CLOGHROE **SHD**

VOLUME II | EIAR

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CLOGHROE EIAR VOL II

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1 Introduction

1.1 BACKGROUND

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Cloghroe Development Limited to assess the likely significant environmental effects of a proposed strategic housing development [SHD] at Coolflugh, Cloghroe, Tower, Co. Cork.

The EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and relevant Irish legislation as well as in conformity with guidance in the European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' (2017) and EPA's Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports' (2017).

The proposed development consists of the construction of 198 no. residential units, two storey creche, two storey café building, ESB substations, and single storey retail food store. The proposed development will be constructed on lands of circa 7.5 hectares in area to the west of the R617 Cloghroe-Blarney Road. A full description of the proposed development is provided in Chapter 2 of this EIAR.

The sites location within the wider settlement of Tower is illustrated in Figure 1.1 as shown.

1.2 PURPOSE OF EIA

EIA requirements are now governed by Directive 2014/52/EU, which amends Directive 2011/92/EU ("the EIA Directive"). The primary function of the EIA Directive is to ensure that projects that are likely to have significant effects on the environment are subjected to an assessment of their likely impacts.

Ireland's obligations under the EIA Directive have been transposed into Irish law and, in particular, the planning consent process through the provisions of Part X of the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, 2001, as amended.

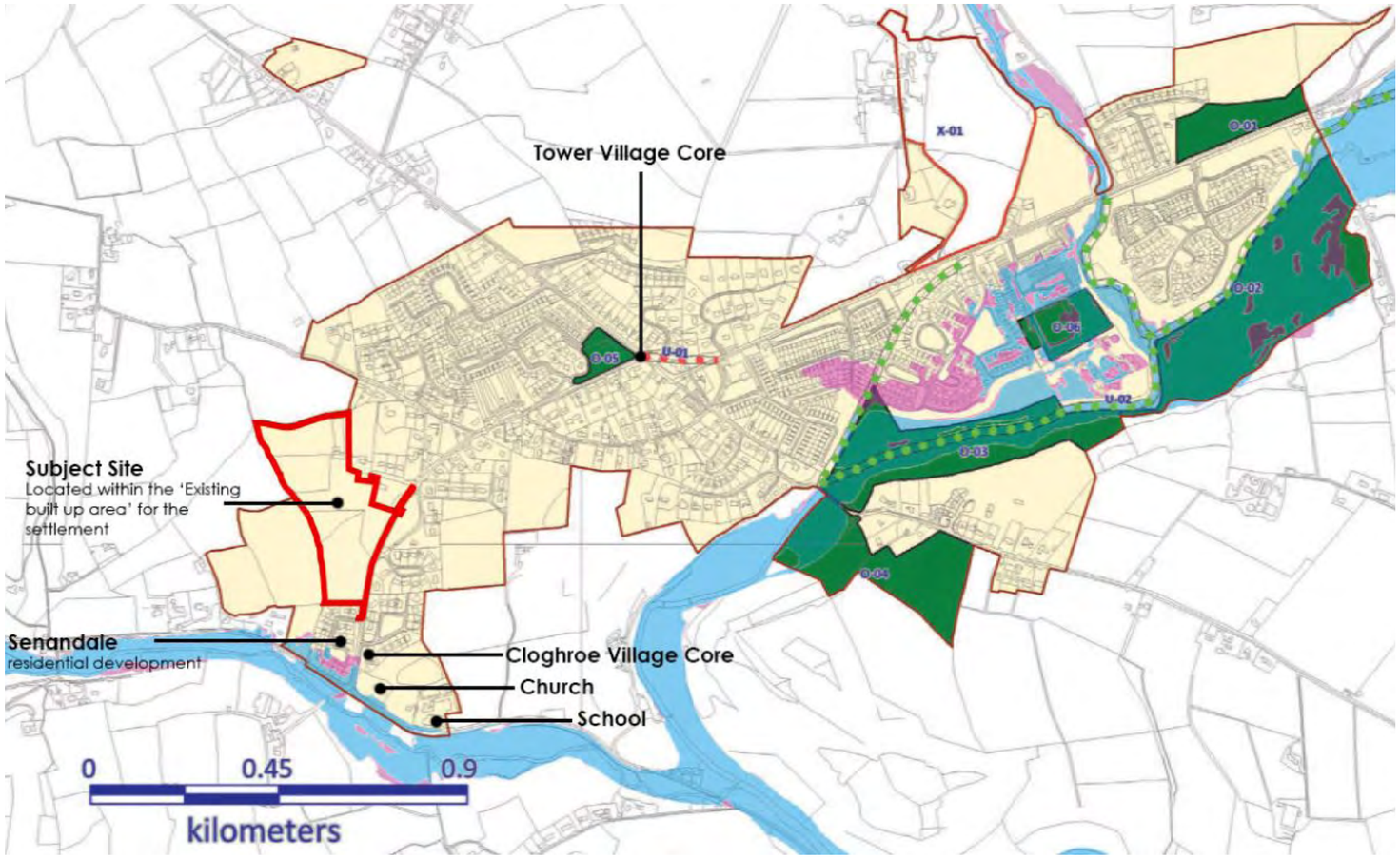

Figure 1.1 Site Location Map

Article 1(1)(g) of the 2014 EIA Directive (2014/52/EU) outlines the stages and steps taken when completing an EIA.

(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.

This is reflected in Article 171A of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which states that '*Environmental Impact Assessment'* means a process—

(a) consisting of—

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii) the examination by the planning authority or the Board, as the case may be, of—

(I) the information contained in the environmental impact assessment report,

(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii)

(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health;

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;

(III) land, soil, water, air and climate;

(IV) material assets, cultural heritage and the landscape;

(V) the interaction between the factors mentioned in clauses (I) to (IV), and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

This EIAR has been prepared in accordance with the relevant provisions of the EIA Directive, the Planning and Development Acts and Planning and Development Regulations. In addition, the EIAR conforms to the guidance contained in the relevant EU and Irish guidance in respect of the preparation of an EIAR.

The objective of the EIA Directive is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of developments that are likely to have significant effects on the environment.

In addition to the legislation and guidelines referenced above, the Department of Housing, Local Government and Heritage's 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) provide practical guidance to An Bord Pleanála on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU.

The EPA guidelines list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding and reducing significant effects;
- Assessing and mitigating effects;
- Maintaining objectivity;
- Ensuring clarity and quality;
- Providing relevant information to decision makers; and
- Facilitating better consultation.

The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should 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 prescribed environmental factors which are:

(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).

This EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed strategic housing development at Coolflugh, Cloghroe, Tower, Co. Cork.

1.3 EIA METHODOLOGY

As per Article 5(1) of the 2014 Directive, an EIAR should provide the following information:

- Description of Project;

- Description of Baseline Scenario;
- Description of Likely Significant Effects;
- Description of Avoidance / Mitigation Measures;
- Description of Reasonable Alternatives (and rationale for chosen option); and
- A Non-Technical Summary.
- Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

In addition to the 2014 Directive, this EIAR has been informed by, but not limited to:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (Department of Housing, Local Government and Heritage, August 2018).
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, August 2017);
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA, September 2015);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union, 2013).
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Housing, Planning, Community and Local Government, 2017.
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).

We would also note that the pre-application discussions with the Planning Authority informed the content of the EIAR. The EIA process has been managed to ensure that the EIAR documentation and relevant analysis are confined to topics which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis have been limited to topics where the indirect, secondary or cumulative impacts are either wholly or dominantly due to the project under consideration.

The EIA process can be broadly described as set out in figure 1.2 as shown.

1.4 EIA SCREENING & SCOPING

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 by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment.

Article 93 of, and Schedule 5 to, the Planning and Development Regulations 2001 set out the classes of development for which a planning application must be accompanied by an environmental impact assessment report (EIAR).

Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001 prescribes the categories of, and thresholds for, prescribed development requiring EIA.

The subject proposal does not come under any of the prescribed development contained in Part 1 of Schedule 5.

Figure 1.2 EIA Process (Source: Page 12 of Preparation of guidance documents for the implementation of EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU).

By way of example, paragraph 10(b) of Part 2 of Schedule 5, which refers to Infrastructure Projects includes, includes:

(i) Construction of more than 500 dwellings

(ii) Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of, a development.

(iii) Construction of a shopping centre with a gross floor space exceeding 10,000 square metres.

(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.)"

However, the proposed development consists of a residential development of 198 no. residential units, retail food store of 1,895 square metres and surface car park of 101 no. spaces to serve the retail development on a site of 7.5 hectares in area. Accordingly, the proposed development is "sub-threshold" development.

However, section 172 of the 2000 Act also sets out the basis on which an EIA will be required for such a "sub-threshold" development. An EIA is required where a sub-threshold development is likely to have significant effects on the environment and therefore should be subject to EIA. Whether or not a proposed development will have a 'significant effect' is not determined by reference to relevant quantity, area or other limit thresholds but involves a consideration of factors such as the nature and location of a project. On this basis, the developer decided to prepare an EIAR in respect of the proposed strategic housing development, so as to enable the Competent Authority to carry out an Environmental Impact Assessment in respect of the proposed development.

Indeed, in circumstances where the application for permission relates to proposed strategic housing development, the provisions of Part 23 of the Planning and Development Regulations 2001, as amended, apply to the Board's consideration of the application. In this context, it is noted that in circumstances where, as in this case, a planning application for a sub-threshold development is accompanied by an EIAR and a request for a screening determination was not made, then the application shall be dealt with as if the EIAR had been submitted in accordance with section 172(1) of the Act.

EIA Scoping is the process of determining the content and extent of the matters which should be considered in the environmental information contained in an EIAR.

The Draft Guidelines on the information to be contained in environmental impact assessment reports, (EPA, August 2017) state that 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. Scoping is defined in the European Commission EIAR guidance (EC, 2017) as:

> *"The process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process."*

Whilst section 7(1)(b) of the Planning and Development (Housing) and Residential Tenancies Act 2016, as amended, enables a request for a scoping opinion to be submitted to An Bord Pleanála, such a scoping opinion is not mandatory and was not sought in this instance. Rather, in this case, the content of this EIAR was informed by an informal scoping process carried out by the applicant, the design team and appointed EIAR consultants to identify the core issues likely to be most important during the Environmental Impact Assessment process.

