMP (AECOM, 2025) will detail relevant procedures including further environmental sampling, testing and assessment requirements, sampling protocols and sample density targets to supplement any existing soil data.

Where any hotspots of potential contamination are encountered, and prior to disposal, further assessment will be undertaken by a suitably qualified environmental scientist to determine the nature and extent of remediation required.

Where the appointed contractor proposes to reuse excavated soil within the works (e.g., as backfill), and where reuse is permitted in accordance with the relevant legislation, the appointed contractor will set out their proposal for its management, documentation and reuse. This will include:

- Define the criteria by which the suitability of the soils for reuse will be assessed (e.g., analytical parameters and limits), the engineering requirements such as geotechnical parameters for the material to be used within the works.
- Delineation of areas where excavated soil is intended for disposal off-site as waste, and where it is intended for reuse on site.
- Identification and recording of the location from where the soil will be excavated and its proposed reuse location and function.
- Engineering assessment to confirm its suitability for reuse.

Management and Control of Soils and Stockpiles

Segregation and storage of soils for re-use on-site or removal off-site and waste for disposal off-site will be segregated and temporarily stored on-site pending removal or for reuse on-site.

Where possible, stockpiling of soils and subsoils onsite will be avoided. However, in the event that stockpiling is required, stockpiled materials, pending reuse on-site, will be located away from the location of any sensitive receptors (watercourses and drains). In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 30m of the open water where sufficient working areas are available within the site boundary.

The re-use of suitable cut material on-site for the Proposed Development (i.e., landscaping, raising levels or engineering fill) will be undertaken in accordance with the engineered design of the Proposed Development. Surplus or unsuitable soils will be removed offsite.

Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite. For any excavated material identified for removal offsite, while assessment

and approval of acceptance at a destination re-use, recovery site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area shall be identified and designated.
- Stockpiles will not be positioned adjacent to ditches, watercourses or existing or future excavations. Stockpiles will be a minimum of 30m from existing drains.
- All stockpiles shall be assigned a stockpile number.
- Material identified for reuse on site, off site and waste materials will be individually segregated and all segregation, storage and stockpiling locations will be clearly delineated on the Site drawings.
- Soil stockpiles will be covered to prevent run-off from the stockpiled material generation and/or the generation of dust.
- Material identified for reuse on site, off site and waste materials will be individually segregated. When a stockpile has been sampled for classification purposes, it shall be considered to be complete, and no more soil shall be added to that stockpile prior to disposal.
- Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross-contamination of the soil below or cross contamination with soil.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.

An excavation/ stockpile register will be maintained on site showing at least the following information:

- Stockpile number.
- Origin (i.e., location and depth of excavation).
- Approximate volume of stockpile.
- Date of creation.
- Description and Classification of material.
- Date sampled.
- Date removed from site.
- Disposal/recovery destination.
- Photograph.

Export of Resource (Soil ad Subsoil) and Waste

All surplus materials and any waste will be removed off-site in accordance with the requirements outlined in the CEMP (AECOM, 2025) and will be managed in accordance with all legal obligations. It will be the contractor's responsibility to either; obtain a waste collection permit or, to engage specialist waste service contractors who will possess the requisite authorisations, for the collection and movement of waste off-site.

As documented in the CEMP (AECOM, 2025), where appropriate, excavated soil and material intended for recovery or disposal offsite will require appropriate waste classification in order to select an appropriate receiving facility for the waste. Assessment of the excavated material will be carried out with due regard to the following guidance and legislation:

- EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002).
- Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substances and mixtures (CLP).
- Environmental Protection Agency document entitled Waste Classification; List of waste and determining if waste is Hazardous or Non-Hazardous.
- Environmental Protection Agency documented entitled Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities.
- UK Environment Agency Technical Guidance WM3: Waste Classification – Guidance on the classification and assessment of waste.
- Any other guidance or legislation that might be applicable or relevant at the time of disposal.

The re-use of soil and subsoil offsite will be undertaken in accordance with all statutory requirements and obligations including where appropriate re-use as by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011) as amended.

Any surplus material not suitable for re-use as a by-product and other waste materials arising from the Construction Phase will be removed offsite by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility sites will have been adequately assessed and mitigated

Any waste soils will be transported under a valid waste collection permit issued under the Waste Management (Collection Permit) Regulations 2007, as amended and will be delivered to an appropriately authorised waste management facility.

Materials and waste will be documented prior to leaving the site. All information will be entered into a waste management register kept on the Site.

Vehicles transporting material with potential for dust emissions to an off-site location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust.

Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles. Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.

Concrete Works

The cementitious grout and other concrete works during the Construction Phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the main contractor and in accordance with the CEMP and relevant industry standards.

Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.

All ready-mixed concrete will be delivered to the site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal off-site in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

Piling

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), it is recommended that a piling risk assessment is completed by the main contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology will give cognisance to the Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (AECOM, 2025), in a designated area of the site away from any watercourses and drains (where not possible to carry out such activities offsite).

Any diesel, fuel or hydraulic oils stored on-site will be stored in designated areas (AECOM, 2025). These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site.

There may also be the requirement for use of portable generators or similar fuel containing equipment during the construction phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times

The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan.

Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the site will also be equipped with its own spill kit.

Emergency Procedures

Emergency procedures will be developed by the main contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development.

Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE.

19.2.3.1.2 Monitoring

During the construction phase the following monitoring measures will be considered:

- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
- Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.
- As documented in the CEMP (AECOM, 2025), the appointed contractor in consultation with the Project Ecological Clerk of Works (ECoW), will provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the Construction Phase of the Proposed Development. The frequency of monitoring and the monitoring parameters (e.g., dust, noise limits) will be in line with best practice and guidance and will be agreed with GCC prior to commencement of the works.
- The appointed contractor will employ a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) to undertake co-ordination for monitoring of the works' impacts and implementation of the contractor's proposal, in respect of all environmental requirements (AECOM, 2025). The CEMPC will be present onsite for the duration of the Construction Phase of the Proposed Development. The CEMPC will prepare, implement, manage, review and revise the CEMP with the sole purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils on-site and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the site; and
    - Ensure records are maintained of material acceptance at the end destination.

