WATER FRAMEWORK DIRECTIVE (WFD) ASSESSMENT

For

A LARGE-SCALE RESIDENTIAL DEVELOPMENT
AT

WHITEBOX STUDENT CAMPUS DEVELOPMENT
GROODY ROAD
NEWCASTLE
CASTLETROY
LIMERICK

Prepared for

Groody Development Limited

Prepared by

Traynor Environmental Ltd.

Reference Number

24.310 TE

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This document is a Construction Environmental Management Plan (CEMP) for the construction of a proposed development for Swellan Lower, Cavan, Co. Cavan.

Issue	Date	Details	Prepared by	Checked/Approved by
1	9th April 2025	Draft	Angela Kelly Environmental Consultant	Nevin Traynor Environmental Scientist
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1.0 INTRODUCTION

Traynor Environmental Ltd has been commissioned by Groody Developments Limited (hereafter referred to as the Applicant) to undertake a Water Framework Directive (WFD) Assessment for the proposed Large-scale Residential Development at Groody Road, Newcastle Castletroy Limerick (hereafter referred to as the 'site' and 'Proposed Development').
This report presents the findings of the WFD Assessment for the site and Proposed Development.

1.1 Project Objective

The overall objective of this WFD assessment is to determine if any specific components or activities associated with the proposed development will compromise WFD Article 4 objectives, cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment also aims to identify any waterbodies with the potential to be impacted, describe the proposed mitigation measures, and define any residual potential impacts.

1.2 Project Scope of Work

The scope of the water framework directive assessment included the following tasks:

- A desk-based review of published information and information pertaining to the Site and Proposed Development provided by the Applicant.
- Develop a hydrological / hydrogeological Conceptual-Site-Model and identify any potential source-pathway-receptor linkages.
- Site visit and river sampling of the Groody River for pH, Ammonia and Dissolved Oxygen levels. and
- Identify and assess any potential impacts of the Proposed Development on the WFD status of sensitive receptors associated with the receiving water environment.

1.3 Professional Competency

The report was prepared by Nevin Traynor Environmental Consultant with Traynor Environmental; with over 25 years' experience in the environmental sector. Nevin has an honours degree in Environmental Science from Sligo IT and a HDIP in IT From Maynooth NUI. His project experience includes the management and productions of numerous hydrological and hydrogeological assessments for various developments across Ireland, Nevin Traynor is professionally competent and accredited to undertake water framework directive assessments.

2.0 Methodology

2.1 Legislative Context

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU, and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised. The Article 4 objectives, which have been considered as part of the design process of the Proposed Development, include:

- Protect, enhance, and restore all bodies of surface water and groundwater with the aim of achieving good surface water status by 2027.
- Prevent deterioration and maintain a 'high' status where it already exists.
- Implement the necessary measures with the aim of progressively reducing pollution in surface waters and groundwater.
- Ensure waters in protected areas meet requirements.

The WFD is implemented through the River Basin Management Plans (RBMP), which comprise a six-yearly cycle of planning, action, and review. RBMPs include identifying river basin districts, water bodies, protected areas, and any pressures or risks, monitoring, and setting environmental objectives. In Ireland, the first RBMP covered the period from 2010 to 2015, with the second cycle plan covering the period from 2018 to 2021.

The Water Action Plan 2024 (RBMP 3rd Cycle) Programme of Measures outlines comprehensive measures to protect and improve water quality across various sectors. The Programme of Measures (PoM) for RBMP is a comprehensive set of actions designed to achieve the environmental objectives set out in the Water Framework Directive. The PoM includes both basic and supplementary measures:

Basic measures are mandatory actions required to fully implement existing water protection directives. The 11 key EU Directives which form the Basic Measures are: Bathing Waters Directive, Birds Directive, Habitats Directive, Drinking Waters Directive, Major Accidents and Emergencies Directive, Environmental Impact Assessment Directive, Sewage Sludge Directive, Urban Wastewater Treatment Directive, Plant Protection Products Directive, Nitrates Directive, and Industrial Emissions Directive.

Supplementary measures augment basic actions to achieve water objectives and include codes of practice, voluntary agreements, demand reduction, education, rehabilitation or research programmes, and legal, administrative, and economic instruments.

Key elements of the PoM include:

- Integrated Catchment Management: The PoM uses an integrated catchment management approach, focusing on identifying the right measures for specific locations to maximize effectiveness.
- Collaboration: Implementation involves collaboration between various government departments, local authorities, the EPA, and other stakeholders, with the Programme Delivery Office overseeing and coordinating efforts.
- Monitoring and Reporting: An enhanced monitoring and reporting programme tracks the implementation progress and assesses the effectiveness of the measures.
- Targeted Actions: The PoM identifies specific actions under each pressure/issue affecting water quality, assigning lead organizations, timelines, and key performance indicators.
- Multiple Benefits: The PoM aims to deliver multiple benefits for water, biodiversity, and climate change mitigation and adaptation.
- Environmental Assessment: All measures and projects arising during the third-cycle RBMP are subject to further environmental assessments, including Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA), as required.

The sources provide numerous specific examples of measures within the PoM, categorized by the sector driving the impact:

- Agriculture: Implementation of a stronger and more targeted Nitrates Action Programme, including tighter controls on nutrient applications, a livestock excretion banding system, a national fertilizer sales database, and enhanced inspection and enforcement programmes.
- Hydromorphology: Developing a new Controlled Activities for the Protection of Waters regime to address pressures on the physical condition of waters.
- Forestry: Increasing the area of forests with appropriate water setbacks, seeking improvements to the licence applications process for key forestry activities, and rolling out schemes that promote water protection.
- Urban Wastewater: Continued investment in urban wastewater infrastructure and a review of water bodies where urban wastewater is a significant pressure.
- Peatlands: Updating the National Peatlands Strategy and continuing the national programme of peatland restoration.

These measures are designed to ensure that all new developments comply with the WFD's fundamental requirements and contribute to the overall goal of achieving good water status by 2027.

This assessment takes into account and meets all the requirements and objectives outlined above, ensuring compliance with the WFD.

2.2 Desk-based Study

A desk-based study was undertaken including a review of relevant information from the following publicly available sources and information provided by the Applicant:

- Ordnance Survey Ireland Online mapping (OSI, 2025).
- Geological Survey of Ireland Online mapping (GSI, 2025).
- Environmental Protection Agency Online mapping (EPA, 2025).
- National Parks & Wildlife Services, Protected Sites Webmapping (NPWS, 2025).
- Relevant drawings and design reports for the proposed development provided by the Applicant.

2.3 Risk Based Impact Assessment

A risk-based and receptor-focussed approach was adopted to include an assessment of any impact to the receiving hydrological and hydrogeological (water) environment associated with the Proposed Development.

The basis for a risk assessment is the CSM or Source-Pathway-Receptor (SPR) model which underpins the Directive 2000/60/EC (Water Framework Directive) amended by Directives 2008/105/EC, 2013/39/EU, and 2014/101/EU. These directives have been transposed into Irish legislation through the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) and subsequent amendments, as well as the EPA Guidance on the Authorisation of Discharges to Groundwater (EPA, 2011) and the EPA Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA, 2013) on the protection of groundwater and surface water resources.

A risk assessment is undertaken to provide an understanding of the risk associated with the presence of any potentially contaminating materials and/or activities on a site. This is informed by the assessment of potential for viable pollutant linkage(s) to be present. A pollutant linkage is established when there is a viable or potentially viable Source, a Pathway and a Receptor (refer to Section 2.4 below).If one or more of the three elements are missing, the exposure pathway is considered incomplete and there is no risk associated with the activity or contaminant source (i.e., a viable means of exposure is not considered to be present or is unlikely to be present).

The objective of the Water Framework Directive (WFD) is to ensure no deterioration of the water quality status, and the "prevent or limit" objective is a key element of achieving that WFD status for all water bodies regardless of their current water quality status. The 'prevent or limit' objective involves measures to avoid and mitigate impacts, serving as the first line of defence in restricting pollutant inputs from a development (i.e., "source" removal) and preventing any potential impact or deterioration of the water quality status or WFD status of the receiving water body.

In this assessment all three elements of the Source-Pathway-Receptor model will be identified to develop a CSM, and any potential linkages evaluated and assessed to determine if the development could potentially impact upon the WFD Status of the water bodies associated with the site.

2.4 Conceptual Site Model

A CSM represents the characteristics of the site and identifies the possible relationship and potential risk between contaminant sources (i.e., characteristics of the Proposed Development), pathways and receptors (receiving environment) These three essential elements of the CSM are described as:

- A **source** – a substance that is in, on or under the land and has the potential to cause harm or pollution.
- A **pathway** – a transport route or means by which a receptor can be exposed to, or affected by, a contaminant source.
- A **receptor** – in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property, or a water body.

The term pollutant linkage is used to describe a particular combination of source-pathway- receptor. Each of these elements can exist independently, but they create a risk only where they are linked together so that a particular contaminant affects a particular receptor through a particular pathway (i.e., a pollutant linkage).

The preliminary CSM for the site of the Proposed Development is initially defined and this is then revised throughout the risk-based assessment process.

3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The subject site is located within the development boundary of Limerick City c. 3.0km west of Limerick City Centre. There is existing residential housing estates located to the east of the proposed site.

The development consisting of 196 no. Bed Clusters, is distributed across 5 no. separate blocks, ranging in height from 5 - 8 storeys, with a total of 1,400 no. student bedspaces including:

- Block A comprising 8 storeys providing for (a) 28 no. bed clusters and 224 no. bedspaces; (b) Student library; (c) Student union; (d) Plant room; (e) Bin store; (f) Bicycle store.
- Block B comprising 7 storeys providing for (a) 52 no. bed clusters and 400 no. bedspaces; (b) Reception & Office; (c) Post room; (d) Laundry room; (e) Student canteen; (f) Maintenance store; (g) Plant room; (h) ESB substation & switch room; (i) Bin Storage; (j) and Bicycle store.
- Block C comprising 6 storeys providing for (a) 51 no. bed clusters and 355 no. bedspaces; (b) Student Gym; (c) Maintenance store; (d) Plant room; (e) ESB substation & switch room; (f) Bin Storage; (g) and Bicycle store; (iv) Block D comprising 6 storeys providing for (a) 32 no. bed clusters and 211 no. bedspaces; (b) Reception & Office; (c) Post room; (d) Laundry room; (e) Student canteen; (f) Student supply retail unit (60m2); (g) Plant room; (h) Maintenance store; (i) Bin Storage; and (k) Bicycle Storage;
- Block E comprising 5 storeys providing for (a) 33 no. bed clusters and 210 no. bedspaces; (b) Reception & Office; (c) Laundry room; (d) Maintenance store; (e) Bicycle store; and (f) Plant room; and ancillary site development works including car parking provision; boundary treatments; roof plant; public lighting; water supply; foul and surface water drainage infrastructure; and signage.