In determining the extent and content of this EIAR, the authors have carefully considered the applicable EU and Irish legislative requirements, relevant EU and Irish guidance and pre-planning consultation meetings held with Cork City Council in accordance with Section 247 of the Planning and Development Act 2000 in November 2020. In addition, the following prescribed bodies were notified of the extent of the proposed development and of the fact that an EIAR was being prepared:

1. Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
2. The Heritage Council
3. An Taisce
4. Irish Water
5. Inland Fisheries Ireland (Southwest Region)
6. Transport Infrastructure Ireland
7. The National Transport Authority
8. Department of Local Government, Housing and Heritage
9. Department of Education and Skills
10. Cork County & Cork City Childcare Committees
11. National Parks & Wildlife Service
12. Office of Public Works

The particulars sent to the above bodies are contained in Appendix 1-1 with any responses received contained in Appendix 1-2.

1.5 PURPOSE & STRUCTURE OF THE EIAR

The primary purpose of this EIAR is to inform 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 provide an input into the decision-making planning process.

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

- Anticipating, avoiding and reducing significant effects
- Assessing and mitigating effects
- Maintaining objectivity
- Ensuring clarity and quality
- Providing relevant information to decision makers
- Facilitating better consultation.

The EIAR document provides information on any identified effects arising as a consequence of the proposed development. The EIAR documents the manner in which the project design incorporated mitigation measures; including impact avoidance, reduction or amelioration; to explains the manner in which significant effects will be avoided.

The key purpose of this EIAR document is to enable the competent authority to to form a reasoned conclusion, in the context of the decision-making process, on the significant effects of the project on the environment, based on the examination of the EIA Report.

Pursuant to the provisions of Article 5(1) of the EIA Directive, where an environmental impact assessment is required, the developer shall prepare and submit an EIAR which shall include at least:

(a) a description of the project comprising information on the site, design, size and other relevant features of the project;

(b) a description of the likely significant effects of the project on the environment;

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;

(e) a non-technical summary of the information referred to in points (a) to (d); and

(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

The EIAR shall include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. In addition, the developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under European Union or national legislation, in preparing the EIAR.

The EIAR is divided into 3 volumes:

- the non-technical summary comprising a concise, but comprehensive description of the project, its environment, the effects of the project on the environment, the proposed mitigation measures, and the proposed monitoring arrangements;
- The main report consisting of 15 chapters as outlined in the table of contents;
- The Appendices numbered in accordance with the chapter they relate.

Each chapter includes the following elements:

Introduction and Methodology

Description of Existing Environment/Baseline Scenario

Impact Assessment which considers the following effects as necessary.

- Indirect Effects
- Cumulative Effects.
- Do-Nothing Effects
- Worst Case Effects
- Indeterminable Effects
- Synergistic Effects

Mitigation Measures (including Monitoring) – Description of mitigation measures proposed for both construction and operational phases of the proposed development.

Residual Impacts

Identify, and assess significance of, any residual impacts.

Difficulties in Compiling Information - Any difficulties/restrictions on gathering information if applicable is stated.

References - Any external references in the report cited and listed at the end of each chapter.

All impacts or effects are described in following terms as in accordance with the "*Description of Effects"* outlined in Table 3.3 of the *2017 Draft Guidelines on Information to be Contained in Environmental Impact Assessment Reports*.

Quality: Positive, Neutral, Negative

Significance: Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Extent and Context: Size of area, population etc.

Probability: Likely, unlikely

Duration: Momentary (seconds to minutes); Brief (less than a day), Temporary <1 yr; Short-term 1-7 yrs, Medium Term 7-15yrs, Long Term 15-60 yrs, Permanent >60 yrs, Reversible (can be undone), Frequency (once, rarely, occasionally, frequently, constantly or hourly, daily, weekly, monthly, annually).

A Natura Impact Statement has also been prepared regarding the proposed development. Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests of the SAC and SPA and the implementation of the proposed mitigation measures, it has been concluded by the authors of this report that the project will not have any adverse effects on the integrity of the Great Island Channel Special Area of Conservation (SAC) and Cork Harbour Special Protection Area (SPA), or any European site.

1.6 EIAR TEAM & QUALIFICATIONS

HW Planning have coordinated the subject EIAR. Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018.

The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

> *'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality"*

Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the proposed development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

In accordance with the EIA Directive 2014/52/EU, we confirm that the EIAR has been carried out by fully qualified and competent experts in their relevant fields as outlined in this chapter. A full list of all consultants and the corresponding chapters that have been prepared is detailed below.

Planning Consultants: HW Planning

Address: 5 Joyce House, Barrack Square, Ballincollig, Co. Cork

Chapters Prepared: Chapter 1 – Introduction, Chapter 2 - Project Description, Chapter 3 - Alternatives Considered, Chapter 13 - Population & Human Beings, Chapter 14 - Interaction of Impacts and Chapter 15 - Summary of Mitigation Measures

Personnel: Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning. Harry has

22 years' experience in the planning profession comprising Local Authority roles and private practice. Harry has acted as planning lead on a wide variety of projects which have required EIAR's including the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

Landscape Architects: Forestbird Design

Address: Alting Cottage, Ballybranagh, Cloyne, County Cork

Chapters Prepared: Chapter 4 – Landscape & Visual

Personnel: Mike Waldvogel (principal of Forestbird Design) has more than 20 years experience as a practicing Landscape Architect and has carried out more than 30 LVIA's. He is a corporate member of the Irish Landscape Institute (ILI, no. PO7008).

Project Engineers/Traffic Consultants: MHL & Associates Consulting Engineers

Address: Carrig Mor House, 10 High Street, Douglas Road, Cork.

Chapters Prepared: Chapter 5 - Material Assets – Traffic & Transportation Chapter 6 - Material Assets – Services, Infrastructure & Utilities,

Personnel: Ken Manley BE CEng MIEI HDip Envm Eng FConsEI of MHL Consulting Engineers. Ken has been involved in the preparation of Traffic & Transportation Schemes for over 20 years and is fully competent in the use of the traffic modelling software used as part of this assessment, namely Junctions 9: PICADY, LinSig (Traffic Signal Design) and TRICS. Ken has been involved in the preparation of Civil Engineering Schemes for over 20 years and is fully competent in the use of the civil engineering software

Project Geologist: Atkins Ireland

Address: Unit 2B, 2200 Cork Airport Business Park, Cork, T12 R279

Chapters Prepared: Chapter 7 – Land, Soils & Geology

Personnel: Kieran Lynch BSc. MSc. LLB of Atkins Ireland Ltd. He has over 25 years' experience in Geo-Environmental Engineering Environmental Law and Waste Management. Kieran has prepared Land Soils and Geology Chapters and Waste Management Chapters for various EIARs for housing developments and other infrastructure projects in addition to peer reviewing overall EIARs. He has prepared numerous EIA Screening Reports, Construction Environmental Management Plans and Waste Management Plans.

Project Hydrologist: Irish Hydrodata

Address: Ballygarvan, Co. Cork. T12 HD5Y

Chapters Prepared: Chapter 8 – Water (Hydrology & Hydrogeology)

Personnel: Jim Walshe, BE, MEngSc MIEI C.Eng who is a director of Irish Hydrodata Ltd and has over 35 years' experience in water related investigations and studies.

Project Ecologist: Atkins Ireland /Greenleaf Ecology

Address: Unit 2B, 2200 Cork Airport Business Park, Cork, T12 R279 /Lissacreasig, Macroom, Co. Cork

Chapters Prepared: Chapter 9 - Biodiversity

Personnel: Paul O'Donoghue has a BSc (Zoology), MSc (Behavioural Ecology) and a PhD in avian ecology and genetics. Paul is a chartered member of the Society for the Environment (CEnv) and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Paul has over 20 years' experience in ecology; including extensive experience in the preparation of Habitat Directive Assessments / Natura Impact Statements (i.e. Appropriate Assessment under Article 6(3) of the EU Habitats Directive). Paul carried out the technical review of this report.

Emma Nickelsen has a BSc (Hons) in Environmental Biology and an MSc in Marine Biology. Emma has worked in ecological and environmental consultancy since 2017, working on a wide range of projects including bridge works, road construction, local amenity development and renewable energy. A focus of Emma's work to date has been on conducting Appropriate Assessment screenings, ecological appraisals and supporting the preparation of Natura Impact Statements and Ecological Impact Statements. Emma assisted in the preparation of this report.

John Deasy has a BSc in Environmental and Earth Systems; an MSc in Marine Science and an MSc in Ecological Assessment. He has 6 years' experience as an ecologist. John previously worked with Atkins, but now operates as a freelance ecologist with extensive experience in habitat surveying; mammal and bird surveys etc.

Karen Banks, Greenleaf Ecology is an established ecological consultancy with over 12 years' experience in ecological survey and assessment. Karen undertakes ecological due diligence and constraints survey before development or purchase of land. She also prepares Ecological Impact Assessment reports and chapters following best practice methodology and provide comprehensive reports to meet legislative requirements. She provides Appropriate Assessment (AA) services including AA Screening reports and statements and preparation of Natura Impact Statements and Natura Impact Reports. She also provides habitat and botanical surveys, mammal surveys, specialist bat surveys, and amphibian and reptile surveys.

Environmental Consultant: AWN Consulting

Address: The Tecpro Building, Clonshaugh Business & Technology Park, Dublin 17

Chapters Prepared: Chapter 10 - Noise & Vibration, Chapter 12 – Air Quality & Climate

Personnel: Alex Ryan, Acoustic Technician. Alex holds a BA, BAI and MAI in Mechanical and Manufacturing Engineering from Trinity College Dublin. At master's level, he specialised in aircraft noise reduction using aeroacoustic simulations. He is an associate member of the Institute of Acoustics. He has experience in the measurement and assessment of environmental noise including the preparation of noise and vibration impact assessments and EIARs (Noise and Vibration chapter). Furthermore, he has experience in acoustic measurement relating to environmental projects, infrastructure projects, wind farms and building acoustics.

Ciara Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd. She holds an MSc. (First Class) in Environmental Science from University College Dublin and has also completed a BSc. in Energy Systems Engineering. She is an Associate Member of both the Institute of Air Quality Management (AMIAQM) and the Institution of Environmental Science (AMIEnvSc). **S**he has been active in the field of air quality for over 4 years, with a primary focus on consultancy.

Built Heritage/Archaeology: John Cronin & Associates

Address: Unit 3a Westpoint Trade Centre, Ballincollig, Co. Cork.

Chapters Prepared: Chapter 11 - Cultural Heritage

Personnel: John Cronin of John Cronin and Associates. Mr Cronin holds qualifications in archaeology (B.A., University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and post-graduate qualifications in urban and building conservation (MUBC (UCD), 1999). He has accumulated over 25 years' experience in the compilation of archaeological, architectural and cultural heritage impact assessments

Project Architects: Deady Gahan Architects.