19.2.3.2 Operational Phase

19.2.3.2.1 Mitigation

There is no requirement for mitigation measures for the operational phase taking account of the design measures for the Proposed Development.

19.2.3.2.2 Monitoring

There are no monitoring requirements specifically in relation to land, soil and geology during the operational phase of the Proposed Development.

19.2.4 Hydrology

19.2.4.1 Construction Phase

19.2.4.1.1 Mitigation

During the Construction Phase, all works will be undertaken in accordance with the Construction Environmental Management Plan (CEMP) (AECOM, 2025). Following appointment, the contractor will be required to further develop the CEMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground and surface water with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. Mitigation works will be adopted as part of the construction works for the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of surface water runoff.
- Control and management of shallow groundwater during excavation and dewatering.
- Management and control of soil and materials.
- Appropriate fuel and chemical handling, transport and storage.
- Management of accidental release of contaminants at the site.
- Control and handling of cementitious materials.

Surface water runoff management will be required to prevent runoff entering excavations during construction. Surface water will require diversion around the open excavations using standard temporary drainage methods to ensure that surface water is effectively conveyed around works areas.

As documented in the CEMP (AECOM, 2025), the following best practice construction measures will be followed to ensure that there are no significant effects on the Terryland Stream as a result of the in-stream construction works related to the outfall pipes:

- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and the water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Terryland Stream.
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Terryland Stream will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st to September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Terryland Stream at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the coffer-dammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.

- The bankside will be excavated, and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.

Sondes will be put in place in the Terryland Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.

The dewatering methodology to be implemented by the appointed Contractor will ensure that any dewatering is confined to the localised zone and does not extend towards the site boundaries.

There will be no authorised discharge of water to ground during the construction phase. Where water must be pumped from the excavations, water will be discharged by the contractor, following appropriate treatment (e.g., settlement or hydrocarbon interceptor) to sewer in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from FCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite. Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers.

Where required, standard design and construction measures (i.e., groundwater drainage around impermeable subsurface structures) will ensure that groundwater flow across the site is maintained and that there will be no impact on groundwater levels.

During the construction phase, fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP in a designated area of the Site away from any watercourses and drains (where not possible to carry out such activities onsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines ‘Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities’ (EPA, 2013). The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing.

Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Proposed Development Site. Only emergency breakdown maintenance will be carried out on-site. Drip trays and spill kits will be available on-site to ensure that any spills from vehicles are contained and removed off-site.

There may also be the requirement for use of portable generators or similar fuel containing equipment during the construction phase of the Proposed Development, which will be placed on suitable drip trays. Regular monitoring of drip tray content will be undertaken to ensure sufficient capacity is maintained at all times.

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Proposed Development Site and compliantly disposed of off-site. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures in the event of accidental fuel spillages.
- All construction works staff on-site will be fully trained on the use of equipment.

Pumping of concrete will be monitored to ensure that there is no accidental discharge. All work will be carried out in the dry and effectively isolated from any onsite drains. A suitable risk assessment for wet concreting will be completed prior to works being carried out. There will be no mixer washings or excess concrete discharged onsite. All excess concrete is to be removed from site and all washout of concrete chutes to be captured in a concrete washout container lined with an impermeable membrane which shall be removed offsite for disposal at an authorised waste facility. The container should be of good condition, should not overflow or leak and should be easily accessible to vehicles clearly marked and must be located away from storm drain inlets, open drainage facilities, water courses & ditches.

The containers must be checked and emptied at a frequency equivalent to the volume of concrete being used and no runoff should leave the washout location.

Given the vulnerability of the underlying groundwater at the site, the shallow groundwater table, the potential presence of karst landforms and the detectable concentrations of hydrocarbons in shallow soils (GII, 2024), it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology, will give cognisance to the Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), (or similar best practice) in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or

additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

All below ground drainage infrastructure will be constructed in accordance with current UE requirements to ensure that there are no potential impacts to groundwater quality.

The Contractor will provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in the River Corrib and Corrib Estuary. The Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the waterbodies during flood events

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will either be discharged to temporary holding tank(s), the contents of which will periodically be tankered off site to a licensed facility or discharged to public sewer in accordance with the necessary temporary discharge licences issued by UE. The Galway WWTP is operated in accordance with relevant statutory approvals issued by UE. The increase discharge to the Galway WWTP as a result of the Proposed Development is considered to be insignificant in terms of the overall scale of the facility. The increased load does not have the capacity to alter the effluent released from the WWTP to such an extent as to result in likely significant effects on its receiving waters. Therefore, there will be no potential impact at any Natura 2000 sites associated with discharges from the site.

19.2.4.1.2 Monitoring

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Inspections will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR and the CEMP (AECOM, 2025) are fully implemented and effective.
- As documented in the CEMP (AECOM, 2025), the appointed contractor in consultation with the Project Ecological Clerk of Works (ECoW), will provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the Construction Phase of the Proposed Development. The frequency of monitoring and the monitoring parameters (e.g., dust, noise limits) will be in line with best practice and guidance and will be agreed with GCC prior to commencement of the works.
- The appointed contractor will employ a suitably experienced and qualified Construction Environmental Management Plan Co-ordinator (CEMPC) to undertake co-ordination for monitoring of the works' impacts and implementation of the contractor's proposal, in respect of all environmental requirements (AECOM, 2025). The CEMPC will be present onsite for the duration of the Construction Phase of the Proposed Development. The CEMPC will prepare, implement, manage, review and revise the CEMP with the sole purpose of ensuring that the environment is safeguarded at all times from anticipated or unexpected adverse impacts during construction.

- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils on-site and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the site; and
    - Ensure records are maintained of material acceptance at the end destination

19.2.4.2 Operational Phase

19.2.4.2.1 Mitigation

Based on the design of the Proposed Development there is limited potential sources of contamination during the operational phase. Furthermore, the proposed attenuation design does not allow for infiltration to ground. Surface water will be managed in accordance with the principles and objectives of SuDS and the GDSDS to treat and attenuate water prior to discharging offsite. Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the operational phase of the Proposed Development.

Foul water during the operational phase of the Proposed Development will ultimately discharge via the Galway WWTP to Galway Bay under the appropriate consents from UE. As mentioned above, the Galway WWTP, which is operated in accordance with relevant statutory approvals issued by UE. Foul water from the site will only be discharged to the UE network under the appropriate consents from UE, and therefore, the proposed development will not cause a potential impact at any Natura 2000 sites associated with discharges from the site.

19.2.4.2.2 Monitoring

There are no monitoring requirements specifically in relation to land, soil and geology during the operational phase of the Proposed Development.

19.2.5 Noise and Vibrations

19.2.5.1 Construction Phase

19.2.5.1.1 Mitigation

To avoid significant construction noise impacts during the construction phase, the following mitigation measures will be adopted.

- To protect residential amenity, construction hours during site construction operations will be restricted to daytime hours as outlined;
    - 0700 hours – 1900 hours - Monday – Friday
    - 0800 hours – 1300 hours - Saturdays
- An on-site speed limit will be enforced for all traffic.
- The use of quiet working methods will be selected, and the most suitable plant will be selected for each activity, having due regard to the need for noise control.
- Best practicable means will be employed to minimise noise emissions and will

comply with the general recommendations of BS 5228. Operators will use “noise reduced” plant and/or will modify their construction methods so that noisy plant is unnecessary.

- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use.
- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness.
- If required, compressors will be of the “noise reduced” variety and fitted with properly lined and sealed acoustic covers.
- In all cases, engine and/or machinery covers should be closed whenever the machines or engines are in use.
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable all mechanical static plant will be enclosed by acoustic sheds or screens.
- Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
- The proper use and maintenance of tools and equipment
- The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receptors
- Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment
- The use and maintenance of sound reduction equipment fitted to power pressure tools and machines
- It is recommended that should complaints be received from nearby residential properties periodic noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receptors. Based on the findings of such noise monitoring, appropriate noise mitigation measures will be implemented to reduce noise impacts. Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary screening of the nearest receptor to on-site activities.
- Responsible Person - It is recommended that the Contractor will appoint a responsible and trained person who will be present on site and who will be willing to answer and act upon complaints and queries from the local public.
- To protect residential amenity, the cumulative noise level from construction activities on the development site (including plant and equipment) shall not exceed 65dB $L_{Aeq,\ 12\ hour}$ at residential properties closest to the site boundary.

The applicant will adhere to the following typical conditions often attached to such a planning permission, if granted.

- Construction, demolition, engineering works and works should be carried out using the best practicable means available so as to minimize the impact of noise generated by such activities on the nearest noise sensitive dwellings.
- Where such activities are to be carried out, consideration should be given to control measures by way of noise generating activities, which are audible at the nearest noise sensitive dwellings.
- Noise from construction activities shall not exceed 65 dB $L_{Aeq,\ 12\ hour}$ between 07.00 hours and 19.00 hours on Monday to Fridays, or 65 dB $L_{Aeq,\ 5\ hour}$ between 08.00 hours

and 13.00 on Saturdays, when measured at any point 1 metre from any façade of any residential accommodation, and

- b. not exceed 55 dB $L_{Aeq,\ 1hr}$ between 19.00 hours and 22.00 hours on Monday to Fridays, or 13.00 hours to 22.00 hours on Saturdays when measured at any point 1 metre from any façade of any residential accommodation, and
- c. not be audible between 22.00 hours and 07.00 hours on Monday to Fridays, before 08.00 hours or after 22:00 hours on Saturdays, or at any time on Sundays, at the boundary of any residential accommodation. (As a guide the total level (ambient plus construction) shall not exceed the pre-construction ambient level by more than 1 dB(A). This will not allow substantial noise producing construction activities, but other "quiet" activities may be possible). Routine construction and demolition work which is likely to produce noise sufficient to cause annoyance will not normally be permitted between 22.00 hours and 07.00 hours."

19.2.5.1.2 Monitoring

It is unlikely that the proposed construction processes will cause significant noise and vibration impact. However, if likely or possible to occur, the contractor should undertake noise and vibration monitoring at the site boundary to ensure that the suggested limits in accordance with BS5228, Annex E are not exceeded.

The measured ambient noise level (rounded to the nearest 5 dB) in proximity to the development site is in the range of 60 - 65 dB $L_{Aeq,12\ Hour}$ during daytime. Therefore, all noise sensitive receptors fall into Category A of the 'ABC' assessment methodology. Hence, daytime construction noise will be subject to a limit of 65 dB $L_{Aeq,12\ Hour}$.

19.2.5.2 Operational Phase

19.2.5.2.1 Mitigation

Operational Phase – Inward Noise

ProPG recommends that an Acoustic Design Statement (ADS) should provide evidence that ProPG Stage 1 and Stage 2 Elements #1 to #4 have been followed. The Acoustic Design Statement (ADS) has included full details of the Stage 1 Initial Risk Assessment and then systematically addressed the four key elements of Stage 2. The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. The acoustic attenuation requirements at each façade of the proposed apartment building are outlined in Figure 20-1.