The site will be accessed via the Groody Road. Extensive landscaping proposals, including (a) landscaped courtyards; (b) pedestrian and cycle connections from the Groody Road to the Groody Valley Green Wedge; (c) natural landscaping and public walkways within the Groody Valley Green Wedge; and (d) a Wetland & Biodiversity area adjacent to the Groody River are also proposed.

Figure 3.1: Proposed Site Layout

3.1 Construction Phase

Phasing and Scheduling of the Development

It is proposed that the project will proceed to construction if planning is successful, and all associated statutory procedures have been approved. While the precise sequencing of the sites phasing construction will be the subject of greater detailed, it is envisaged that the project will be delivered in two phases:

- Phase 1 – Will be the completion of the Retention Pond, completion of Block C (6 Storeys), Block D (6 Storeys), Block E (5 Storeys) 786 Beds.
- Phase 2 - will be the completion of Blocks A (8 Storeys) and B (7 Storeys) 624 Beds.

The following earthworks are envisaged during the construction of this project:

- Remediation of existing filled material within the site. These works will primarily take place above the previous natural ground level.
- Installation of piled foundations. It is envisaged that these pile foundations will extent down and into bedrock. The piling will be placing place on an elevated position when comparted to the pre-filled natural level of the site. The piling operation does present a potential direct pathway from the surface to the groundwater table.
- Installation of new roads, footpaths and associated surface finishes. These will be constructed at an elevated position compared to the pre-filled natural ground. These works will be occurring on remediated and replaced ground material. The finished levels are similar in nature to the current levels of the site both in the filled and no filled areas.
- Installation of new drains, sewers, ducts and associates' services. The surface water sewers are up to 2.5m deep some of which will be occurred on non-filled areas such as for the construction of the surface water wetland. The foul sewers extend to up to 3.8m in depth. The deeper depths are located on filled areas of the site and adjacent to the existing road.
- Installation of surface water attenuation tank which is 2.5m in depth.
- Construction of surface water attenuation and wetland the wetland is 2.1m in depth.

3.2 Operational Phase

3.2.1 Foul Water Drainage

As documented in the Civil Engineering Report prepared by Garland January 2025.

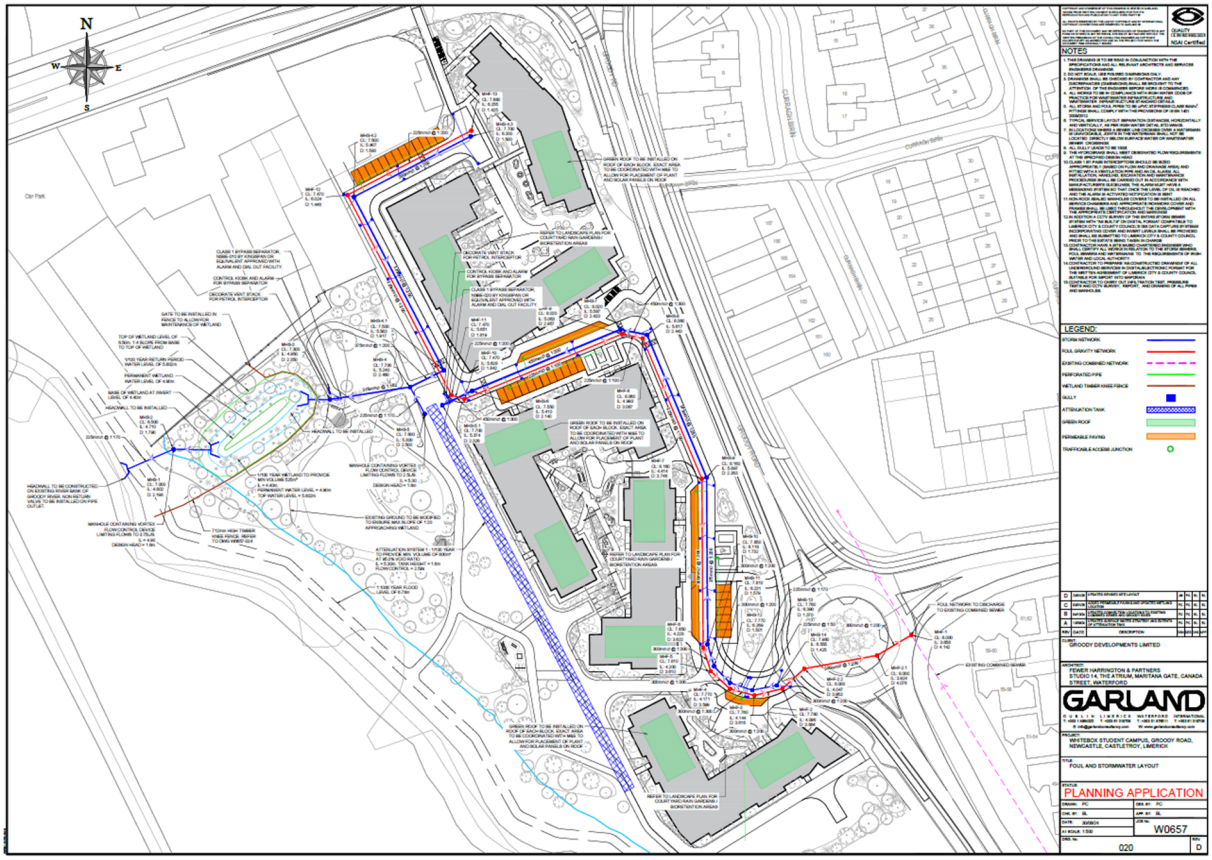
A pre-connection enquiry was lodged with Irish Water for the development outlining the proposed flows and loads which would be generated by the development. This application was undertaken to determine if there is adequate capacity in the existing public foul sewer network to cater for this development. The Uisce Éireann reference number for the application is CDS24007270. A confirmation of feasibility has been received from Uisce Éireann which notes that there is capacity within their system to cater for this development.

It is proposed to provide a single gravity foul sewer system for the development, discharging to an existing combined sewer east of the development below the Groody Road.

The foul sewer network was designed in accordance with Irish Water Code of Practice July 2020 and to IS EN 12056/ IS EN 752,

The proposed drainage system has been designed so that Foul and Surface Water will be kept separate in line with UE requirements. Foul water from the Proposed Development will be treated in the Castletroy Wastewater Treatment Plant (WWTP) (Discharge Licence No. D0019-01) before ultimately discharging to the Lower River Shannon. All manholes will be constructed in blockwork, precast, or cast in-situ concrete.

Figure 3.2: Foul & Stormwater Layout.



3.2.2 Surface Water Drainage

As documented in the Civil Engineering Report prepared by Garland January 2025

3.2.2.1 Sustainable Urban Drainage System

SUDS addresses the water quality, water quantity, amenity, and biodiversity by the management of surface water run off in a sequence of treatment processes along the drainage infrastructure network. Bioretention systems are shallow landscaped depressions that can reduce runoff rates and volumes, treat pollution through the use of engineered soils and vegetation and facilitate infiltration. They are particularly effective in delivering interception and can also provide attractive landscape features that are self-irrigating and fertilising, habitat, biodiversity, and cooling of the local microclimate due to evapotranspiration. Details of the biodiversity systems to be installed are shown on the landscape engineering plan submitted with the application.

3.2.3 Water Supply Demand Calculations

The peak demand for sizing of the pipe network will normally be 5.0 times the average day/ peak week demand from Section 3.7.2 of the Uisce Eireann Water Code of Practice. The average day/peak week demand should be taken as 1.25 times the average daily domestic demand.

Average Daily Domestic Demand = 1404 x 150 l/person/day

= 210,600 l/day

= 2.44 l/s

Average Day / Peak Week Demand = 2.44l/s x 1.25

= 3.05 l/s.

4.0 SITE SETTING AND RECEIVING ENVIRONMENT

4.1 Site Location and Description

The Proposed Development, measuring approximately 36,424m², is located on the land of Groody Raad, Newcastle, Castletroy, Limerick. The site is located approximately 1.19 km north of the M7 Motorway and 1.61km south of the University of Limerick. The Proposed Development site location is presented in Figure 4.1.

The site is currently a greenfield, which is surrounded by residential developments, industrial buildings and scrub land. The site is generally bounded to the north by R445 (Dublin Road), to the east by the L5173 (Groody Road) and to the west and the south by an existing greenfield site to be developed in the future.

The subject site is located on the western side of Limerick City at Groody Road, Newcastle, Castletroy Limerick, partially located beside University of Limerick. The subject site is located approximately 3km west of Limerick City Centre. The site's location in the context of Limerick City is illustrated in Figure 1 below. The lands to the south and east of the subject site are characterised by greenfield land which is zoned for Groody Valley. The lands to the east of the site are characterised by existing residential development including Curragh Birin and a local centre. The lands to the north of the site are characterised by greenfield land. There are existing public transport facilities in the area including the 304, 304A and 310 bus routes operated by Transport for Ireland. The nearest bus stop that serves these routes is located approximately 200m east of the site and at the east boundary of the site.