Address: Eastgate Village, Little Island, Co. Cork

Chapters Prepared: N/A

Personnel: Eamonn Gahan, Director -Architects Registration No. 04148

1.7 CUMULATIVE IMPACTS

The potential environmental effects of the proposed development have not been assessed in isolation. The potential impacts of this project has been considered in combination with other relevant permitted or proposed projects in the vicinity of the site and Plans for the area, which may result in cumulative environmental impacts.

1.7.1 Projects

Each of the projects listed in table 1.1 have been assessed for potential cumulative impacts. These projects were identified by using Cork City and Cork County Councils Planning Enquiry Systems and An Bord Pleanála's website.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Cork City Council Ref: 21/40620	Kevin McDonnell and Paul Coburn	The construction of 73 no. residential units, flood mitigation works which include works to the R579, culverting of existing streams, foul and storm drainage, public lighting, landscaping, amenity areas and all associated site works.	Application currently being assessed by Cork City Council
Cork City Council Ref: 20/39202	Tower Residential Developments Limited	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Gleann Fia Homes Ltd.	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.
Cork County Council Ref: 19/4718	Whitebon Developments Ltd	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019. Construction has commenced on site
Cork County Council Ref: 18/7111	Hydro Estates Ltd	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019. Decision upheld by An Bord Pleanála submission of third-party appeals (Ref: ABP-305373-19).
Cork County Reference 18/6802	The Board of Management of Cloghroe National School	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final Permission granted on 4th December 2019
Cork County Council Ref: 18/5562	Gleann Fia Homes Ltd	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018. Construction has commenced on site with some units completed and occupied.

Table 1.1 Cumulative Impacts – Projects Considered

1.7.2 Plans

The existing planning policy context is defined by the provisions of subsection 30(1) of the Local Government Act 2019, which gave effect to the 2019 boundary extension of Cork City Council and which indicates:

> *''The development plan in force immediately before the transfer day in respect of the functional area of the county council shall, on and after that day, continue to apply in respect of the relevant area until the next making of a development plan by the city council in respect of the functional area of the city council in accordance with section 9 of the Act of 2000.''*

As a new Cork City Development Plan has yet to be made, the zoning and policy objectives for the site are those in the Cork County Development Plan 2014. Similarly, the lands are comprised in the Blarney Macroom Municipal District Local Area Plan 2017 having regard to subsection 30(2) of the Local Government Act 2019:

> *''(2) Subject to paragraph (b) of subsection (4) of section 18 of the Act of 2000, any local area plan in force immediately before the transfer day in respect of an area within the relevant area shall, on and after that day, continue to apply to the first-mentioned area until the next making of a local area plan by the city council in respect of the first-mentioned area in accordance with the said section 18''.*

The Blarney Macroom Municipal District Local Area Plan 2017 and 2014 Cork County Development Plan remain in force for the area until such time as a new Local Area Plan or City Development Plan is prepared by the City Council. Therefore, the Plans considered were the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

1.7.2.1 2014 Cork County Development Plan

The Cork County Development Plan (CDP) outlines policies and objectives for housing development in County Cork. The Plan is underpinned by a number of key principles which include sustainability, social inclusion, high quality design and climate change adaptation. The Plan establishes a hierarchical network of settlements in the County, allocating related population and housing growth projections. Chapter 2 of the Plan outlines the Core Strategy for the County over the lifetime of the Plan. The strategy identifies a hierarchy in the network of settlements and divides the County into different strategic areas to focus growth in appropriate locations and ensure a sustainable, plan-led future for Cork.

The site is situated within the 'key village' of Tower in the CDP's Network of Settlements and the County Metropolitan Cork Strategic Planning Area' identified in the Core Strategy Plan:

Volume Three of the Cork County Development Plan 2014 contains the SEA Statement and Natura Impact Report. Chapter 4 of this Environmental Statement describes the different development scenarios that were assessed by Cork County Council as part of the preparation of the Development Plan and the SEA process and the reasons for choosing the plan as adopted, in the light of the reasonable alternatives dealt with in accordance with Article 9 of the *European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive).*

Three alternative scenarios were considered during the preparation of the Cork County Development Plan 2014. The scenarios look at options for development within each Strategic Planning Area. Scenario 3 was identified as the preferred scenario following the evaluation of the three proposed alternative scenarios for their respective impacts on the environment was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three.

The potential impact on the environment of the Cork County Development Plan was assessed for cumulative impact and were considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1.

1.7.2.2 2017 Blarney Macroom Municipal District Local Area Plan

Tower is identified as a 'key village' in the Blarney Macroom Municipal District Local Area Plan 2017-2023 (LAP) with the site included within the settlement's development boundary. Volume Two of the Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 of the SEA highlights that three alternative scenarios were considered and that as a Local Area Plan is at the lower end of the statutory plan hierarchy, and the Planning Acts require a Local Area Plan to be consistent with the objectives of the development plan, its core strategy and any regional spatial and economic strategy that applies to the area. Therefore, Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans. Based on this and consistent with the 2014 Cork County Development Plan, Scenario 3 was the preferred scenario.

The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-2.

1.8 DIFFICULTIES ENCOUNTERED

No particular difficulties were encountered in compiling any of the specified information contained in the EIAR, such that that the prediction of impacts has not been possible. The relevant chapters of the EIAR, identify any specific difficulties which were encountered during preparation of this EIAR.

1.9 AVAILABILITY OF EIAR DOCUMENTATION

This EIAR will be available in printed form at the offices of Cork City Council (City Hall, Anglesea Street, Cork, T12 T997) and An Bord Pleanála (64 Marlborough St, Rotunda, Dublin 1, D01 V902).

The EIAR will also be available to view electronically at the following website. **www.CloghroeSHD.ie**

1.10 EIAR QUALITY CONTROL & REVIEW

HW Planning oversaw the preparation of this EIAR. A key aspect of the EIAR has been to make the documentation as accessible and clear as possible to the public and other relevant stakeholders. This EIAR has been prepared in accordance with the relevant legislation regarding the preparation of EIARs including the 'Guidelines on the Information to be contained in an Environmental Impact Assessment Report, Environmental Protection Agency, 2017' and 'Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017'.

1.11 TYPOGRAPHICAL ERRORS

Every effort has been made to ensure that the content and findings of this EIAR is consistent and error free. However, it is acknowledged that some minor grammatical/spelling and typographical errors may occur. These typographical minor inconsistencies are unlikely to result in any material impacts on the overall findings and conclusions of the EIAR.

CHAPTER TWO
Project Description

CHAPTER TWO

Contents

CHAPTER TWO

2 Project Description

2.1 INTRODUCTION

The EIA Directive requires that an EIAR should provide an overview of:

- the location, site, design, size, etc.;
- the physical characteristics of Project (including any demolition or land-use requirements);
- the characteristics of the operational phase of the Project;
- any residues, emissions, or waste expected during either the construction or the operational phase.

As the European Commission's EIAR Guidelines state, the requirement to include a description of the project in the EIA Report is not new, however, the key difference brought about by the 2014 amendments is the inclusion of relevant requisite demolition works during the construction and operational phases. In addition, an estimate of residues and emissions during the construction phase is to be included, where previously such estimates concerned only the operational phase. Article 5 requires other relevant features of the Project to be included. In addition, a description of the location of the Project is now specifically required by Annex IV. Finally, the operational phase of the Project is not limited to production processes, as it was previously.

In addition, the lists of characteristics given in Annex IV, have been expanded upon:

- any requisite demolition works must now be described, where relevant;
- energy demand and energy used should be described in context of the operational phase;
- natural resources must now be described in the context of the operational phase
- the list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution;
- estimates of quantities and types of waste produced must now be given.

This chapter describes the nature, location and specific characteristics of the proposed development during construction and operational phases in accordance with the 2014 Directive.

2.2 DESCRIPTION OF THE PROJECT

The proposed development consists of the construction of a mixed-use residential and retail development and all ancillary site development works, including the demolition of 2 no. existing agricultural structures at Coolflugh, Cloghroe, Tower, Cork. The proposed residential development comprises the construction of 198 no. residential units, two storey creche, two storey café building, ESB substations, and single storey retail food store. The proposed development provides for 117 no. dwelling houses consisting of 5 no. 4 bedroom detached houses, 44 no. 4 bedroom semi-detached houses, 8 no. 4 bedroom townhouses, 14 no. 3 bedroom semi-detached houses, 24 no. 3 bedroom townhouses and 22 no. 2 bedroom townhouses. The proposed development includes 81 no. apartment/duplex units consisting of 2 no. 3 bedroom, 35 no. 2 bedroom and 44 no. 1 bedroom units. 79 no. of the proposed apartment/duplex units will be provided in 6 no. 3 storey apartment buildings with ancillary communal areas and bicycle parking facilities. 2 no. apartment units will be provided at first floor level of a proposed café building to the south of the site.

The proposed retail development consists of a single storey retail food store with a net sales area of 1,315 m2 which includes the sale of alcohol for consumption off premises, totem sign and ancillary building signage, servicing areas, surface car park and bicycle parking facilities. The proposed development includes a proposed two storey café building with café on ground floor and 2 no. apartments at first floor level.

Access to the proposed development will be via 2 no. entrances from the R617, one which will serve the proposed residential development and one to serve the proposed retail development. A separate pedestrian entrance is to be provided from the existing cul-de-sac to the northeast of the site. The proposed development makes provision for the upgrade of the R617, including the installation of footpath/cycle infrastructure, signalised pedestrian crossing and the relocation of the existing public bus stop to the west of the R617. Ancillary site development works include flood defence works, public realm upgrades, amenity walks, public open spaces, an urban plaza to the east of the proposed retail unit and the undergrounding of existing overhead lines.

The subject lands are situated within the development boundary and 'existing built-up area' of Tower in the current Blarney Macroom Municipal District Local Area Plan 2017 confirming their suitability for mixed-use development.

2.3 EXISTING ENVIRONMENT/BASELINE SCENARIO

2.3.1 Locational Context

The subject lands are located the settlement boundary of Tower as defined in the Blarney Macroom Municipal District Local Area Plan 2017. The subject site of approximately 7.5 hectares in area, is situated in the townland of Coolflugh to the southwest of the joint settlements of Cloghroe/Tower, approximately 4km southwest of Blarney. The lands are currently in agricultural use and are irregular in shape, consisting of two separate field parcels with 2 no. existing agricultural structures (combined area of circa 382 sq.m) to the north of the site.