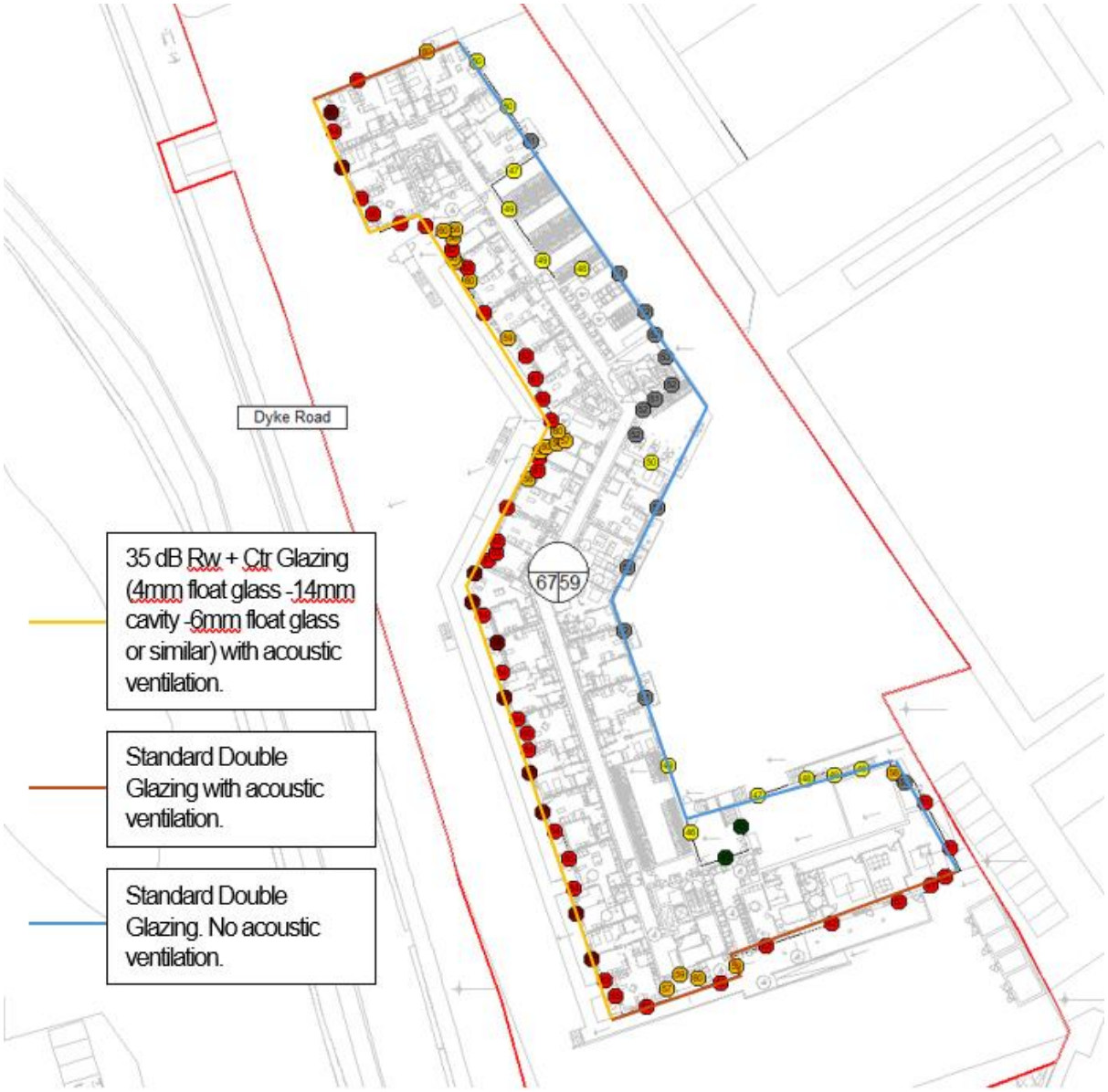

Figure 19-1: Acoustic attenuation glazing and ventilation requirements at each façade of the proposed apartment building.

Operational Phase – Mechanical and Electrical Plant

As part of the detailed design of the development, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties, including those within the development itself.

19.2.5.2.2 Monitoring

No operational noise monitoring is required.

19.2.6 Air Quality

19.2.6.1 Construction Phase

19.2.6.1.1 Mitigation

Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest sensitive receptors will be controlled to ensure impacts are of negligible significance.

The IAQM Guidance recommends that significance is only assigned to the effect after considering the construction activity with mitigation. Therefore, the detailed mitigation measures have been defined in a form suitable for implementation by way of a planning condition and will be included in a Construction Environmental Management Plan.

There are 2 sensitive residential properties <20m from the site boundary. Using the IAQM methodology for the assessment of air quality impacts from construction activities has indicated that the risk of dust soiling for earthworks and trackout are **low risk** and are **medium risk** for construction. The impacts on human health are **negligible** for earthworks and are **low risk** for construction and trackout. The ecological impacts **low risk** for earthworks and are **high risk** for construction and trackout.

In accordance with the IAQM Guidance, the highest risk category should be applied when determining proposed mitigation measures. Therefore, the mitigation measures applicable to a **high-risk site** will be applied:

<u>General Measures</u>

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.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 logbook.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary if applicable, 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.

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.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

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

- Avoid bonfires and burning of waste materials.

The IAQM Guidance Mitigation Measures applicable to the specific works undertaken are as follows:

Measures specific to earthworks

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

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 power 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 logbook.
- 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.

19.2.6.1.2 Monitoring

Monitoring of air quality and dust related impacts will be required during the construction stage only of the Proposed Development. The monitoring activities are to:

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

19.2.6.2 Operational Phase

19.2.6.2.1 Mitigation

There is no requirement for mitigation measures relating to the operational phase. The development has been shown to be not significant in terms of air quality. Future proposed engine improvements and a transition to electric vehicles will result in continued improvement in urban air quality into the future.

In terms of space heating, the proposal is expected to utilise electric heating for both hot water and space heating. Therefore, there will be no pollutant emissions to atmosphere from traditional combustion sources, such as oil or gas boiler heating systems.

19.2.6.2.2 Monitoring

No operational air quality monitoring is required.

19.2.7 Wind and Microclimate

19.2.7.1 Construction Phase

19.2.7.1.1 Mitigation

There are no further mitigation measures recommended for construction. Established construction practices are likely to ensure wind comfort the site workers.

19.2.7.1.2 Monitoring

No monitoring measured are required for the construction phase of the Proposed Development with respect to the wind flow.