Figure 4.1: Site Location

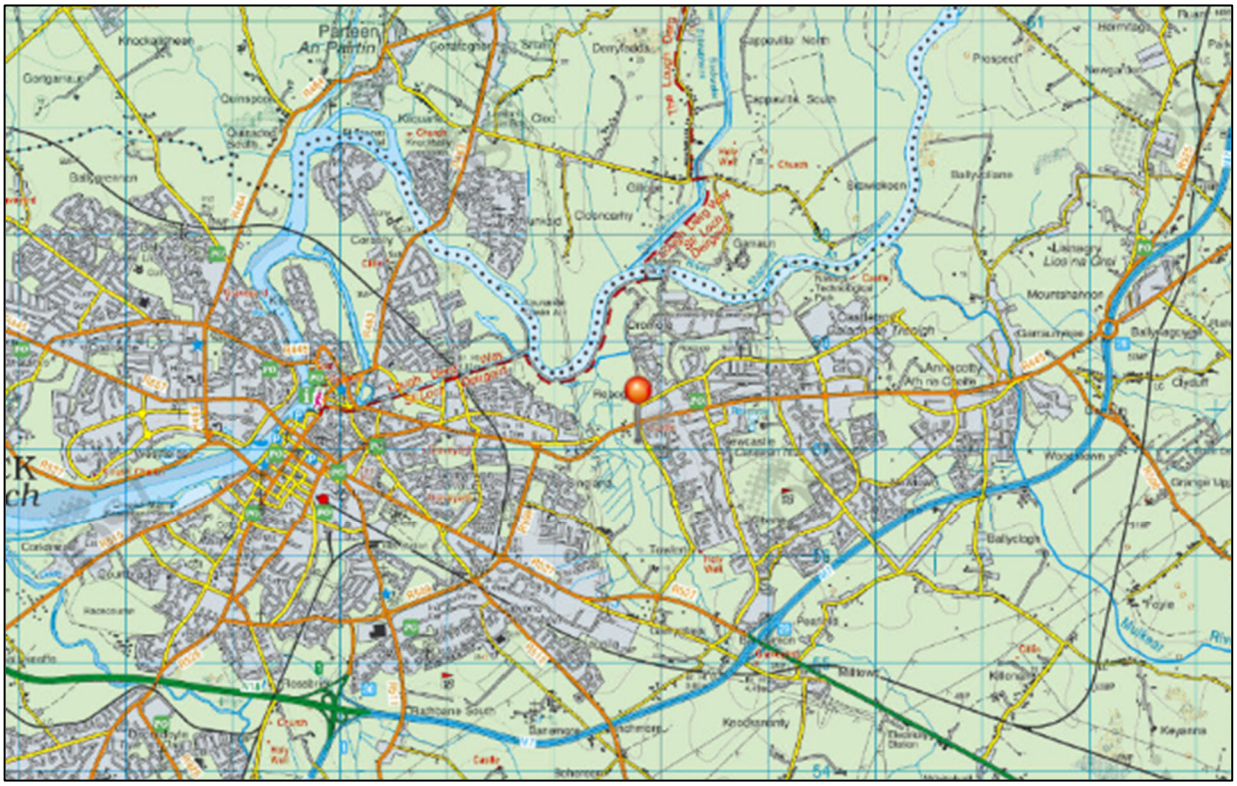
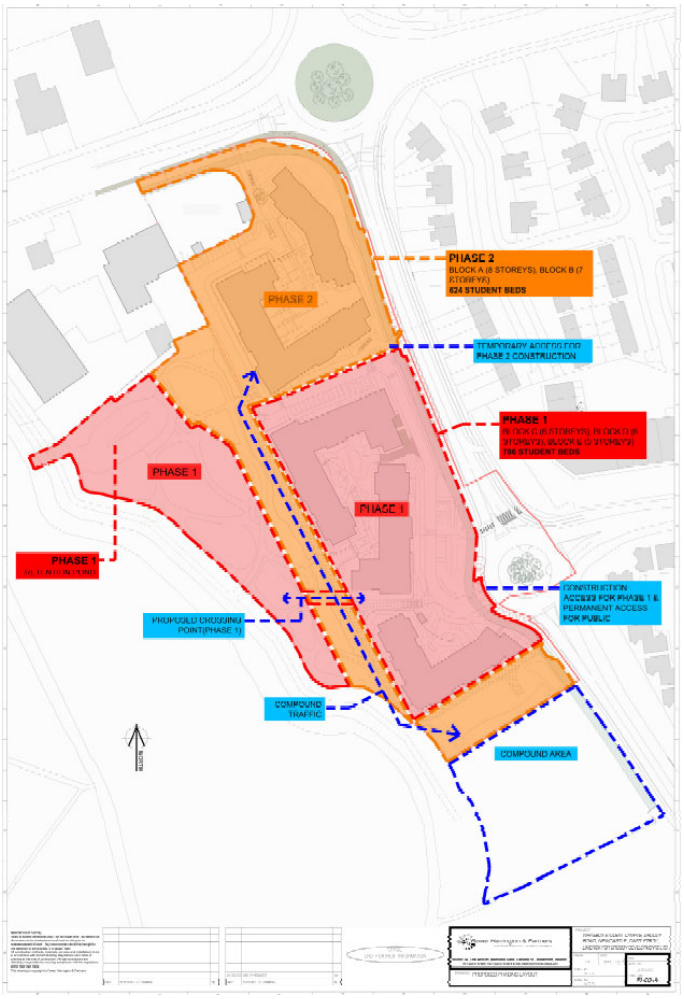


Figure 4.2: Aerial Photography of Site

Figure 4.3: Phasing Layout



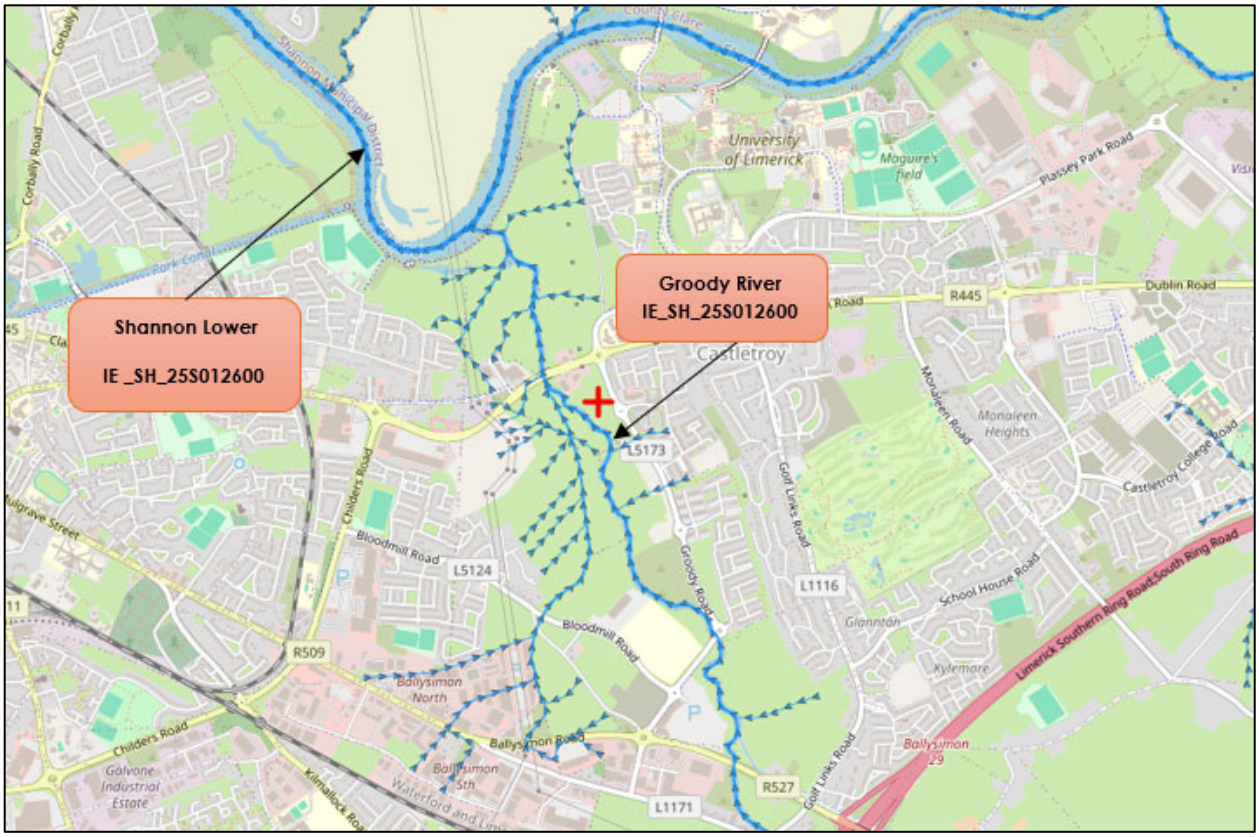
4.2 Topography

The site is relatively flat with a small fall from Groody Road along the Eastern Boundary of the site to the River Groody located along the Western Boundary of the site. There is approximately a 1-2m fall in level from east to west across the site. The level of the site adjacent to the existing Groody Road varies from 9.50m OD to 7.50m OD while the levels vary from 9.50m to 6.50m along the northern boundary.

4.3 Hydrology

The site is mapped by the EPA (EPA, 2025) to be within the WFD Catchment of the Lower Shannon and (25D), the Shannon[Lower]_SC_090 WFD Sub-catchment the Shannon (lower)_060 WFD River Sub Basin (EU Code: IE_SH_25S012600). The closest surface water feature to the site and Proposed Development is mapped by the EPA (EPA, 2025) as the Groody River (WFD Name: Groody 025_2053 ; River Waterbody Code: IE_SH_25S012600) which adjoins the western boundary of the site for the Proposed Development. The River Groody flows in a northerly direction until its confluence with the River Shannon approximately 0.8km downstream.