Figure 2.1 Existing Agricultural Structure to North of Site

As detailed in Chapter 4 of this EIAR, the site can be broadly described as a mosaic of fertile agricultural land set within rolling hills formed by the rivers, punctuated by mature broadleaf hedgerows. The topography of the site generally falls from north to south. The site is bound to the east by the R617 Cloghroe – Blarney regional road and to the south by the Senandale residential development. To the north is a mix of open agricultural lands and one-off dwelling houses with further undeveloped agricultural fields to the west. An existing man-made broadleaf/wet willow woodland exists to the east of the site, likely resultant from historical works to the R617 with an existing man-made land drain running across the site joining an existing stream along the site's western boundary. The stream flows southwards and joins the Owennagearagh river to the south of the settlement.

As detailed in EIAR Chapter 7, the dominant soil type of the site and immediate area is well drained mineral soils with the lands to the south comprising urban soils or made ground. The underlying bedrock of the site is Gyleen formation comprising sandstone with mudstone and siltstone in the northern areas of the site with Cuskinny Member formation comprising sandstone and siltstone towards the south of the site. There are no karst features mapped within the site or its immediate environs.

Existing foul and surface water infrastructure exists under the R617 road to the east of the site. The western boundary stream enters a culvert to the rear of the Senandale residential development and discharges to an open channel before passing through twin small-bore pipe culverts under the R579 Cork-Kanturk regional road. It then joins the Owennagearagh river which is located some 20 metres further to the south. As detailed in EIAR Chapter 8, indicative flood maps from the Office of Public Works (OPW) Preliminary Flood Risk Assessment (PFRA) 2012 show localised flooding on the western stream channel at the southern part of the site and along the Owennagearagh river channel. More detailed flood mapping produced for the OPW LeeCFRAM study, and the current Blarney Macroom Municipal District Local Area Plan do not include the western stream, and only indicate flooding along the Owennagearagh channel. Historic data indicates flooding occurrences along the R579 and at the junction with the R617.

The subject lands are not located within any European designated sites. The site is hydrologically connected via the Dromin Stream, Currabeha River, River Shournagh and River Lee to the Cork Harbour Special Protection Area (SPA) (Ref: 004030), located 17.65km downstream. There are no Special Areas of Conservation (SACs) within 15km of the proposed project. Following site investigations, no invasive species were discovered at the site, nor the presence of badgers or otters. The site contains several natural/semi-natural habitats including '*Improved agricultural grassland', 'Wet grassland', 'Dry meadows and grassy verges', 'Eroding/Upland Stream', 'Drainage Ditch', 'Hedgerow, Treeline', 'Mixed broadleaved woodland', 'Wet willow-alder-ash woodland',* and *Scrub.* A 'Bat Survey' (Appendix 9-2 of this EIAR) concludes that the site and area is suitable for commuting and foraging of bats. However, no evidence of any roosting of bats was discovered at any existing trees/structures at the site.

As detailed in EIAR Chapter 10, the primary existing noise sources at the site are road traffic from R617 (dominant), wind in trees and birdsong with some distant construction and agricultural activities.

There are no recorded archaeological sites located within the site or within 180 metres of its boundary. There are no National Monuments within the surrounding 1km study area and the recorded elements of the archaeological resource within this area are types commonly found within the wider region and are of likely medium to high value. No evidence for potential unrecorded archaeological sites within the proposed development boundary was identified during the desktop study and field surveys. There are no designated architectural heritage structures located within the site or within 600m of its boundary and the examples within the wider study area are deemed to be of regional significance by the NIAH and are, therefore, of likely medium value.

The site is situated proximate to several local services and amenities, including within short walking distance to Cloghroe Neighbourhood Centre which includes a local newsagent, pharmacy, post office, fitness studio as well as Cloghroe National School and Cloghroe Church to the southeast of the site. The site is also situated immediately adjacent to an existing bus stop serving as the terminus of the No. 215 Cloghroe – Mahon Point bus route providing a half hourly service to urban centres including Blarney, Blackpool, the City Centre and Mahon.

The existing settlement of Tower consists of two traditionally separate villages, Tower and Cloghroe, which have combined in recent decades to form a single administrative settlement. The development context in Tower has evolved considerably in the past 30 years. The population of Tower grew to 3,032 people by 2002, having increased by 116.3% since 1991. The 2011 census calculated that in 2011, 3,306 people lived in Tower which was an increase of 6.6% from 2006. The most recent 2016 census recorded a population of 3,421, a further increase of over 3%.

Tower is currently designated as a 'key village' within the settlement hierarchy of the current Cork County Development Plan (CDP), having formerly been classified as 'Main Settlement' until 2011.

A summary of all significant pending and permitted planning applications for residential development which have occurred in Tower since the adoption of the LAP is provided in Table 2.1 below. The locations of these applications are illustrated on the accompanying Figure 2.2.

Application Reference	Applicant(s)	Date Received	Description	Outcome/Current Status
Cork City Council Ref: 21/40620	Kevin McDonnell and Paul Coburn	03/11/2021	The construction of 73 no. residential units, flood mitigation works which include works to the R579, culverting of existing streams, foul and storm drainage, public lighting, landscaping, amenity areas and all associated site works.	Application currently being assessed by Cork City Council
Cork City Council Ref: 21/40653	Gleann Fia Homes Ltd.	11/10/2021	Construction of consisting of 16 no. dwellings	Application currently being assessed by Cork City Council
Cork City Council Ref: 20/39202	Tower Residential Developments Limited	25/03/2020	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Gleann Fia Homes Ltd.	20/12/2019	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.
Cork County Council Ref: 19/4718	Whitebon Developments Ltd	25/03/2019	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019.
Cork County Council Ref: 18/7111	Hydro Estates Ltd	29/11/2018	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019.
Cork County Council Ref: 18/5562	Gleann Fia Homes Ltd	15/06/2018	Construction of 60 no. dwelling houses.	Conditional permission granted by Cork County Council on 25/10/2018.
Cork County Council Ref: 17/7253	Muskerry Homes Ltd	13/12/2017	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018.

Table 2.1 - Other recently permitted residential developments in Tower (Multi-unit applications only).

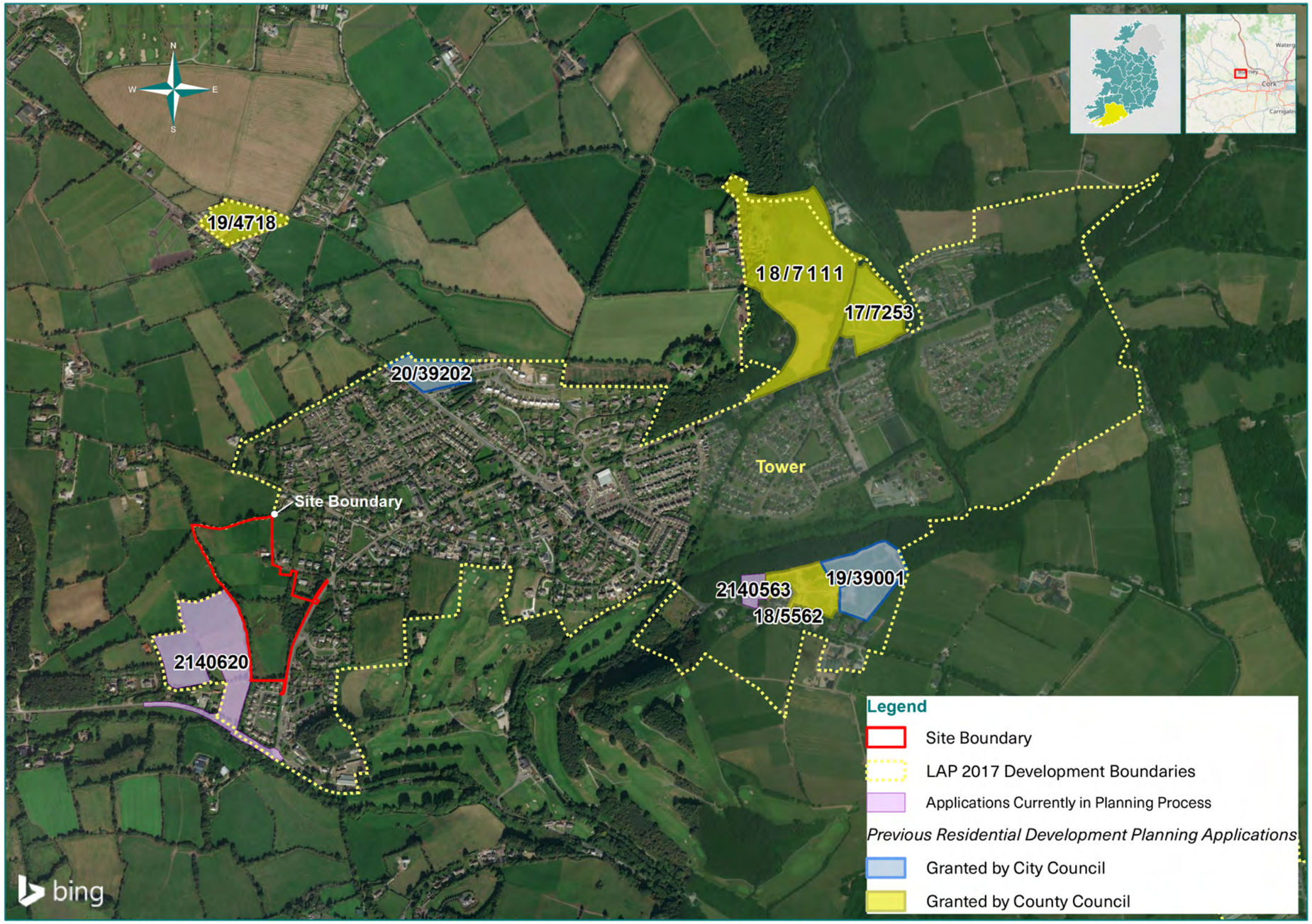

Figure 2.2 Planning Activity in Tower

Tower is identified as forming part of Cork's BusConnects Network in the Cork Metropolitan Area Transport Strategy (CMATS). It is envisaged that CMATS and BusConnects will significantly improve the bus services and public transport opportunities of the settlement into the future.

2.3.2 Retail Context

There are currently two neighbourhood centre areas within Tower/Cloghroe providing a range of small-scale local services reflective of its traditional function as a village settlement. Within the settlement there are currently 3 no. convenience retail outlets, all of which serve differing purposes. Cloghroe Stores serves as a newsagent as well as the local post office while the Daybreak/Circle K functions primarily as the local service station while also acting as a newsagent. O'Learys SuperValu reflects a larger supermarket more suited to household grocery shopping.