19.2.7.2 Operational Phase

19.2.7.2.1 Mitigation

This assessment pertains to operational phase impacts. As such, no mitigation measures are recommended during the construction phase. The mitigation measures required for the operational phase have already been incorporated in the design of the scheme.

These incorporated mitigation features include courtyard location and the shape, Trees and vegetation along various paths.

No further mitigation measures are required.

19.2.7.2.2 Monitoring

No monitoring measures are required for the operational phase of the Proposed Development with respect to the wind flow.

19.2.8 The Landscape

19.2.8.1 Construction Phase

19.2.8.1.1 Mitigation

During the construction phase, site hoarding will be erected to restrict views of the site. Construction activities will adhere to the hours specified in the Preliminary Construction and Environmental Management Plan. Mitigation measures will include enclosing all site areas visible from local dwellings with robust, visually impermeable hoarding at least 2 meters high. Additionally, trees will be planted in appropriately sized tree pits to accommodate the proposed species.

19.2.8.1.2 Monitoring

Landscape tender drawings and specifications will be produced to ensure that the landscape work is 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 planting season after completion of the main civil engineering and building work.

19.2.8.2 Operational Phase

19.2.8.2.1 Mitigation

There are no relevant mitigation measures over and above the measures integrated into the design of the scheme such as landscape works, visual variety in the building, height limitations, breaking down of visual massing and variation of materials.

A comprehensive landscape architectural design for the entire site is proposed, integrating mitigation measures that are required to avoid or reduce potential negative effects of the development. Please see the landscape plans and reports by Murray & Associates, Landscape Architecture as submitted with the planning application for full details of the extensive landscape proposals. The primary measures of note are as follows:

- Variation of building heights, and roof types (including green roofs) gives visual relief and punctuates the block layout.
- The proposed development represents a high quality of design and the quality of materials proposed throughout should reflect this quality. See Architects' Design Statements for full details of buildings and urban design strategies.
- General landscape planting of trees and shrubs along the boardwalk and in the open spaces will create an attractive immediate visual environment and will, over time as trees mature, create a sylvan character and give further relief and variety in the visual presentation of the development in views from outside and in. Planting will also create shelter and reduce wind speeds, thus increasing pedestrian comfort and amenity value. See Landscape Architect's drawings and report for full details.
- Use of native trees, shrubs and wildflowers and non-native pollinator-friendly plants where possible will enhance the landscape and biodiversity value of the proposed development and add to wider landscape quality.
- A new habitat plantation and integrated Sustainable Drainage measures.

The existing boundary hedges around the site to the east are to be retained. In areas where these existing boundaries need rehabilitation and filling in, semi-mature native tree planting, bare-root tree planting and native shrub planting is proposed as part of the planning application. This will create a landscape buffer space that will reduce the views into the site from adjacent properties.

Mitigation measures are shown on the submitted landscape drawings. At time of planting, the proposed standard trees in the landscaped buffer zones will be at least 3.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependent on species within the medium term.

19.2.8.2.2 Monitoring

This will consist of inspections of the site and ongoing maintenance to ensure that the public realm remains in good condition and the site vegetation is managed appropriately. All landscape works will be in an establishment phase for the initial three years from planting. A landscape management plan accompanies the planning application.

19.2.9 Traffic and Transport

19.2.9.1 Construction Phase

19.2.9.1.1 Mitigation

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 Construction Phase impacts raised, 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 Dyke 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 Construction Phase impacts raised, 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.

19.2.9.1.2 Monitoring

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:

- Galway City 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.

19.2.9.2 Operational Phase

19.2.9.2.1 Mitigation

The design and construction of the built services in accordance with the relevant guidelines and codes of practice will mitigate any potential impacts during the operational phase of the development.

19.2.9.2.2 Monitoring

There will be no monitoring requirements of the traffic and transport in the operational phase of the development.

19.2.10 Materials Assets – Waste Management

19.2.10.1 Construction Phase

19.2.10.1.1 Mitigation

The following mitigation measures are recommended for the construction phase of the Proposed Development regarding Waste Management:

- The waste minimisation measures outlined in the outline Resource and Waste Management Plan (oRWMP) will be implemented in full and will form part of the mitigation strategy for the site. The waste minimisation measures outlined in the outline RWMP will ensure effective waste management and minimisation, reuse, recycling, recover and disposal of waste material generated during the construction phase of the Proposed Development;
- The Principal Contractor will implement the RWMP throughout the duration of the Proposed Development construction phase;
- Waste materials will be separated at source and will follow the outline Resource and Demolition Waste Management Plan;
- Beneficial use must be identified for the entirety of the excavated soil from the Proposed Development prior to its production for the excavated soil and stone to be considered as a by-product under Article 27 of the European Communities (Waste Directive) Regulations, 2011;
- A suitably competent and fully permitted waste management company will be employed to manage all waste arising for the Construction Phase. The appointed waste contractor must have the relevant authorisations for the collection and transport of waste materials, issued by the National Waste Collection Permit Office (NWCPO);
- Similarly, all waste materials will be transported to an appropriately authorised facility, which must have the relevant authorisations for the acceptance and treatment of the specific waste streams, i.e., a Certificate of Registration (COR) or a Waste Facility Permit (WFP) as granted by a Local Authority, or a Waste/Industrial Emission Licence as granted by the Environmental Protection Agency; and
- All waste quantities and types will be recorded and quantified, and records will be retained onsite for the duration of the construction phase.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with provisions of the Waste Management Act 1996, as amended, associated Regulations and Litter Pollution Act 1997, and The National Waste Management Plan for a Circular Economy 2024-2030. The mitigation measures will also ensure optimum levels of waste reduction, reuse, recycling and recover are achieved and will promote more sustainable consumption of resources.

19.2.10.1.2 Monitoring

All waste transfer notes will be checked and filed in the environmental plan for regular review and monitoring.

The site control measures to manage and minimise waste include:

- Signage on the site office/welfare bins to separate them as environmental/domestic waste bins; and
- Briefing for all sub-contractors via induction handouts.