Figure 4.4 Site Location in the Context of the Wider Surface Water Environment



According to the EPA Maps, the application site is located within the Lower Shannan Hydrometric Area 25 and Catchment Area (25D), and the Shannon [Lower]_SC_090 and Shannon (Lower) Sub-Basin 060. The EPA refer to the river that flows to the west boundary of the site as the Groody River (IE_SH_25S012600). The Groody river flows north into the Lower Shannon (IE_SH_25S012600). The Lower Shannon water flows into the four transitional waters bodies along this water course, Limerick Dock (IE_SH_060_0900), Upper Shannon Estuary (IE_SH_060_0800), Fergus Estuary (IE_SH_060_1100) and the Lower Shannon Estuary (IE_SH_060_0300). Finally, the water is deposited into the Mouth of the Shannon (IE_SH_25S012600) and the Southwest Atlantic Seaboard (IE_SH_010_0000) thereafter.

The Environmental Protection Agency (EPA, 2025) on-line mapping presents the available water quality status information for water bodies in Ireland. The Groody River 25R69 waterbody (IE_SH_25S012600) that bounds the site to the west achieved "Moderate" status in the latest WFD Cycle (2016-2021). The Groody River discharges into the Shannon (Lower)_060 waterbody (IE_SH_25S012600) which is also achieved as 'Moderate' status in the latest round (2016-2021). Downstream the Shannon Lower River flows in a westerly direction through the transitional waters, Limerick Dock (IE_SH_060_0900) and Upper Shannon Estuary

(IE_SH_060_0800) which both have achieved Poor status in the latest round of WFD monitoring (2016-2021). It continues flowing westerly through the Fergus Estuary (IE_SH_060_1100) and finally to the Lower Shannon Estuary (IE_SH_060_0300). The Fergus Estuary is of Moderate status, whereas the Lower Shannon Estuary is reported as good status in the latest round of the WFD monitoring (2016-2021).

For the coastal waterbodies, The Mouth of the Shannon (IE_SH_060_0000) achieved good status, and the South Atlantic Seaboard (IE_SH_010_0000) achieved High status.

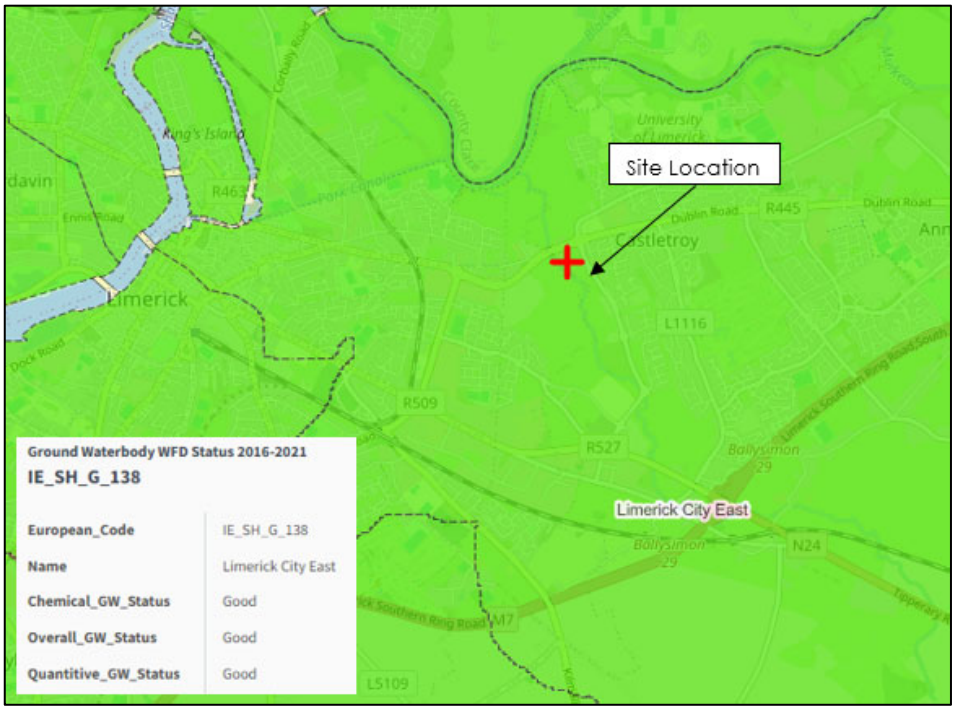
4.4 Hydrogeology

4.4.1 Groundwater Body

The bedrock aquifer beneath the site is mapped by the GSI (GSI, 2025) to be within the Limerick City East Groundwater Body (GWB) (EU Code: IE_SH_G_138). The Limerick East GWB covers approximately 46 km² and spans areas across the east of Limerick City. The area is generally low-lying, with higher elevations to the east and, to a lesser extent, to the north. Elevations decrease towards the various river estuaries around Limerick city. At the boundaries of the GWB, the highest elevations are to the north at Woodcock Hill Bog and to the east where the Slieve Felim Mountains form an area of higher elevation and the Silvermine Mountains east of Limerick.

Recharge in the vicinity of the site is described as being diffuse through subsoil. The potential for recharge, estimated at 101 – 150mm/year (GSI, 2025), is attributed to the locally important aquifer underlying the site. This aquifer can support local water supply needs and may exhibit significant groundwater flow paths. The main groundwater discharge mechanism within the GWB is described as occurring to the rivers and streams. The GSI (Limerick City East GWB Report) identifies that the majority of groundwater flow direction in the aquifer is towards the coast and towards the River Shannon. Groundwater flow in the Limerick City East GWB generally occurs along fractures, joints, and major faults. The flow paths are relatively long, typically ranging from 500 to 1500 meters. Locally, groundwater flow within the vicinity of the site is considered likely to be to the west and southwest towards the Groody River and River Shannon.

Figure 4.5 Groundwater Body Map (Limerick City East Groundwater Body (GWB) (EU Code: IE_EA_G_008)



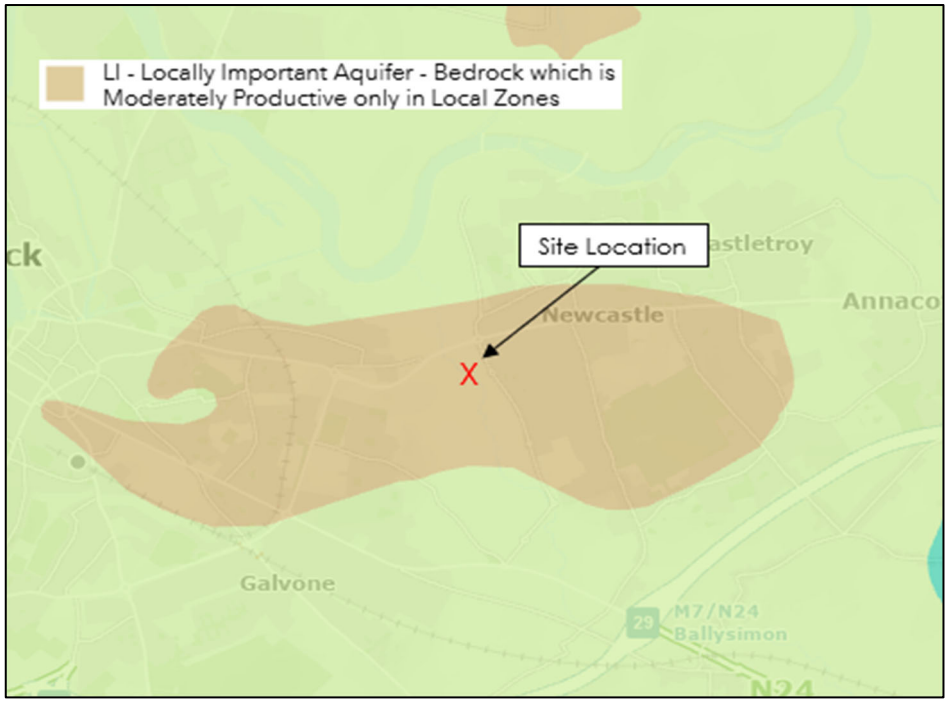
4.4.2 Aquifer Classification

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important, and poor) and vulnerability (extreme, high, moderate, or low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities (vulnerability classification primarily based on the permeability and thickness of subsoils).

The GSI has classified the bedrock aquifer of the Rathkeale and Lough Gur Formation in the area and within the surrounding areas as a Locally Important Aquifer which is moderately productive only in local zones (Ll).

As documented by the GSI a description of Irish Aquifer Categories), Locally Important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or 'good' yields (100-400 m3/d). Groundwater flow occurs predominantly through fractures, fissures, and joints. It is noted that there is no gravel aquifers mapped within a 2.0km radius of the site. The bedrock aquifer is presented in Figure 4-3.

Figure 4.6 Locally Important Aquifer - (Ll)



4.4.3 Groundwater Vulnerability

The vulnerability categories, and methods for determination, are presented in the Groundwater Protection Schemes publication (DEHLG/EPA/GSI, 1999) and summarised in Table 4-1. 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 4-1. Vulnerability Mapping Criteria

Hydrological Requirements					
Subsoil Thickness	**Diffuse Recharge**			**Point Recharge**	**Unsaturated Zone**
	Subsoil Permeability & Type			**(Swallow holes, losing streams)**	**(sand & gravel aquifer only)**
	High Permeability (Sand & Gravel)	**Moderate permeability (sandy subsoil)**	**Low permeability (clayey subsoil. Clay, Peat)**	**(Swallow holes, losing streams)**	**(sand & gravel aquifers only)**
0-3m	Extreme	Extreme	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High
Notes: (i) N/A= not applicable (ii) Permeability classification 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 'Extreme' for the groundwater beneath the majority of the Site. The anticipated depth to bedrock based on the 'High 'groundwater vulnerability rating is between 3.0mbGL and 5.0mbGL. The southern portion of the site has been assigned a groundwater vulnerability rating of 'Moderate'. The anticipated depth to bedrock based on the 'Moderate' groundwater vulnerability rating is between 5.0mbGL and 10.0mbGL.

Figure 4.7 Groundwater Vulnerability - (High)

4.5 Site Investigation works.

Based on information provided by Garland 2025, A large proportion of the site has previously been filled with construction and demolition waste, mostly clay with stones and boulders but also containing waste associated with being from construction sites. This has elevated the site above the existing levels and has raised the majority of the site higher above the ground water level. In 2010 a geotechnical and environmental investigation was undertaken in conjunction with Limerick Council. In 2024, GARLAND witness 5 number trial holes to verify the 2010 investigation.