Due to Tower's location, the settlement provides for a large rural hinterland for the provision of local services. Tower serves as the most convenient location for household retail shopping for rural areas to the north and west such as Cloghroe, Maethy, Inniscarra, Donoughmore, Berrings, Dripsey and Courtbrack. Tower's importance as a retail centre for a large rural catchment is amplified by the limited retail provision in Blarney which contains a number smaller to medium sized retail outlets, however no significantly sized supermarket is currently provided for in the settlement.

The current deficit in convenience retail provision in the area results that people living within the hinterland of Tower, often travel further afield to urban centres such as Blackpool and Ballincollig to conduct their grocery and retail shopping. This encourages unsustainable and unnecessary travel patterns.

2.4 CONSTRUCTION PHASE

This section provides an overview of the construction and demolition phases of the proposed development. In addition, a '*Construction and Environmental Management Plan'* (CEMP) prepared by MHL & Associates is included as Appendix 2-2 of this EIAR. All measures set out in this section of the EIAR and the CEMP will be implemented during the construction phase of the project.

2.4.1 Construction Programme and Phasing

Construction access to the site will be provided from the R617 via the proposed access serving the residential development. The proposed development will be constructed in three distinct phases comprising.

- **Phase 1** – (Expected duration of approximately 6 months). Bulk excavation across the entire site extents and public realm upgrades to the R617 including installation of signalised pedestrian crossing, relocation of bus stop and delivery of footpath/cycle infrastructure on the R617. Demolition of the existing agricultural structures to the north of the site will also be undertaken in Phase 1.
- **Phase 2** - (Expected duration of approximately 18 months). Development in the southern areas of the site comprising 82 no. residential units, creche, retail food store/café and central amenity parkland.
- **Phase 3** - (Expected duration of approximately 24 months). 109 no. residential units in the northern area of the site.

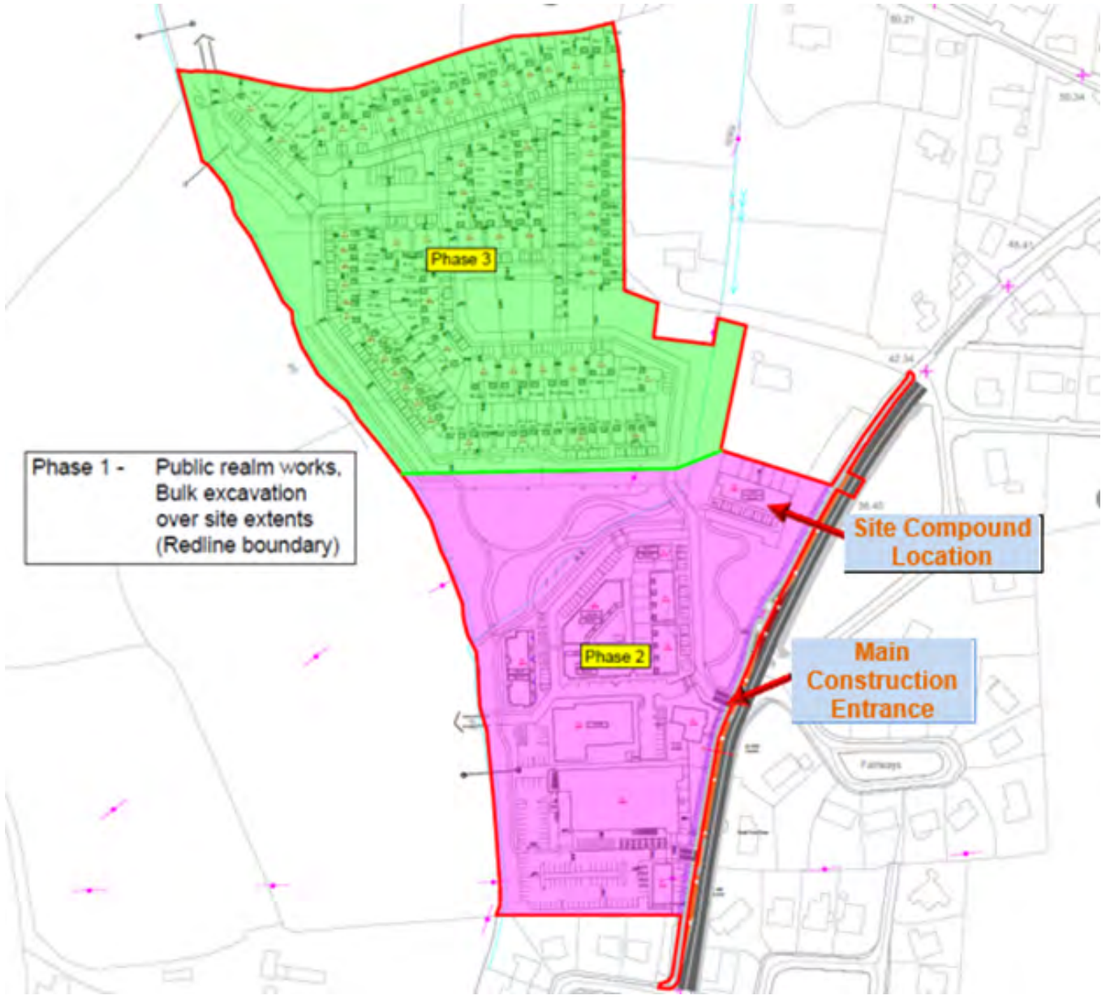

Figure 2.3 Construction Phasing Plan

It is envisaged that the construction phase of the project will last for approximately 48 months (4 years) in total.

A temporary construction compound will be located to the east of the site which will contain:

- Site offices, canteen and toilet / changing facilities c/w temporary water supplies and wastewater treatment unit.
- Secure compound and containers for storage of materials and plant.
- Temporary vehicle parking areas.
- Contained area for machinery refuelling and construction chemical storage.
- Contained area for washing out of concrete and mortar trucks.

- An automatic wheel-washing unit shall be installed and maintained at the entrance to the site. This will be available for use at all times. Maintenance will include for cleaning out of the equipment and disposal of any material gathered within. The required equipment for supplying water and power to the wheel washing facility shall be made available and maintained in good working order. At the end of the construction phase, the wheel washing facilities shall be removed from site.

Security/heras fencing will be provided at the main site entrance from the R617. All vehicles and personnel will be checked on entry to ensure no unauthorized access or fly-tipping will occur within the site. Heras fencing will also be provided on all boundaries to adjoining lands.

Water supply for the construction facilities will be taken from the mains supply which is adjacent the site. Power for the pumps and small power requirements for construction activities will be supplied from diesel generators until such time as the permanent site power supply is available.

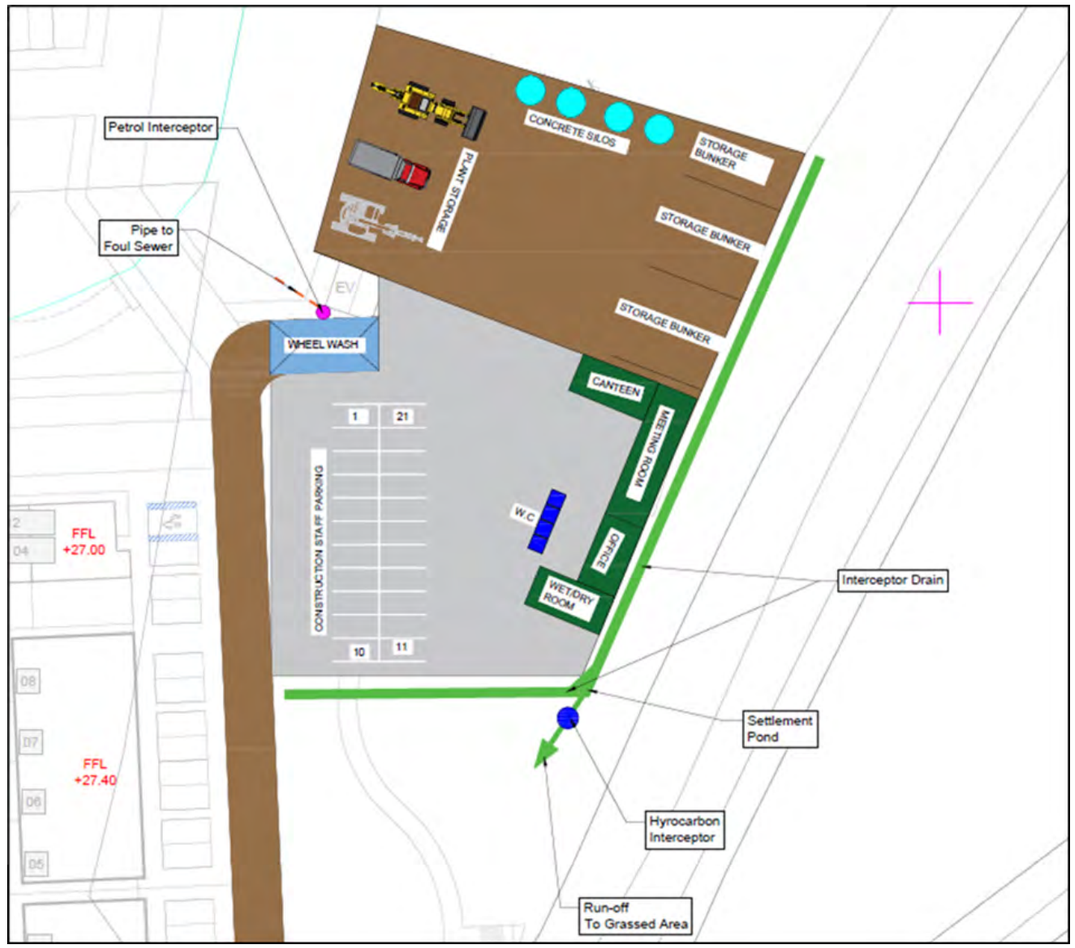

Figure 2.4 Compound Plan

2.4.2 Construction Stage Methodology

2.4.2.1 Pre-commencement Activities

Before works commences, several preparatory activities will be carried out. Prior to undertaking groundworks, a professional land surveyor shall be appointed to confirm existing ground levels.

2.4.2.2 Enabling Works

- The initial enabling works, as described in the CEMP, will enable the main access road off the R617 to facilitate construction access to the site.
- The demolition of two existing agricultural structures (combined area of 382 sqm) to the north of the site shall be completed with generated waste to be disposed of as described in Section 4 '*Construction & Demolition Waste Arising & Management'* of the CEMP. These structures comprise of corrugated metal sheds with steel frame on concrete foundations. In the unlikely event asbestos is uncovered on site (waste classification code 17 06 05), the asbestos containing materials (ACM) will be double-bagged and removed from the site by a competent contractor and disposed of in accordance with the relevant policies and legislation.
- This will be followed by bulk excavation works to the north of the site. These works will include the creation of level platforms, accessible from the main access road, upon which the site compound and materials storage area will be constructed.
- Once the site compound is accessible, Tree Protection Fencing will be installed prior to other works commencing on site. Fencing will be installed at 2m offsets from hedgerows to be retained and will remain in place for the duration of construction. Fence panels shall be open mesh to ensure continued light and air circulation, with 150mm ground clearance to ensure continued small fauna movement. All trees and other vegetation to be retained shall be clearly marked on site.