19.2.10.2 Operational Phase

19.2.10.2.1 Mitigation

As previously stated, an outlined Operational Waste Management Plan has been prepared by AECOM (2025) and is included in Volume 3 - Appendices of this EIAR. The measures outlined in the outline Operational Waste and Services Management Plan will be implemented in full and form part of the mitigation strategy for the site. Implementation of this Operational Waste and Services Management Plan will ensure a high level of recycling, reuse and recovery at the Proposed Development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.

19.2.10.2.2 Monitoring

No operational phase monitoring is proposed.

19.2.11 Materials Assets – Utilities

19.2.11.1 Construction Phase

19.2.11.1.1 Mitigation

Construction Stage Controls

The Contractor will take all precautions to prevent the pollution or silting of watercourses from the construction of the proposed development.

The Contractor will apply the following mitigation:

- During the construction of the new sewers, surface water networks and associated structures arising from the Proposed development will continue to discharge to the respective existing networks. Surface water collected will be treated by sedimentation prior to discharge to the existing surface water sewer. Total Suspended Solids (TSS) and colour will be monitored daily by a handheld multi parameter sonde.

- Maintain and monitor the performance of the surface water drainage network throughout the construction of the proposed development.

- Cover all temporary stockpiles generated during construction to minimise run-off.

- Locate spoil and temporary stockpiles in locations which are at least 15 m from drainage systems.

- Neither ground water or surface water runoff from the working areas will be permitted to discharge directly to the Terryland River or Corrib River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily by a hand held multi parameter sonde. In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.

- Avoid direct or indirect discharges of untreated surface or ground water generated during the proposed development, to any surface water.

- Dewater all working areas at the end of each working day, if necessary, using pumping and transport of water off site in tankers if volumes prevent effective treatment prior to discharge.

- Where the Contractor utilises pumping to drain works areas, a backup pump and generator must be provided on site for use in the event of the primary pump failing.

- Use wheel washers and dust suppression on site roads (to be captured within the proposed SUDS system) and undertake daily plant maintenance checks and corrective actions where required.

- Establish contingency measures to cater for impacts to unknown services underlying the construction site (for example, old sewers or culverts).

- Identify whether shallow groundwater monitoring wells on site will be maintained and protected during construction works; decommissioned; or removed completely as part of excavation works, to prevent them from acting as direct pathways for contamination to enter the groundwater body beneath the site.

- Ready mixed concrete will be brought to the proposed development site by truck.

- The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil/ground water media.

- Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite or where onsite wash out will be captured, for disposal off-site.

All design and construction will be carried out in accordance with the Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.
Daily monitoring of the excavation/earthworks, the water treatment and pumping system will be completed by a suitably qualified person during the removal of the carpark surfacing, wearing course and base courses, as well as site excavation to achieve the proposed ground levels and to facilitate ground improvements, and construction phases. Preventative measures will be implemented to ensure no entrained sediment, or deleterious matter directly into any drains or watercourses.
If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied.
The Contractor shall take note of when fluvial flooding warnings are issued for the Galway City area. In the event that a flood warning is issued, all plant and construction materials must be moved and stored in parts of the site that are located within Flood Zone C or above the estimated 1 in 1000-year return period fluvial flood event (CFRAM). Therefore, in the event of floodwaters inundating the site, no materials will be washed from the site into nearby watercourses.

Spill Control Measures
No oils/ fuels will be stored on the proposed development site for the purpose of refuelling on the site.
On-site plant will be refuelled by an external Contractor who will call to site as required. Road vehicles will not be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.
Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection.
Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce the risk of spillages entering the sub-surface or groundwater environment; booms shall be held on site for works near drains or dewatering points.

The Contractor will train all operatives in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences or accidental spillage.
The following steps provide the procedure to be followed by the Contractor(s) in the event of any significant spill or leak:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains or watercourses;
- If possible, clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately;
- Verify, if necessary, measures are in place to contain and clean up the spill and prevent further spillage from occurring, where necessary proposing additional the necessary; and,
- The Contractor will notify Galway City Council and (if GCC deem it appropriate) Inland Fisheries Ireland.

Material Handling and Storage

Materials will be stored within the site compound and outside of areas identified as being at risk of flooding.
Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains are as outlined above.

Disposal of Material
All material to be disposed of off-site will be disposed of to a disposal facility licensed in accordance with Irish Waste Management Legislation. Where material is to be stockpiled on site prior to disposal, the contractor will control all run-off to prevent contamination of surrounding watercourses.
Contaminated soil will be assessed to determine its constituents and disposed of offsite in accordance with Irish Waste Management Legislation.

Control of Concrete

Ready-mixed concrete will be brought to the Proposed Development site by truck. Measures for protection of watercourses from wet concrete shall be included in the Construction Methodology and Phasing Management Plan (CMPP). This will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil / groundwater or nearby surface watercourses.
The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil / groundwater media. Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite where possible, alternatively, where wash out takes place on-site, it shall be carried out in carefully managed on- site wash out areas.

Foul Drainage
Foul sewage arising from temporary toilets and sanitary facilities on the Proposed Development site will initially be discharged to an on-site receptacle which will be emptied by tanker on a regular basis for disposal. This arrangement will be in place until the construction of on-site facilities connected to the existing Irish Water wastewater network.
It is anticipated that due to the scale of the Proposed Development that a canteen will be provided on site during construction. Provisions will be made for a grease trap at the canteen drain outlet and this drain will connect to the on-site receptacle and later to the foul sewer. Drumming of waste cooking oil within the canteen will also be provided.

In relation to electricity supply, gas supply and ICT, new connections for electricity and telecommunications will be coordinated with the relevant utility provider and Galway County Council and will be carried out and tested by approved contractors, as per standard protocols.

19.2.11.1.2 Monitoring

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures.

Monitoring

It will be the responsibility of the Contractor and the Ecological Clerk of Works (ECoW) to provide and implement a monitoring schedule for dust, noise and vibration, and water quality monitoring throughout the construction phase. The results of which shall be available upon request and shall be reported to the client on a monthly basis. Any exceedances will be reported to the client upon occurrence along with details of what caused the exceedance and how it was rectified. The Contractor will also provide a location plan of monitoring points for dust, noise and vibration, and water quality and will include a monitoring methodology as an appendix to the Contractors CEMP.