The 2010 investigation noted in some test locations that perched ground water was encountered typically at a change in ground strata and permeability rates. Similarly, 3 of the 2024 trial holes some water ingress from perched locations. It is not apparent that any test location met bedrock, despite the mapping and available desk study data suggesting this should be relatively shallow.

Figure 4.7 – 2010 and 2024 Site Investigation Locations

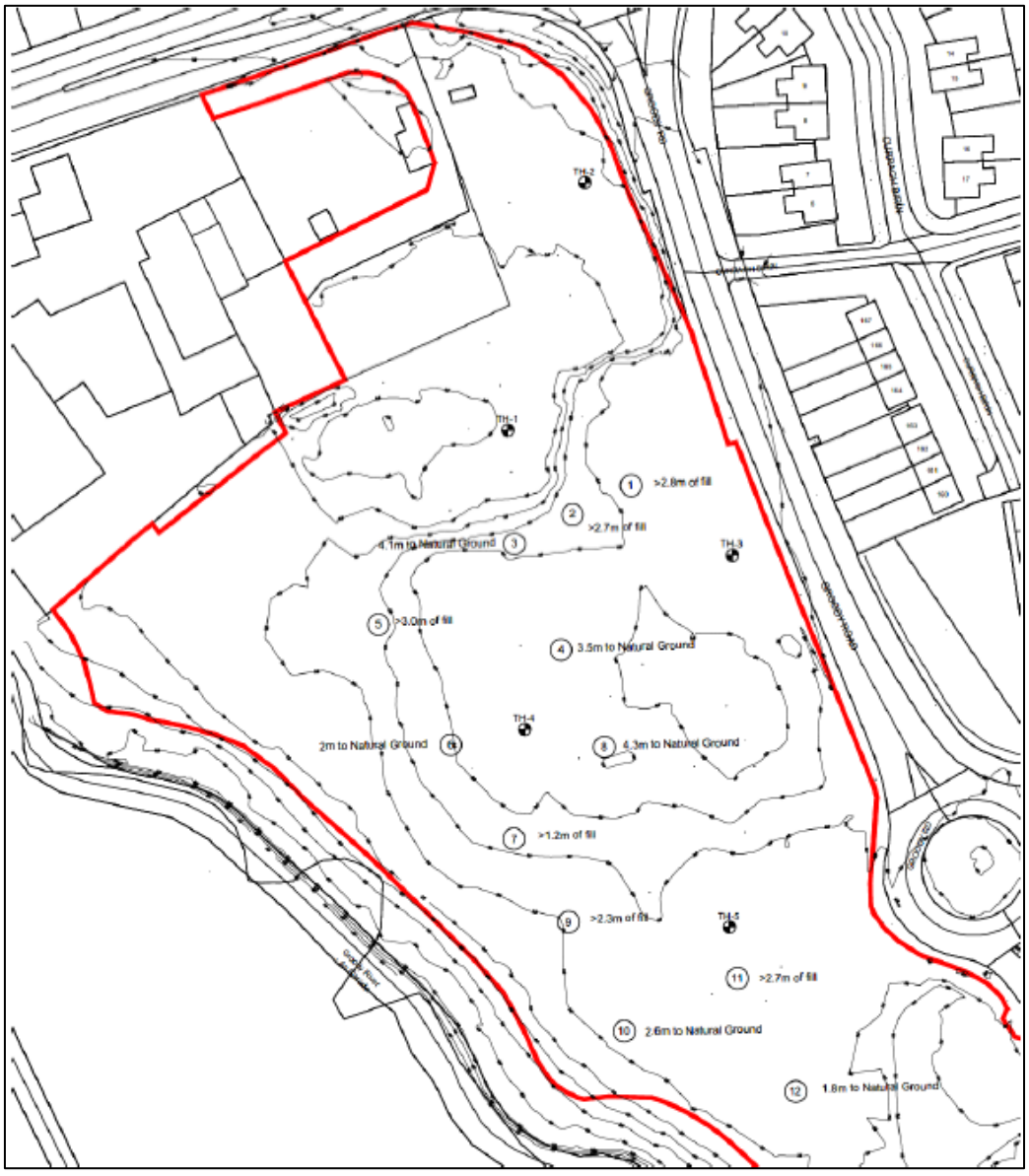


Table No 4.2 Trial Holes Log Details from Site Investigations Carried out by GARLAND

Trial Hole No	1	2	3	4	5
Depth	1.8m	1.4m	3m	2.5m	2.1m
Original Ground d Found	Yes	No	No	No	No
Typical Contents Inspecte d Visually	C+D Waste incl: Clay Stones incl up to boulder size Galvanised sheeting Wood Bricks Plastic Piping/cables	C+D Waste incl: Clay Stones incl up to boulder size Concrete kerbs Blocks Timber post Insulation (small amount) plastic	C+D Waste incl: Clay Stones incl up to boulder size Concrete kerbs Concrete with rebar, Bicks Drain pipe, Cooper pipe plastic	C+D Waste incl: Clay Stones incl up to boulder size Plastic drain Plastic bottle Timber Pipes cables bricks	C+D Waste incl: Clay Stones incl up to boulder size Plastic Wood
Notes	Possibly most non clay, stone material. Water at base, possibly perched on natural ground	noted Terminated by obstruction. Water ingress		Water ingress noted	Black coloured layer present within top 1m and black appearing at base of trial pit

4.6 Site Walkover and Water Sampling

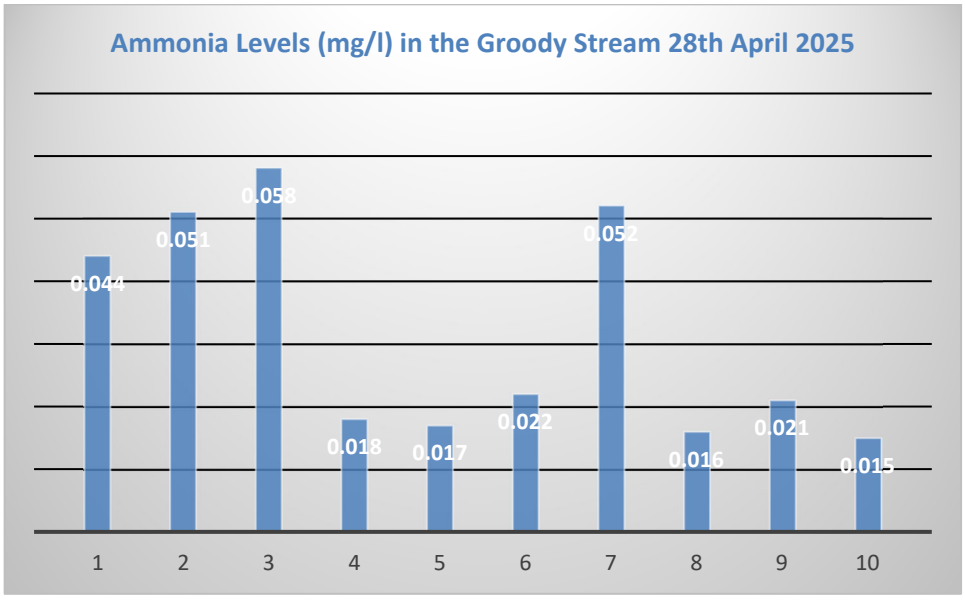
The site was visited on the 28th April 2025 and the river was walked and sampled were taken in 10no locations to present a snapshot of the overall quality of the river in terms of pH and Ammonia.

Figure 4.8 Water Sampling Locations 28TH April 2025.

Table 4.3 Water Sampling Results from the River Groody

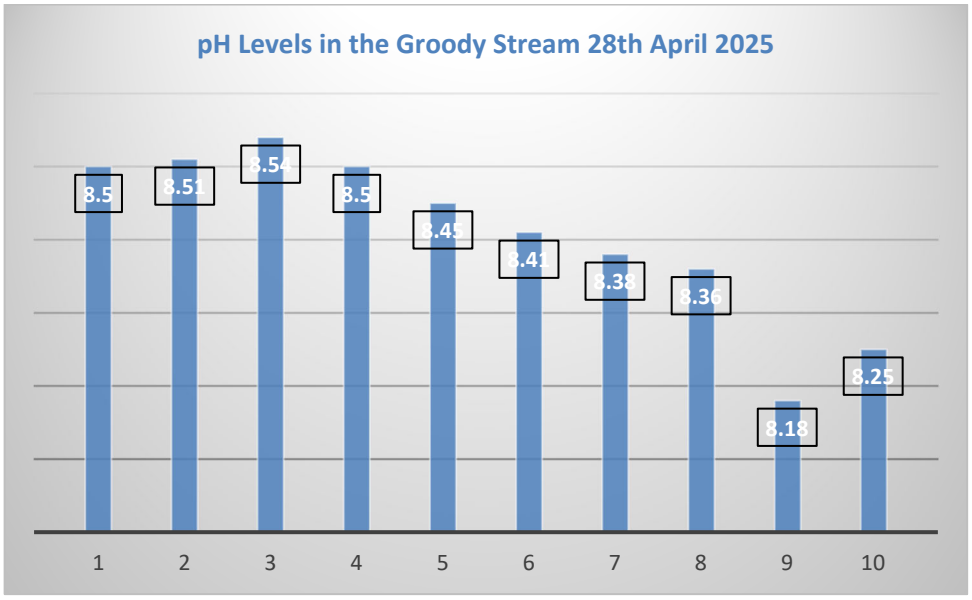
Monitoring Station	DO Levels (mg/l	pH (pH Units)	Ammonia (mg/l)
Indicative Quality Threshold	-	6 – 9 (Good Water Quality)	0.065 (Good Water Quality)
1	9.82	8.50	0.044
2	9.95	8.51	0.051
3	9.72	8.54	0.058
4	9.83	8.50	0.018
5	9.72	8.45	0.017
6	9.89	8.41	0.022
7	9.31	8.38	0.052
8	9.62	8.36	0.016
9	9.88	8.18	0.021
10	9.91	8.25	0.015

Graph 4.2 Ammonia Results Samples No. 1 – 10 – Groody Stream



From the water samples sampled on the 28th April 2025, Water chemistry data indicate no significant difference on Groody upstream and downstream of the site values for ammonia were comparable. The data indicate all the ammonia samples are within the threshold for the EQS (0.065 mg/l N).