2.4.2.3 Phased Based Construction

The following processes will be repeated for each phase of development and will be carried out in accordance with the requirements of the CEMP.

Bulk Excavation and Demolition Works

- Following the demolition of the existing structures, topsoil stripping will be completed. No soil will be stripped within 5m of the edge of stream. Given the history of pasture use, soil will be stripped to 350mm depth and stored as topsoil in stockpiles of no greater than 2m height, to ensure long term storage soil fertility. Soil excavated at depths greater than 350mm will be stored separately as subsoil. During the construction phase, the estimated breakdown of materials to be generated are as follows.

Summary		
Description	Cut (m^3)	Fill (m^3)
Site extents	13199.43	34333.88

Cut Breakdown (m^3)		
Topsoil	Subsoil	Rock
3470.51	9728.92	0.00

Figure 2.5 Breakdown of Materials to be generated during Construction

- Following the topsoil strip of phase 1, the main access road serving the development will be constructed to formation level. The bulk excavation work across the site will then be undertaken. Excavation undertaken to the north of the site will generate structural fill for the grading of the southern housing/commercial platforms. Any excess fill material generated will be stored locally to be used in later stages of development.
- Having established the desired site levels during the early works, the next phase of construction will involve the digging of the foundations for each of the buildings. The civil and structural design for each building will confirm the precise location and extent of foundations that are required to support each of the buildings. The foundations for each building will be excavated to the desired size and depth in preparation for the pouring of concrete.

Civil Works

- The initial civil concrete works will involve the pouring of the foundations for each of the prepared buildings in this phase. Once the foundations are poured and have cured it will allow the building envelope to be erected.
- It is proposed that a concrete block construction process will be used which will involve the delivery of blockwork to site followed by external finishing material such as brickwork, plaster, and roof tiles.
- Works on external services including water mains, foul sewers, storm sewers, roads, footpaths, electricity to include undergrounding of existing overhead lines, and public lighting will be carried out in conjunction with the completion of the units.
- All buildings will be constructed in accordance with current Building Regulations and certified by an appropriated qualified engineer during and after construction.

Landscaping

- In tandem with the other construction activities being carried out on the buildings, elements of the sites landscaping plan will be progressed. The formation of landscape features will take place in parallel to the early works, utilising material excavated during the cut and fill exercise. As the site build progresses the landscape works will begin to focus on the soft landscaping aspects such as establishment of green zones and walkways, as well as planting of trees and shrubs in designated areas.
- Peripheral planting will be installed during the first planting season to ensure boundary interfaces are as robust as possible upon occupation.
- No herbicides will be used in the landscape preparation of the public open spaces, to minimise impact on natural drainage systems. The only use of herbicides will be in the private rear gardens prior to amenity grass installation.

2.4.3 Working Hours

Construction works will occur within the hours outlined below.

- 07.00am – 07.00pm* (Monday – Friday inclusive)
- 07.00am – 4.00pm* (Saturday)
- There will be no work on Sunday and Bank Holidays.

It is proposed that exceptionally, and with the prior agreement of the planning authority, working hours may be extended and/or works may take place on a Sunday and/or Bank Holiday at times when critical elements of work need to be advanced. Longer working days can occur when there is a planned concrete pour. If extended working hours are required, these will be agreed in advance with the Planning Authority. Accordingly, traffic generated by core construction personnel will be mainly during the off-peaks and will not have a significant adverse impact on the road network.

2.4.4 Construction Traffic Management Plan

Based on the calculated quantities of cut and the fill requirements identified in Figure 2.5, approximately 30,000 cubic metres of suitable structural fill material will be required at construction stage. This equates to approximately 1,500 HGV movements to the site during this construction phase of the works. Other construction stage deliveries include concrete, concrete blocks, timber, structural steel, reinforcing steel, road construction materials, finishing materials, subsurface drainage works (including attenuation and storage systems), public lighting columns, windows and doors which will be delivered to site at different phases of the scheme.

A Construction Traffic Management Plan (CTMP) has been prepared by MHL & Associates and is included as Appendix 2-3 of this EIAR. As referenced previously, the subject lands will be accessed via the R617. The R617 has an existing speed

limit of 50 kmph. The sightlines for the construction entrance, are in accordance with TII Publication DN-GEO-03060, Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions), are shown in Figure 2.6 as shown.

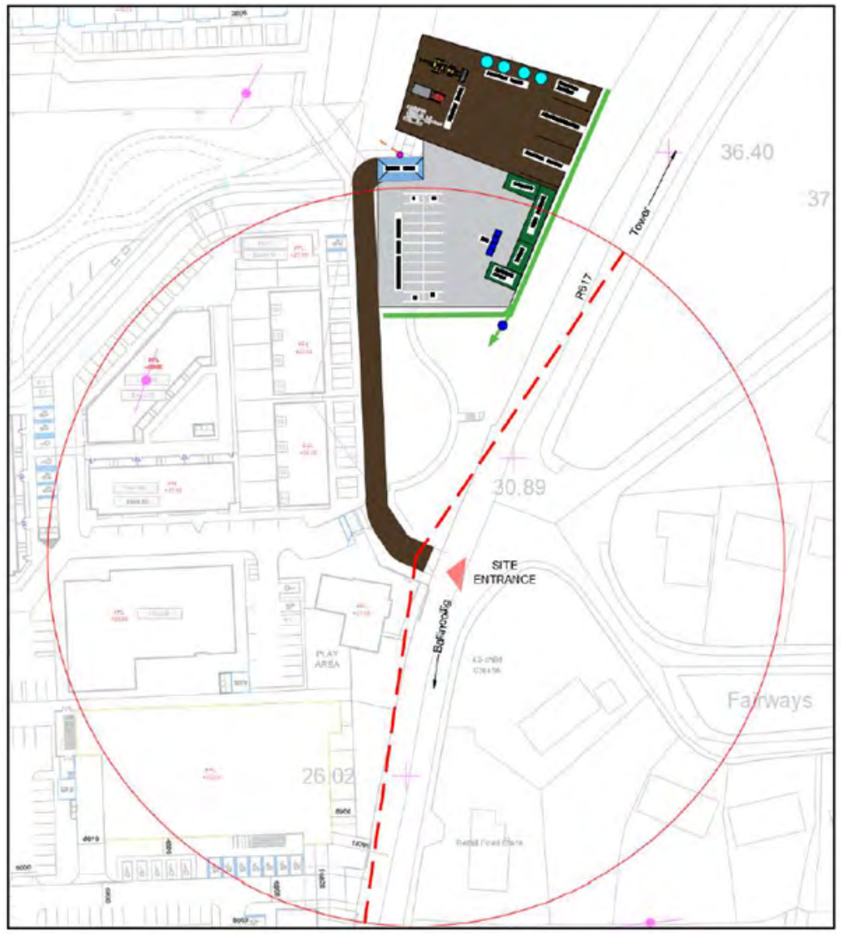

Figure 2.6 Sightlines at Site Entrance

2.4.5 Demolition and Waste Management

Section 4 of the CEMP (Appendix 2-2) details measures that will be implemented to address waste arising from construction and demolition phases of the proposed development. The proposed development involves the demolition of 2 no. existing agricultural structures to the north of the site. As detailed previously, these structures are corrugated metal sheds with steel frames and concrete foundations. The demolition of these structures will occur during phase 1 of the construction phase as outlined previously in this chapter.

A key objective of the construction strategy of the site is to minimise the amounts of material which leaves the site as waste during construction. All wastes will be managed, collected, stored, and segregated in separate areas and removed off-site where necessary, by a licensed waste management contractor at regular intervals during the works.

2.5 OPERATIONAL PHASE

2.5.1 Residential Development

The proposed residential development and creche involves the majority of the wider lands with the northern and central areas of the site reserved for residential development. The residential development includes a central amenity parkland, which will serve as a valuable recreation and amenity outlet for future residents in addition to a variety of public open spaces, amenity walks and pedestrian/vehicular connections. An overview of the key statistics of the proposed residential development is provided in table 2.2 as shown.

Key Figures of Proposed SHD Development	
No. of units	198 (117 houses and 81 apartment/duplex units)
Site Area	7.5 ha
Residential Developable Site Area	5.6 ha
Density (Residential Developable site area only)	Within the proposed residential developable area 196 no. residential units are proposed reflecting a residential density of 35 units per hectare.*
Plot Ratio	0.352 (Net Developable Residential Area)
Open Space provision	16% of residential developable site area - (14% is useable public open space)
Creche Details	A two storey 404.9 sqm 42 no. child capacity creche
Total Residential Car Parking spaces	287
Total Residential Bicycle spaces (including creche)	126 no. serving apartment units
Total Creche Car Parking Spaces.	9
Access	Provided via a new access from the R617 Cloghroe – Blarney Road

Table 2.2 – Key Statistics of Proposed Residential Development

* 2 no. additional apartment units are proposed are first floor level of the proposed café building within the defined 'commercial developable area' of the proposed development. For the purposes of calculating the residential density of the proposed development these 2 no. units have not been factored into density calculations.

Figure 2.7 Proposed Residential Development

2.5.2 Retail Development

The proposed retail development involves the southern areas of the site, most proximate to the existing Cloghroe Neighbourhood Centre. The retail development includes a surface car park, café building with 2 no. apartments at upper floors and urban plaza fronting onto the R617. An overview of the key statistics of the proposed residential development is provided in table 2.3 as shown.

Key Figures of Proposed Retail Development	
Commercial/Retail developable site area	0.81 ha
Retail foodstore floor area	1,895 sqm (gross) - 1,315 sqm (net)
Café floor area	186.3 sqm (gross) – 155.5 sqm (net)
No. of car parking spaces	101
No. of bicycle parking spaces.	26 no. spaces serving retail foodstore/café building.
Access	Access provided via an upgraded existing agricultural entrance from the R617 Cloghroe – Blarney Road. This represents a separate access point from the residential development to the north.