The frequency of monitoring and the monitoring parameters (such as noise limits) will be in line with best practice and guidance and will be agreed with Galway City Council prior to the commencements of works.

Survey

The Contractor will ensure all required pre-construction surveys are carried out prior to commencement of works and that the Contractors CEMP is updated with any mitigation or

monitoring measure identified within the survey report. The list of surveys will be agreed with the project Ecological Clerk of Works (ECoW).

Refer to Chapter 3 of the OCEMP Report compiled by AECOM for more detail.

Water Quality

The Contractor will produce and commence a Water Quality Monitoring Programme (WQMP) at least one month in advance of the construction programme including any enabling works to establish a baseline dataset and continue throughout construction. The regularity of, and specification for water quality monitoring in this section will need to be agreed following consultation.

The baseline water quality dataset will include sampling within the Corrib River, within the Terryland River, and (where possible should such events overlap with the pre-construction monitoring period) periods of elevated rainfall.

The WQMP will sample surface water discharge upstream and downstream from the proposed outfall to the Terryland River, in similar habitat and flow conditions, to enable siltation and other contaminants from the proposed development to be detected and distinguished from 'background' levels (including natural and man-made activities.

The WQMP will include relevant parameters from the European Communities (Quality of Salmonid Waters) Regulations, 1988 S.I. No. 293 as amended including Suspended Solids, pH, Dissolved Oxygen, Biochemical Oxygen Demand, hydrocarbons, Nitrites, Nitrates and heavy metals.

Testing for pH, turbidity and/or Total Suspended Solids will be carried out daily in-situ sing a calibrated multi-parameter sonde (to 0.1 NTU accuracy), and fortnightly for all other parameters.

The WQMP will inform the Contractor's adaptive management of the temporary construction-phase drainage works, having regard for any consents or planning conditions.

The Contractor will provide WQMP results to the Ecologist and GCC at least fortnightly (but immediately after a known silt release or other pollution incident), along with a record of any corrective actions taken by the Contractor to improve or repair performance of silt fencing or other surface water protection measures.

The installation of the utilities during the Construction Phase of the Proposed Development will be monitored by the Main Contractor and inspected by the Design Team.

19.2.11.2 Operational Phase

19.2.11.2.1 Mitigation

Water Supply

The water system will be metered to determine water consumption and facilitate leakage detection.

Flood Risk

The proposed development is located within Flood Zone A and the associated water level in the area is 6.48 m OD Malin.

The proposed finished floor level for new buildings within the development is 7.28 m OD Malin. This level includes a climate change and an appropriate freeboard of 500mm and 300mm, respectively. This level is above the 1 in 100-year return period fluvial flood event level. In addition, all critical infrastructure within the buildings will be at a minimum level of 7.28 m OD Malin.

The design incorporates elevated building for the development as a mitigation measure to prevent any flood waters to enter the main structure. The development proposal includes measures to minimise flood risk to people, property, the economy, and the environment as far as reasonably possible. An evacuation and emergency plan has been prepared and is included with the Site Specific Flood risk Assessment (SSFRA).

The hydraulic modelling undertaken as part of the Stage 3 SSFRA has verified that the proposed development will not increase the flood risk elsewhere.

Storm Water Drainage

The system includes two attenuation tanks which will store run-off when the inflow rate ex-ceeds 10l/s and 15 l/s, respectively. The system also includes a Class I Bypass Hydrocarbon Separator to remove hydrocarbons which may be suspended in runoff. To minimise sediment, build up within the storm water drainage network, trapped inlets will be used at all points of entry and key manholes will have sumps to collect material.

A regular maintenance regime, including monitoring, will be put in place to remove any excess build-up of material. A Class I Bypass Hydrocarbon Separator has also been provided to treat surface water collected in the new gullies on Dyke Road.

LDA shall establish a maintenance company that will be responsible for the regular mainte-nance and monitoring of all infrastructure installed as part of the development. This includes the surface water drainage, and gullies on Dyke Road. Future third party Connection to the infrastructure in Dyke Road will only be permitted if the same standard can be given with regards maintenance and monitoring.

Foul Drainage

All foul water from the Proposed Development will discharge to the existing Uisce Éireann sewer network. Uisce Éireann have issued confirmation of feasibility to receive the discharge and for the proposed diversion of the Black Box Theatre drainage. Uisce Éireann have also provided a statement of design acceptance for the proposal. Connection agreements, including for taking in charge the wwps will be advanced at the next stages of the project.

19.2.11.2.2 Monitoring

Emergency planning and evacuation procedures are to be monitored and coordinated with the relevant emergency services once developed. As part of the evacuation procedure residents will be able to evacuate, if required, to the southernmost part of the site which is above 7.28m OD Malin. In addition, flood warning communication systems to be monitored with real time water levels of the Corrib River and Terryland River (https://waterlevel.ie/).

The building management company, residents, tenants and creche operators will be required to maintain all utilities as required by the Utility Providers i.e. pay their respective utility bill as they arise.

19.2.12 Cultural Heritage

19.2.12.1 Construction Phase

19.2.12.1.1 Mitigation

The mitigation strategies outlined in this section detail the measures to be adopted to ameliorate the effects that the proposed works may have on features of archaeological, architectural, or cultural heritage within the study area during both the construction and operational phases of the scheme. The residual effects that will remain once these mitigation measures have been implemented are also identified.

It is recommended that a suitably qualified archaeologist monitor initial groundworks/site investigation works to establish the extent of previous ground disturbance at the subject site. Based on the results of this work further mitigation such as intermittent inspections may be recommended if deemed required.