Graph 4.3 pH Results Samples No. 1 – 10 – Groody Stream



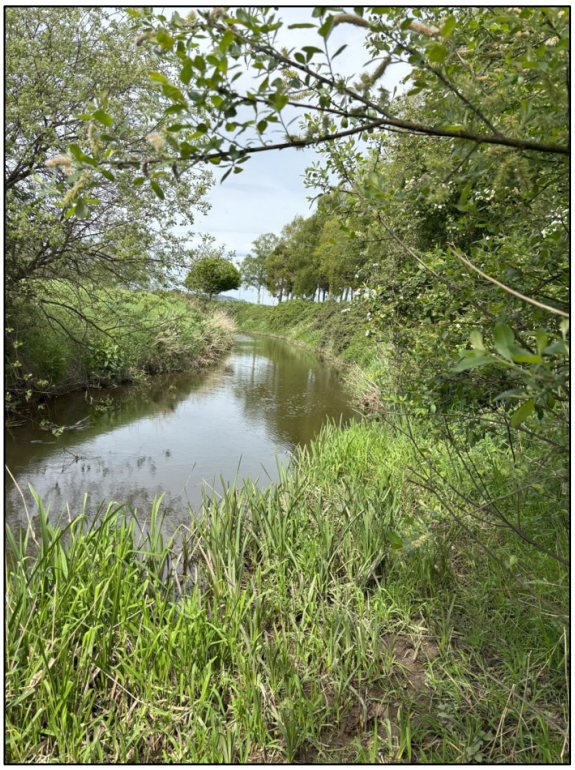
From the water samples sampled on the 28th April 2025, PH indicate no significant difference on Groody upstream and downstream of the site values for pH were comparable. The data indicate all the pH samples are within the threshold acceptable (6-9 pH Units).

4.5.1 Photographs – River Groody Sampling Points (28th April 2025)

Sample Location No. 1

Sample Location No. 2

Sample Location No. 3



Sample Location No. 4

Sample Location No. 5

Sample Location No. 6

Sample Location No. 7

Sample Location No. 8

Sample Location No. 9

Sample Location No. 10

4.7 Flood Risk

The site-specific flood risk assessment (SSFRA) report produced by Garland 2025) assessed the potential flood risk to the site associated with the Coastal flooding from the River Shannon, fluvial flooding, pluvial flooding, groundwater, and drainage system failures due to human error or mechanical system failure. No indication of historic or predicted flooding were identified for the site. The following is concluded regarding flood risk:

- The CFRAMS fluvial study and LCCC Development Plan maps confirm that a small portion of the site is located in Flood Zone A and Flood Zone B.
- As a result of the position and level of the proposed development when compared to the surrounding areas, the fluvial flood risk to the proposed development site is considered to be LOW subject to mitigation measures being employed.
- Furthermore, the buildings within the development are being constructed on the higher areas of the existing site in proximity to the proposed road at the eastern boundary. The minimum building finished floor levels are proposed at 7.80m OD approximately 1m above the 0.1% AEP flood level to allow for freeboard and climate change.
- The CFRAMS coastal hydraulic model results in the vicinity of the development indicates that tidally influenced flooding of the River Shannon does not extend to this section of the river and that the fluvial flood maps are to be used, refer to Figure 7 below. Therefore, coastal flooding is not considered a risk for the development.
- The design of a new storm drainage network for the development on the lands will address any pluvial flooding issues on the site. The new surface water connection is being made to the existing Groody River and a non-return valve is to be installed at the outfall headwall to ensure no flood waters enter the storm water network.

4.7.1 Flood Mitigation Measures

As a result of the flood risk assessment, the following mitigation measures have been used during the design of the mixed-use development:

- The topography of the Flood Zone A & B lands at the western and southern boundaries of the site will remain and no development is proposed for this area of the site.
- The topography of the Flood Zone C lands adjoining the Flood Zone A& B extents have been retained at very similar levels to existing site levels.
- All buildings are located within Flood Zone C and have a minimum finished ground floor level of 7.8m OD. This level is approximately 1m above the 0.1% AEP flood level to allow for freeboard and climate change.
- The Electrical Substation if required will be built outside of the Flood Zone A& B areas and at a level of 7.8m OD.
- In the event of emergency, all buildings can be accessed from roads above the 0.1% AEP flood level.
- The surface water discharge from the site is limited to the existing greenfield run-off to prevent downstream flooding.
- The surface water outfall from the site will contain a non-return valve.
- We note no basement construction is proposed for the development.

All available existing information has been reviewed regarding flood risk in the location of the proposed development. This development meets the requirements for sustainable development under the Flood Risk Management Guidelines. A series of mitigation measures against flooding have been adopted in the design of the development, namely constructing the development within the zoned lands outside the flood zone, maintaining a green open space for the flooding to occur, raising building levels well in excess of predicted flood levels and maintaining access above the flood level from the adjoining existing road in case of emergency.

All development within the site is being undertaken within Flood Zone C and the Flood Zone A & B areas are being maintained. Therefore, a justification test is not required for the development.

4.8 Water Use and Source Protection

A review of the GSI wells and springs database (GSI, 2025) was conducted to identify registered wells and groundwater sources. There are no regional groundwater supplies or Source Protection Areas (SPA) identified within this area. The nearest SPA sites are approximately 11km east of Murroe.

There is an existing well North of the site, reference IE_GSI_GW_Well_19928 which appears to have been drilled in 1973 with the site reference "Parkway Motor Inn". However, the area is serviced by public mains therefore it is unlikely that many wells are currently used for potable supply.

Table 4.9 Groundwater Sources Within 2km of the Site.

4.9 Water Quality

4.9.1 Published Regional Groundwater Quality

The EPA groundwater monitoring data (EPA, 2025) was reviewed and there are no groundwater quality monitoring stations within a 2km radius of the site or that are hydraulically connected to the site.

4.9.2 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 4-3.

4.9.3 Receiving Water Quality – Castletroy Wastewater Treatment Plant (WWTP)

Foul water from the site will be discharged via the Castletroy WWTP to the Shannon Estuary Lower transitional waterbody. The WWTP is operated under relevant statuary approvals. The most recent available Annual Environmental Report (AER) for the Castletroy WWTP is 2023 (UE,2023).

The AER identified that the final effluent was compliant with the Emission Limit Values (ELV) specified in the discharge license (D0019-01). The parameters met the ELV's included biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total nitrogen and total phosphorus. A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

Table 4.4. Receiving Water Quality – Castletroy Wastewater Treatment Plant (WWTP) Aer 2023.

Parameters	Number of Samples	Annual Max	Annual Mean
Total Nitrogen mg/l	12	46	27
ortho-Phosphate (as P) - unspecified mg/l	12	3.66	2.08
COD-Cr mg/l	14	676	341
Total Phosphorus (as P) mg/l	12	7.13	3.73
Suspended Solids mg/l	12	296	104
BOD, 5 days with Inhibition (Carbonaceous mg/l	13	456	154
Ammonia-Total (as N) mg/l	12	33	20
Hydraulic Capacity	N/A	18679	8299

4.10 Water Framework Directive

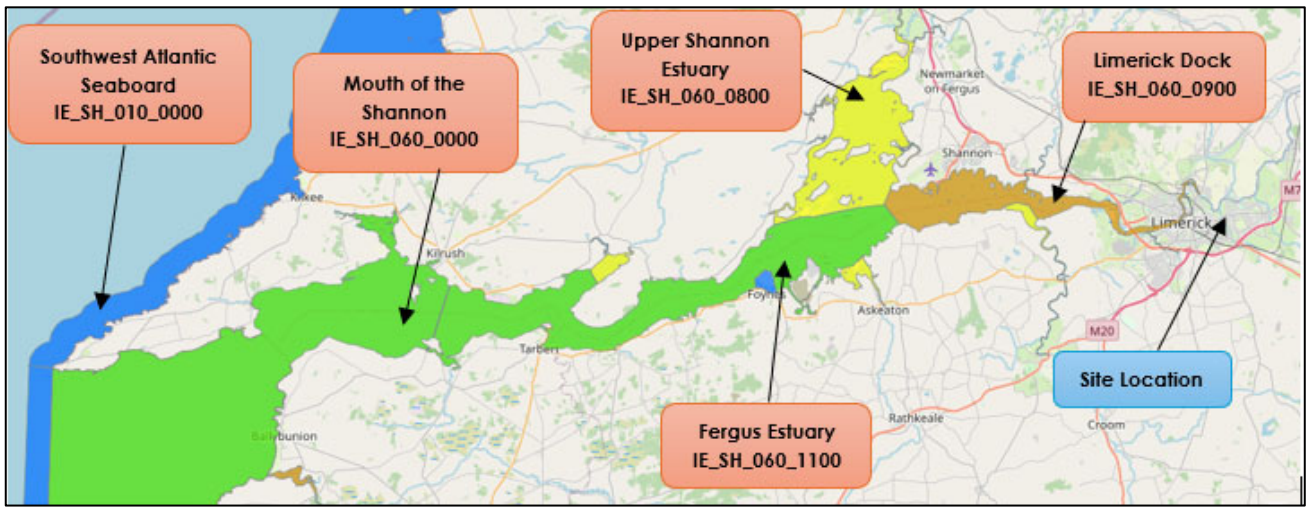
The WFD status for river, lake, groundwater, transitional and/or coastal water bodies that have a potential hydraulic connection to the subject site as recorded by the EPA (EPA, 2025) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 4.5 and presented in Figure 4-6 and Figure 4-7.