Table 2.3 – Key Statistics of Proposed Retail Development

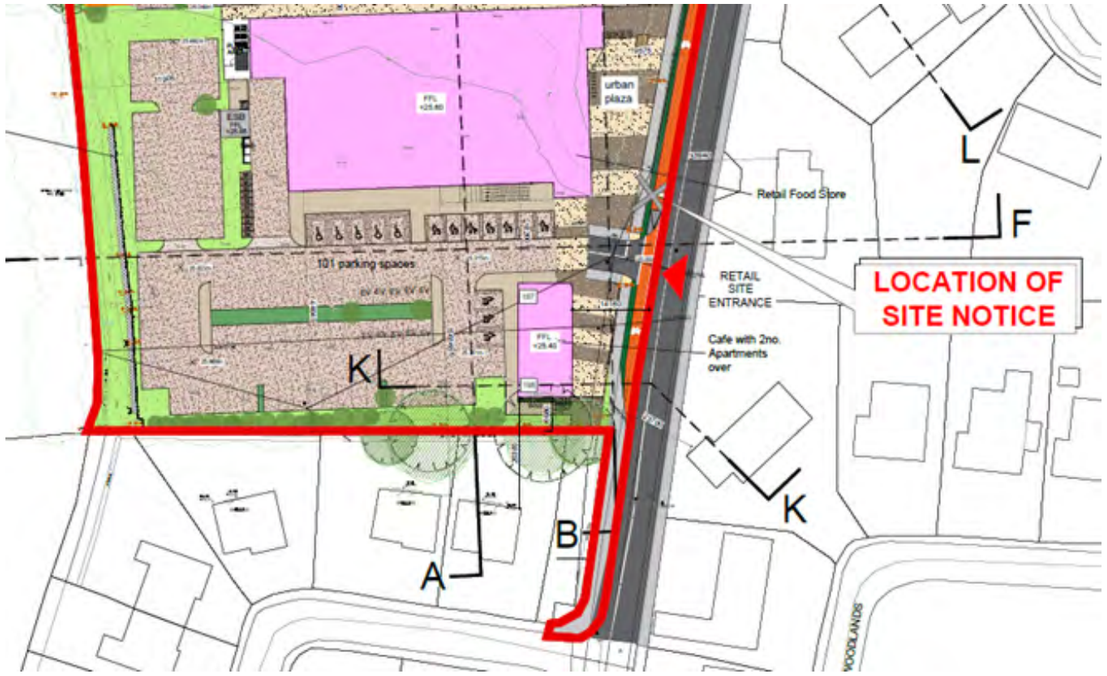

Figure 2.8 Proposed Retail Development

2.5.3 Access, Connectivity & Public Realm

As referenced above, the proposed development provides for separate vehicular entrances for the proposed residential and retail elements of the development. The proposed retail unit will be accessed via the southern entrance from the R617 in addition to the café building. The access to the proposed residential development and creche will be via a new entrance further north. The dual access strategy for the proposed development will assist in delineating the residential and commercial elements of the proposed development, improving the operational capacities of the proposed retail and café uses, while also protecting the residential amenity of future residents of the proposed dwellings and apartments to the north.

Figure 2.9 CGI illustrating vehicular entrance to the proposed commercial uses (G-Net)

The proposed development also provides for separate pedestrian entrances to the site, via the existing cul-de sac to the north and a stepped path within the site, providing direct access from the site to the relocated bus stop on the R617. The proposed pedestrian links to the site will not only provide direct and convenient access from the site to the relocated bus stop, but also satisfy natural desire lines from the site to the village core of Tower to the northeast.

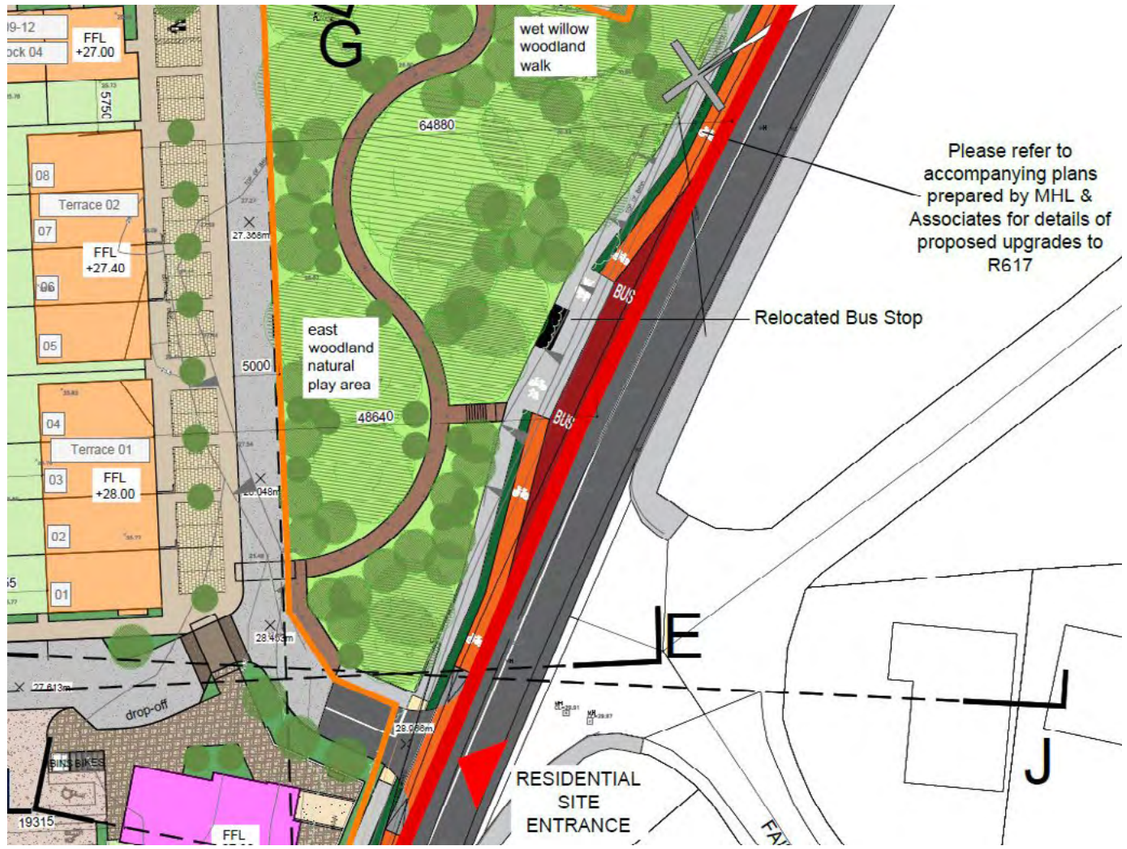

Figure 2.10 Pedestrian Link to Relocated Bus Stop

At present, the existing bus stop to the west of the R617 which serves the 215-no. route is not served by a shelter, footpath or cycle lane.

Figure 2.11 Existing Bus Stop on R617 on sites eastern boundary

The referenced relocation of the bus stop is one of suite of public realm and traffic calming measures including the provision of.

- traffic calming measures including the provision of a signalised toucan crossing to improve connectivity with Tower to the north;
- relocation of existing bus stop and provision of bus shelter;
- provision of 2 metre footpath, 1 metre verge and 2 metre cycle lane in accordance with the guidance provided in the National Cycle Manual;
- future provision for 3.25m bus lane to form part of BusConnects network. In the interim this will form part of the hard and soft landscaping proposal to the R617.

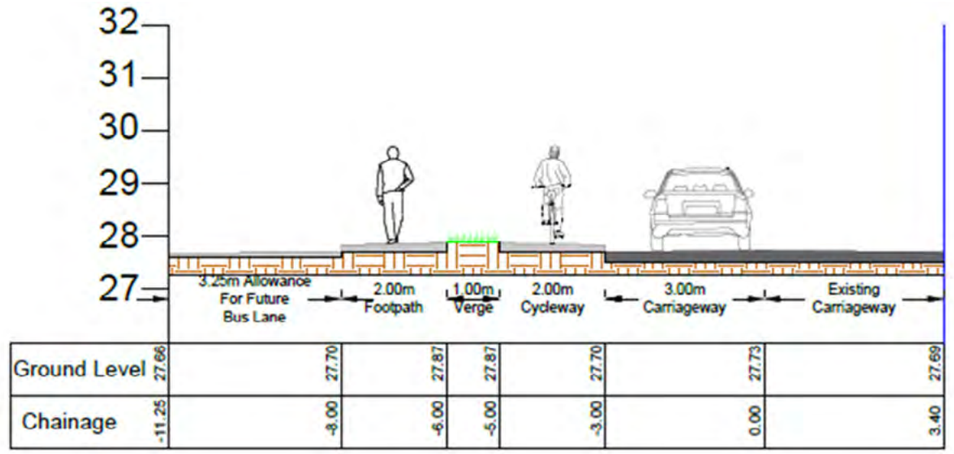

Figure 2.12 Proposed Cross Section of R617

Figure 2.13 Proposed Upgraded Bus Stop with Shelter on the R617

These works will result in a significant improvement in terms of access to public transport opportunities from the existing 'do nothing' scenario.

2.5.4 Proposed Layout & Landscape Strategy

The design rationale for the proposed development has been influenced by an analysis of the site's natural constraints, setting in the wider settlement of Cloghroe/Tower and its location adjacent to a suburban bus route and short distance from a variety of recreational, employment, retail and service outlets in the settlement.

The design rationale for the proposed development has been 'landscape led', with the site topography and setting in its local and wider contexts forming a critical component of the development strategy of the lands. The proposed landscape, recreation and amenity strategies of the development are based upon a number of key features and landscape proposals including.

- The creation of an appropriate streetscape (approximately 700 metres) on the R617, reflective of the sites existing context and which positively contributes to the character and amenities of the settlement. The proposed is divided into distinctive 'urban' and 'green' streetscapes, reflective of the existing site context and defining the traditionally separate villages of Tower and Cloghroe.