A suitably qualified archaeologist should be appointed to advise the design team on archaeological matters, liaise with the relevant authorities, prepare an archaeological licence application and method statement, and complete the archaeological monitoring work. Monitoring should be carried out under licence to the National Monuments Service at the DHLGH. The application for such a licence requires a detailed method statement, outlining the procedures to be adopted to monitor, record, and recover material of archaeological interest during such work.

Should archaeological material be uncovered at any location, the feature will be summarily investigated to determine the form, age, nature, depth, and extent of the feature. The feature will be planned, photographed, and recorded to best professional standards.

Adequate funds to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available if required. Upon completion of the works dissemination of the results will take the form of a stratigraphic report and full report to publishable standard lodged with the licensing section (NMS) and the Planning Section (NMS) and the National Museum of Ireland. A summary of the report will also be submitted to the Excavations Bulletin within six weeks of the end of fieldwork. Should results warrant it, wider dissemination in the form of a full publication may be recommended.

The above recommendations are subject to approval by the National Monuments Service at the DHLGH and other relevant authorities.

19.2.12.1.2 Monitoring

Not applicable to cultural heritage.

19.2.12.2 Operational Phase

19.2.12.2.1 Mitigation

There will be no operational phase impacts on the cultural heritage resource if the above-described mitigation is implemented. No operational phase mitigation is recommended.

19.2.12.2.2 Monitoring

Not applicable to cultural heritage.

20 QUALITY ASSURANCE AND COMPETENCY OF EXPERTS

Under Article 5(3)(a) of Directive 2014/52/EU it is a requirement that:

> "*the developer shall ensure that the environmental impact assessment report is prepared by competent experts"*

This EIAR has been prepared by Enviroguide, supported by sub-consultants on certain specialist assessments.

Founded in 2010, Enviroguide is an award-winning, multi-disciplinary environmental consultancy specialising in environmental compliance, ecology, planning, waste management, contaminated land, engineering, and sustainability. Providing end to end environmental consultancy services, Enviroguide consultants hold scientific, engineering, and/or legal qualifications with extensive technical knowledge and extensive practical experience within the environmental consultancy and management sectors. Professional memberships include the Chartered Institute of Ecology and Environmental Management, the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association, the Institute of Environmental Management and Assessment (IEMA), Engineers Ireland, the Institute of Geologists of Ireland, and the Royal Town Planning Institute.

For each chapter of this EIAR, the author, qualifications, and experience of working on other development projects are detailed in the relevant chapters. The EIAR Project Team are identified in Table 20-1.

Table 20-1 EIAR Project Team

No.	Chapter	Consultant Name and address	Specialist Area
1	Introduction	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt Reviewed by Catherine Keogan	Multidisciplinary Planning and Environmental Consultants (specializing in Environmental Impact Assessment)
2	Site Context		
3	Description of the Development		
4	Consideration of Alternatives		
5	Population and Human Health	Brock McClure Planning and Development Consultants, 63 York Road, Dún Laoghaire, Co. Dublin Vitalija Janusonyte Reviewed by Linda McEllin	Planning and Development Consultants
6	Biodiversity	Scott Cawley Ltd., 71-73 Rock Road, College House, Rock Road, Blackrock, Dublin Sorcha Shanley Síofra Quigley Tim Ryle Colm Clarke	Ecological consultancy

No.	Chapter	Consultant Name and address	Specialist Area
7 8	Land and Soil Water	Enviroguide, 3D Core C, The Plaza, Park West, D12F9TN Gareth Carroll Reviewed by Patrick Higgins	Multidisciplinary Planning and Environmental Consultants (specializing in impact assessment of land and soil and water)
9 10	Noise and Vibration Air Quality	AONA Environmental Consulting Ltd., Unit 8A, Northwest Business Park, Sligo F91 E285 Mervyn Keegan Olivia Maguire	Environmental and Occupational Health and Safety consultancy (specialising in Air Quality and Odour Impact Assessments and Noise and Acoustic Assessments)
11	Wind and Microclimate	Integrated Environmental Solutions Ltd, 4th Floor, Castleforbes House, Castleforbes Road, Dublin 1 Harshad Joshi Reviewed by Colin Rees	Software and consultancy company specializing in building performance analysis
12	Landscape and Visual Impact Assessment	Murray & Associates Landscape Architecture, 16 The Seapoint Building, 44-45 Clontarf Road, Dublin 3 Luciana Pinho (Verified View input from: 3D Design Bureau, Unit 1, Adelphi House, George's Street Upper, Dún Laoghaire, Dublin)	Landscape Architecture Company 3D modelling & visualisation company
13	Material Assets - Traffic and Transport	PUNCH Consulting Engineers, Carnegie House, Library Road, Dun Laoghaire, Co. Dublin Julie Tiernan	Consulting Engineers
14	Material Assets - Waste Management	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin Reviewed by Catherine Keogan	Multidisciplinary Planning and Environmental Consultants
15	Material Assets - Utilities	Homan O Brien, 89 Booterstown Ave, Blackrock, Dublin Brian Homan AECOM Ireland Limited, 1st floor, Montrose House, Carrigaline Road, Douglas, Cork T12 P088 Thorne Prophet Reviewed by Emma McKendrick	Consulting Engineers Multi-disciplinary Engineering Consultants
16	Cultural Heritage	Moore Group, 3 Gort na Rí Athenry, Co. Galway Declan Moore (Consultant Archaeologist)	Multi-disciplinary environmental, planning

No.	Chapter	Consultant Name and address	Specialist Area
			and heritage resource management consultancy
17	Interactions	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Lakshmi Priya Mohan	Multidisciplinary Planning and Environmental Consultants
18	Risk Assessment	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt Reviewed by Catherine Keogan	Multidisciplinary Planning and Environmental Consultants
19	Summary of Mitigation Measures	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Lakshmi Priya Mohan	Multidisciplinary Planning and Environmental Consultants
20	Competent Persons Table	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
NTS	Non-Technical Summary	Enviroguide 3D Core C, The Plaza, Park West, D12F9TN Lakshmi Priya Mohan Louise Hewitt	Multidisciplinary Planning and Environmental Consultants
App	Appendices		

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