Table 4.5. Water Framework Directive Status

Waterbody Name	Waterbody EU Code	Location from Site	Distance from Site (km)	WFD Status (2016-2021)	WFD Risk	Hydraulic Connection to the Site
Surface water Bodies						
Groody River	IE_SH_25S012600	West	<0.1km	Moderate	Under Review	Yes, via groundwater and surface water drainage from the proposed developed
Shannon (Lower)	IE_SH_25S012600	North	0.79km	Moderate	Under Review	Yes, via downstream of the Groody river waterbody.
Transitional Water Bodies						
Limerick Dock	IE_SH_060_0900	Northwest	4.0km	Poor	At Risk	Yes, via downstream of the Groody and Shannon river waterbodies.
Upper Shannon Estuary	IE_SH_060_0800	Northwest	8.5km	Poor	At Risk	Yes, via downstream of

						the Groody and Shannon river waterbodies.
Fergus Estuary	IE_SH_060_1100	Northwest	27km	Moderate	At Risk	Yes, via downstream of the Groody and Shannon river waterbodies.
Lower Shannon Estuary	IE_SH_060_0300	Northwest	27km	Good	At Risk	Yes, via downstream of the Groody and Shannon river waterbodies.
Coastal water Bodies						
Mouth of the Shannon	IE_SH_25S012600	West	60km	Good	Not at Risk	Yes, downstream of the Upper and Lower Shannon Estuary Transitional waterbodies.
Southwest Atlantic Seaboard	IE_SH_010_0000	West	95km	High	Not at Risk	Yes, downstream of the Upper and Lower Shannon Estuary Transitional water bodies.
Groundwater Bodies						
Limerick City East	IE_SH_G_138	West	N/A	Good	At Risk	Yes, underlying the Site.

Figure 4.10 Transitional and Costal Water Bodies



4.10.1 Nature Conservation

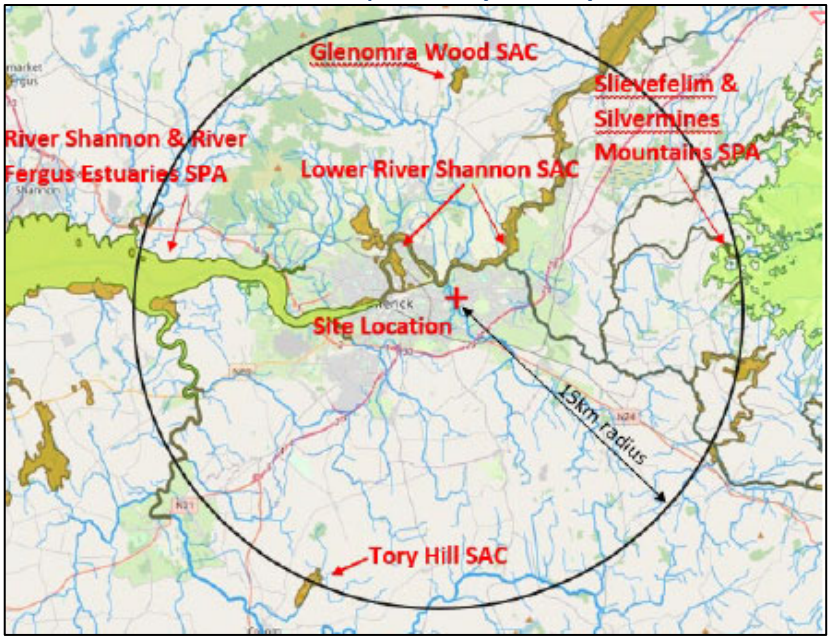
The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). SACs and SPAs are collectively known as Natura 2000 or European sites (referred to hereafter as Natura 2000 site). National 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.

Although there are a number of sites within the 15km radius of the site as indicated in Figure 4, a more accurate assessment is where the Source- Pathway-Receptor (SPR) model is applied together with the Zone of Influence (ZOI), which in the case of rivers may be outside of the 15km radius (OPR, 2021). Therefore, of the five sites identified in the Stage 1 Screening Report, the European Sites where there may be a potential impact as a result of the SPR where further assessment was required, are the Lower River Shannon SAC and River Shannon and the River Fergus

Table 4.6 European Sites within 15km of the development site (EPA, 2025)

European Site	Distance from Proposed Development	Screening Summary
Lower River Shannon SAC	780m following water courses	There are potential direct impacts on Otter Lutra lutra as the site of the proposed development is located approximately 780m from the SAC and therefore requires further assessment There are potential pathways for indirect impact on the Annex species of the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. These have been identified in the form of emissions to surface water which has the potential to affect the supporting habitat of the species downstream of the proposed development site. Consequently, the potential for indirect impacts on the Annex species associated with the SAC and SPA requires further assessment.
River Shannon and River Fergus Estuaries SPA	4.5km following water courses	

Figure 4.11 European Sites within 15km of the development site (EPA, 2025)



There are five (5No.) Natura 2000 sites that are identified with a potential hydraulic connection to the site and Proposed Development. There are also two (2No.) pNHA identified with a potential hydraulic connection to the site and Proposed Development. The Natura 2000 sites and other protected and designated sites or areas with a potential hydraulic connection to the site are summarised in Table 4-5.

Groody Developments was commissioned by the Applicant to prepare an Appropriate Assessment (AA) Screening Report (Russell Environmental Ltd, 2025) in relation to the Proposed Development. The AA Screening Report (Russel Environmental Ltd ,2025).

Accordingly, a Natura Impact Statement (NIS) Report (Russell Environmental ltd 2025) was prepared for the Proposed Development and the conclusion is as follows:

Conclusion of Natura Impact Statement

The proposed development, as planned, will not adversely affect the integrity of the identified European sites. During this assessment, the emissions to surface water were identified as a pathway for potential indirect effect on the Qualifying Interests of the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

Potential pathways for indirect impacts in the form of surface water pollution/particulate matter during construction and operation of the proposed development were identified as well as potential direct impacts on Otter Lutra lutra . Mitigation measures to avoid the potential for any significant impacts via any of the pathways identified were outlined in Section 4.4.
It can be excluded, on the basis of objective scientific information, that the project, individually or in combination with other plans or projects, will not affect the integrity of the European Sites (Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA)'

4.10.2 Drinking Water

The river drinking water protected areas (DWPA) are represented by the full extent of the Water Framework Directive (WFD) river waterbodies from which there is a known qualifying abstraction of water for human consumption as defined under Article 7 of the WFD.
There are no surface water drinking water sources, under Article 7 of the Water Framework Directive, identified by the EPA (EPA, 2025) within a 2km radius or hydraulically downstream of the site.

4.10.3 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 West Shannon Ballylongford IE_SH_060_0000 located approximately 60km west of the site.

4.10.4 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."
The closest designated nutrient sensitive area is the Lough Derg on the River Shannon located approximately 15.0km upstream of the site.

4.10.5 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.

The closest designated Bathing Water location is Cappagh Pier Kilrusk IESHBWC060_0000_0100 located proximately 61.0km downstream of the site. This site has a bathing water quality status of good.

4.10.6 Water Action Plan (WAP) 2024-2027 Programme of Measures

The Water Action Plan sets out the actions planned for implementation between now and the end of 2027. With only 52% of rivers; 48% of lakes and 63% of coastal waterbodies currently reaching the required water quality standard set by EU and national law, immediate and comprehensive action is essential to succeed in this Plan and achieve improvements.The Water Action Plan (WAP) provides information on the status and planned actions for various water bodies in Ireland including the River Shannon. These entries offer insights into the specific measures being considered or implemented to improve the ecological status of this watercourses. Agriculture is the top significant pressure impacting 60% of the 35 At Risk waterbodies within the Lower Shannon and Mulkear Catchment, followed by 26% impacted by Hydromorphological Pressures and 11% by Forestry.

5.0 WFD ASSESSMENT

5.1 Screening of Potential Effects to Waterbody Status

5.1.1 Surface Waterbodies

Potential effects of the proposed development on the WFD surface waterbody status both during construction and operation have been considered. Immediate downstream waterbodies have been screened in due to their proximity; these include the Groody _20_23327 through to the Groody_20_2025. The Groody__20_3327 has been screened out for further assessment as it is upstream of site and Proposed Development and there are no proposed construction or operational activities that could propagate upstream and adversely affect the waterbody.

The Shannon Estuary Lower has also been screened in as it receives treated wastewater from the Castletroy WWTP which the Proposed Development will be contributing to. Lower Shannon and downstream waterbodies have been excluded based on the substantial water volumes associated with transitional and coastal waterbodies and their significant distance from the site and Proposed Development. The Proposed Development is anticipated to have no potential to cause a deterioration in the status of these waterbodies or hinder the future attainment of good surface water quality objectives.

5.1.2 Groundwater bodies

The underlying Limerick City East GWB has been screened in due to its proximity to the works. No other groundwater bodies are seen as seen to be sufficiently close or hydraulicly connected to have their status impacted as a result of the Proposed Development.

5.2 Risk Evaluation of Source-Pathway-Receptor Linkages

A risk-based assessment of the Source-Pathway-Receptor Model and the potential risk linkages associated with the Construction Phase and Operational Phase of the Proposed Development was undertaken. The results were evaluated to determine if the Proposed Development could potentially impact any potential receptors associated with the Site.

Table 5-1. Conceptual Site Model (Source- Pathway Receptor) and Risk Evaluation

Source	Pathway	Receptor	Risk Evaluation
Construction Phase			
Discharge of Contaminants to Ground / Groundwater	Vertical and Lateral Groundwater Migration in Bedrock Aquifer	Limerick City East GWB Receiving Surface Waterbodies Protected Sites	**Low to Moderate Risk (worst-case unmitigated scenario)** Remediation of existing filled material within the site. These works will primarily take place above the previous natural ground level. the groundwater vulnerability will be increased and there will be a more direct pathway for surface contaminants to enter the underlying bedrock aquifer and migrate towards downgradient receiving surface water bodies. will likely be confined to the immediate vicinity of the site. In a worst-case scenario during the remediation 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 and downgradient receiving surface water receptors (i.e., Groody River and Lower Shannon. Taking account of the distance downstream and the attenuation and dilution which will occur, it is considered

			that there is an indirect negligible risk to the downstream receiving waterbodies. Appropriate design avoidance and mitigation measures will prevent any potential impact to the receiving water quality.
Discharge of Surface Water Runoff (i.e., Rainwater)	Discharge to surface water bodies	Groody River Shannon River Protected Sites	**Low to Moderate Risk (worst-case unmitigated scenario)** During groundwork and excavations, the groundwater vulnerability will be increased and there will be a more direct pathway for surface contaminants to enter the underlying bedrock aquifer and migrate towards downgradient receiving surface water bodies. However, based on the relatively limited recharge potential, it is considered that there is some protection of groundwater from migration of dissolved phase contaminants to the aquifer which will likely be confined to the immediate vicinity of the site. In a worst-case scenario during 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 and downgradient receiving surface water receptors (i.e., Groody River and Lower Shannon. Taking account of the distance downstream and the attenuation and dilution which will occur, it is considered that there is an indirect negligible risk to the downstream receiving waterbodies. The limited nature of the construction works means any impacts during construction are likely to be confined to the immediate receiving waterbodies Ensure remediated ground is appropriately screened and unsuitable and contaminated materials disposed of appropriately off site. Control runoff and prevent infiltration of hazardous substances during construction by implementing best practice construction methodologies. Appropriate design avoidance and mitigation measures will prevent any
Foul Water Discharge	Discharge to Mains Sewer	Receiving Surface Waterbodies (i.e., Lower Shannon Estuary Protected Sites	**Low Risk** Foul water during the construction phase of the Proposed Development will be either removed by tankers in accordance with waste management legislation and managed accordingly or discharged under consent to the mains UE drainage network and ultimately discharged to the receiving surface waterbodies. Foul water from the site will only be

			discharged to the UE network under the appropriate consents from the UE and therefore, the Proposed Development will not cause a potential impact on the WFD status of any receiving waterbody or protected sites.
Flooding of Site During Construction	Mobilisation of Construction Materials and Sediments	Receiving Surface Waterbodies Groody River (IE_SH_25S012600	**Low Risk** The CFRAMS fluvial study and LCCC Development Plan maps confirm that a small portion of the site is located in Flood Zone A and Flood Zone B. Flooding affecting the Site during construction is considered extremely unlikely. Furthermore, the buildings within the development are being constructed on the higher areas of the existing site in proximity to the proposed road at the eastern boundary. The minimum building finished floor levels are proposed at 7.80m OD approximately 1m above the 0.1% AEP flood level to allow for freeboard and climate change.
Operational Phase			
Discharge of Surface Water Runoff	Discharge to Surface Water Drainage Network	Receiving Surface Waterbodies Groody River (IE_SH_25S012600Protected Sites	**Low Risk** 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. Appropriate drainage design in the form of SuDS will prevent any potential impact to the receiving water quality of downstream waterbodies (i.e., Groody River (IE_SH_25S012600 and River Shannon) and protected sites.
Discharge of Contaminants to Ground / Groundwater	Vertical and Lateral Groundwater Migration in Bedrock Aquifer	Limerick City East GWB Receiving Surface Waterbodies (i.e., Protected Sites	**No / Low Risk** Based on the design of the Proposed Development there is limited potential sources of contaminants to ground/groundwater. 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. 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 potential impacts to the receiving water quality of the Limerick East GWB and downstream water bodies (i.e., the River Shannon and Groody River) and protected sites.

Foul Water Treatment and Discharge	Discharge to Mains Sewer	Receiving Surface Waterbodies (i.e., Shannon Estuary Lower). Protected Sites	**Low Risk** Foul water during the operational phase of the Proposed Development will be discharged to the UE drainage network and ultimately discharged to the Lower Shannon via the Castetroy WWTP 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 have a potential impact on the WFD status of any receiving waterbody or protected sites.
Hydromorphology	Discharges to the Groody River	Receiving Surface Waterbodies Protected Sites	**Low Risk** The proposed SuDS drainage design will maintain current flow paths as well as discharge rates and volumes to the Groody River (IE_SH_25S012600and the wider catchment

Table 5-2. Summary of WFD Status for Unmitigated Scenario

WFD Waterbody I.D.	WFD Status (2016-2021)	Assessed Potential Status Change without mitigation
Construction Phase		
Groody _2053 – (Adjacent to Site)	Moderate	Poor
Groody _2067 – Down Stream	Moderate	Poor
Groody _2063 – Down Stream	Moderate	Poor
Shannon Lower – Down Stream	Moderate	Moderate
Limerick City East GWB	Good	Moderate
Operational Phase		
Groody _2053 – (Adjacent to Site)	Moderate	Poor
Groody _2067 – Down Stream	Moderate	Poor
Groody _2063 – Down Stream	Moderate	Poor
Shannon Lower – Down Stream	Moderate	Moderate
Limerick City East GWB	Good	Moderate

6.0 DESIGN AVOIDANCE AND MITIGATION

The assessment of the potential impacts on the receiving environment takes account of the embedded design avoidance measures and standard good practice construction methods to reduce the potential for impacts to the water environment. These are outlined below together with additional specific measures based on the findings of this assessment.

6.1 Construction Phase

The first phase of the project is the Remediation of existing filled material within the site. These works will primarily take place above the previous natural ground level

During the construction phase, all works will be undertaken in accordance with the Construction Environmental Management Plan (CEMP) Garland, 2025 submitted with the planning application). The CEMP (Garland, 2025) takes into account the proposed mitigation outlined in the Ecological Impact Assessment (EcIA) Report (Russell Environmental Ltd 2025) and the Natura Impact Statement (NIS) Report (Russell Environmental, 2025) also submitted with the planning application. 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 the ground 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 (if required).
- Management and control of soil and materials.
- Appropriate fuel and chemical handling, transport, and storage.
- 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.

Managing silt and sediment at the source is the most effective method to prevent siltation of watercourses. Silt fencing will be used to isolate the Site from receiving surface water bodies, and to isolate designated surface water percolation areas. Vegetation buffers will be retained, measured, and marked out wherever possible in advance of works commencing. Silt fencing will then be installed along all watercourses including drains, in advance of works commencing. Silt fencing is also required around the following areas prior to works commencing stockpiles, percolation areas associated with settlement tanks, and the water management system onsite.

Every precaution will be taken to ensure that the installation of the silt fencing itself does not result in emissions of silt into watercourses. To this end, sequential excavation, and reinstatement of turves as the silt fence is trenched will be implemented. Silt fencing will be placed as close as possible to the construction works while allowing for sufficient space for maintenance and clearance of silt and debris. Regular inspections of the silt fences will be undertaken to ensure they are functioning as intended, and no damage has occurred (e.g., holes, blown over in wind). The silt fencing will be amended as required and will remain in place for the duration of works and until exposed soils have revegetated.

Any drains within the site will be blocked or treated to prevent silt entering downstream watercourses. This will be accomplished with either dams, silt curtains in series downstream of the works, straw bales firmly posted to exit points to catch silt before leaving the site, or via dewatering bags on outflow pipes. These measures will be in place prior to works beginning.

Where water must be pumped from the excavations during the construction phase of the Proposed Development, 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 LCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water. The Contractor will be required to provide a site-specific dewatering plan, clearly setting out proposed excavation methodology, estimated dewatering rates, details of the proposed treatment system, and discharge location. Under no circumstances will any untreated wastewater generated onsite (from washing equipment, road sweeping etc.) be released to ground or to drains. Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite enters the public sewers.

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 concrete 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.

Fueling and lubrication of equipment will be carried out in a designated area of the Site away from any watercourses and drains (where it is 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). 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 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.

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.

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. 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 off site to a licensed facility or discharged to public sewer in accordance with the necessary temporary discharge licences issued by UE.

6.2 Operational Phase

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. 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 Casteltroy WWTP to the Lower Shannon under the appropriate consents from UE. As mentioned above, the Catletroy WWTP, which is operated in accordance with relevant statutory approvals issued by UE, is currently undergoing upgrade works to improve the final effluent discharge of several parameters from the facility including BOD, suspended solids, ammonia, DIN and MRP.

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 the WFD status of any receiving waterbody or protected sites.

6.3 Residual Risk to Waterbody Status

The effect of the design avoidance and mitigation measures have been assessed and summarised in Table 6-1. In all cases the proposed measures are sufficient to meet WFD objectives. Groody_3327 and Groody_2056 Upstream were screened out.

Table 6-1. Summary of WFD Status for Unmitigated and Mitigated Scenarios

WFD Waterbody I.D.	WFD Status (2016-2021)	Assessed Potential Status Change with mitigation
Construction		
Groody _2053 – (Adjacent to Site)	Moderate	Moderate
Groody _2067 – Down Stream	Moderate	Moderate
Groody _2063 – Down Stream	Moderate	Moderate
Shannon Lower – Down Stream	Moderate	Moderate
Limerick City East GWB	Good	Good
Operational Phase		
Groody _2053 – (Adjacent to Site)	Moderate	Moderate
Groody _2067 – Down Stream	Moderate	Moderate
Groody _2063 – Down Stream	Moderate	Moderate
Shannon Lower – Down Stream	Moderate	Moderate
Limerick City East GWB	Good	Good

6.4 Potential Impact on Protected Areas Objectives

Based on the findings of this assessment, it is considered that in applying the precautionary principle and assessing a worst-case scenario there is no identified potential negative impact associated with the Proposed Development on the Protected Areas individually or in- combination.

6.5 Potential Impact on Water Action Plan Programme of Measures

Based on the findings of this assessment, it is considered that in applying the precautionary principle and assessing a worst-case scenario the Proposed Development will have no adverse impacts on the implementation of the WAP Programme of Measures. The change of use from agricultural to residential land may reduce agricultural pressures. Adverse impacts associated with historic urbanisation will be negated through the implementation of SuDS and appropriate treatment of foul effluent from the site.

7.0 CONCLUSIONS

The findings of the risk-based assessment identified that in the absence of any mitigation and avoidance measures there could be a potential impact on the waterbody status within receiving water bodies associated with the Proposed Development, specifically within a local zone of the Limerick City East GWB and locally within the Groody River and Lower Shannon.

The mitigation measures as outline above 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 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 Limerick City East GWB and locally within the Groody River and Lower Shannon and downstream surface waterbodies as a result of the Proposed Development taking account of embedded design avoidance and mitigation measures.

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