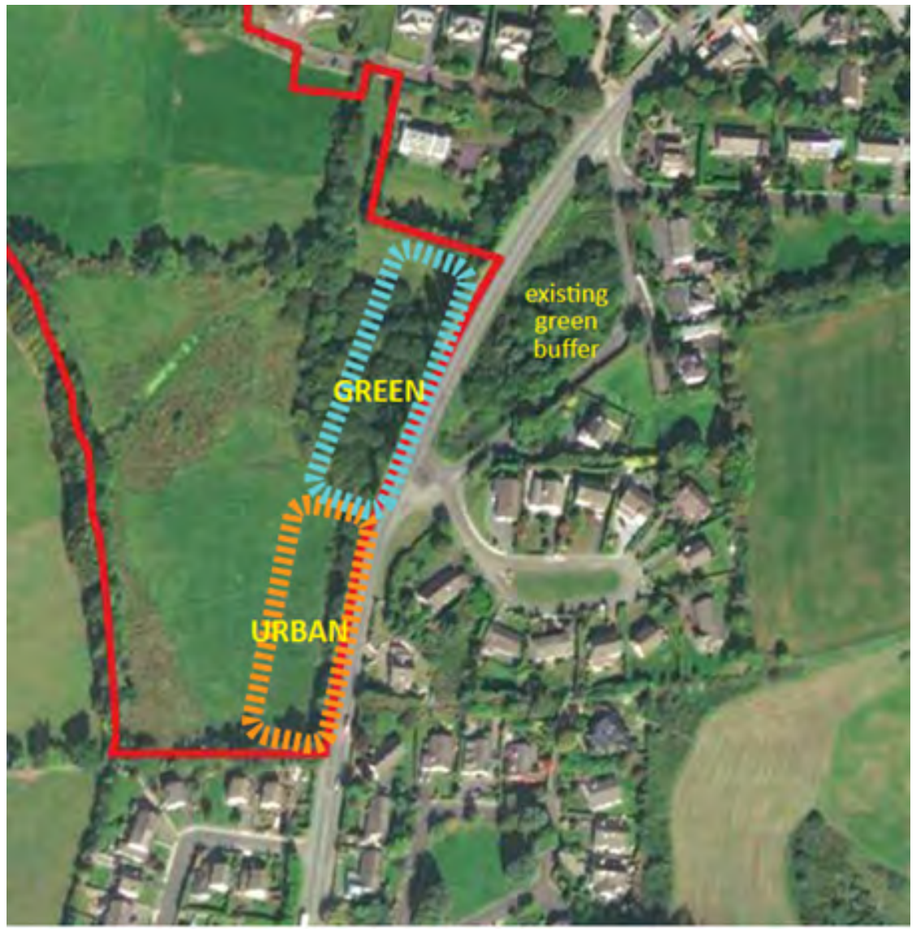

Figure 2.14 Urban/Green Streetscape on the R617

- The provision of a 420-metre streamside amenity path along the sites western boundary, a 1700 m2. central amenity/parkland access and biodiversity corridor, and 1200 metres in amenity walks throughout the site, through four different habitats.

Figure 2.15 Central Amenity Parkland (G-Net)

- A willow wetland walk with nature play amenity, 500 m2 of formal children's play areas with full equipment, 4 no. adult exercise equipment units, 3 acres of wildflower meadow and quadrangle with public orchard.

Figure 2.16 Quadrangle with public orchard and areas of wildflower meadow (G-Net)

The proposed layout, pedestrian links, amenity areas/walks and landscaping treatments will result that the proposed development will not only provide for the amenities of future residents of the scheme, but also serve as a local 'destination' in its own right, benefiting the existing residents of the settlement.

2.5.5 Engineering and Servicing

The Engineering Design Report prepared by MHL & Associates (Appendix 2-1) details the proposed engineering and servicing details relating to the proposed development. An overview of the main servicing proposals relating to the proposed development is as follows.

- The internal estate roads have been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS). The public realm upgrades will improve pedestrian, cyclist and motorist safety in the area. The proposed layout and public realm upgrades satisfy the recommendations of a prepared Road Safety Audit, prepared by MHL & Associates, attached as Appendix 2-4 of this EIAR.
- The proposed surface water drainage system is in accordance with Sustainable Urban Drainage Systems (SUDS) principles and divides the site into six (6) drainage catchments: all of which are proposed for attenuation utilising Stormtech Underground Chamber systems. Each attenuation system is designed with a controlled flow rate of less than the greenfield run-off rate for the catchment area. This results in an overall discharge from the site of 20.8 l/s which is less than the greenfield run-off of 25.29 l/s. The attenuated systems will ultimately discharge into the Owennagearagh River downstream of the Currabeha bridge, via the public storm sewer present on the R617.

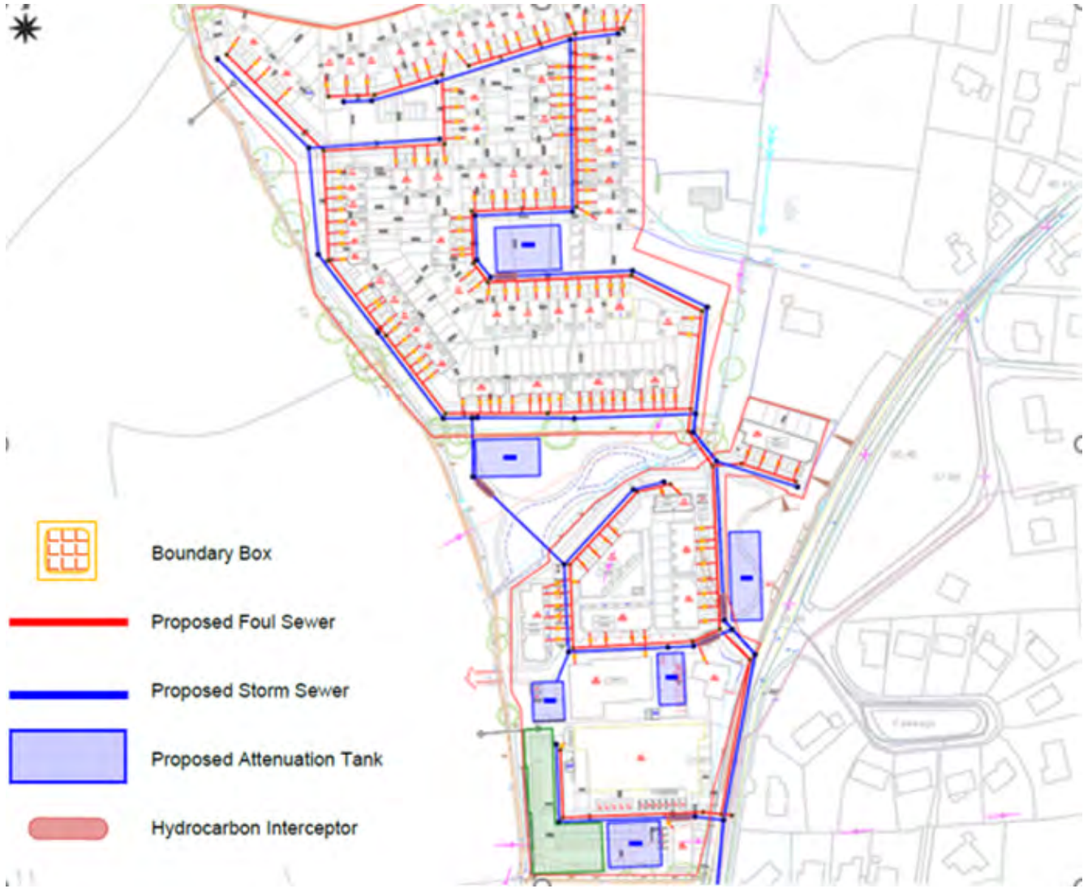

Figure 2.17 Proposed storm/foul lines, attenuation tank, and flood storage tank locations

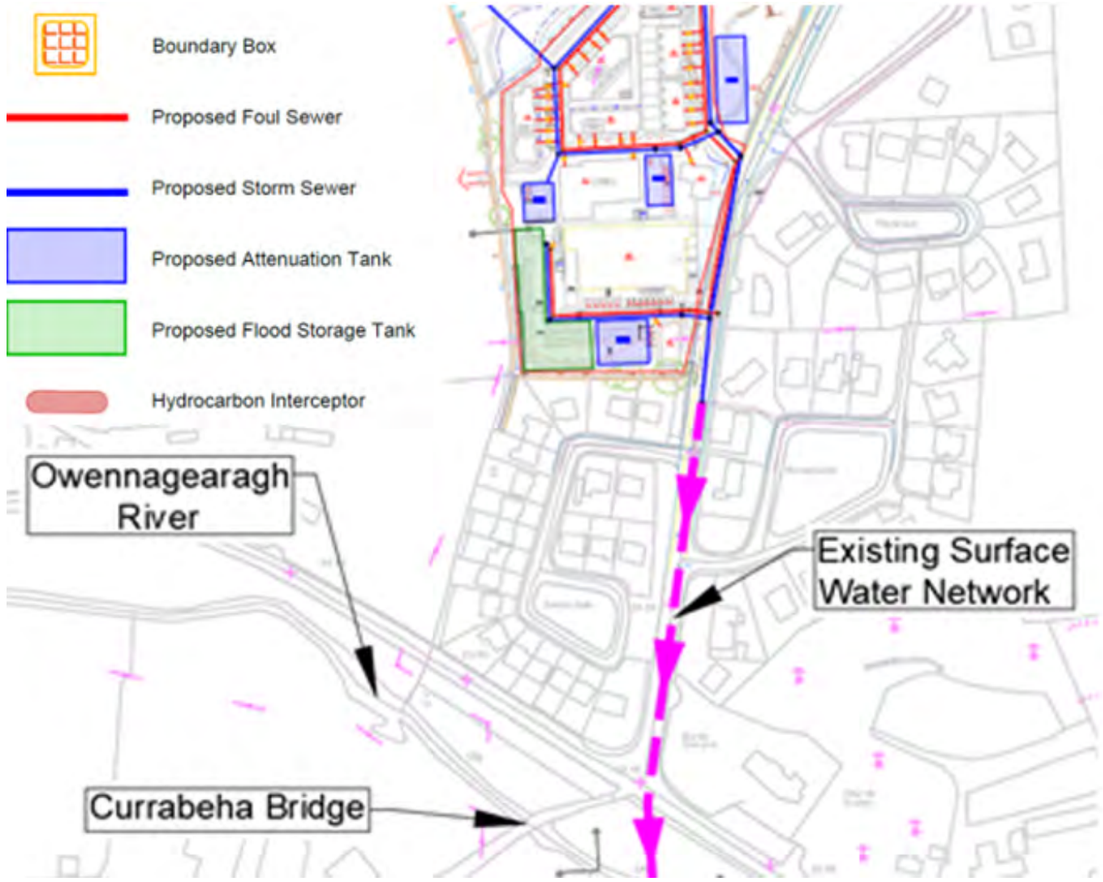

Figure 2.18 Proposed tie-in to existing surface water network

- Wastewater will discharge to the Cloghroe Wastewater Pumping Station. In order to accommodate the proposed connection, upgrade works to the existing pumps are required at the Cloghroe Wastewater Pumping Station to the south of Cloghroe Church. Irish Water has confirmed that following the upgrade, the pumping station will have sufficient capacity to adequately process the additional input from the operational demand of the proposed development. A Confirmation of Design Acceptance from Irish Water accompanies the Engineering Design Report.

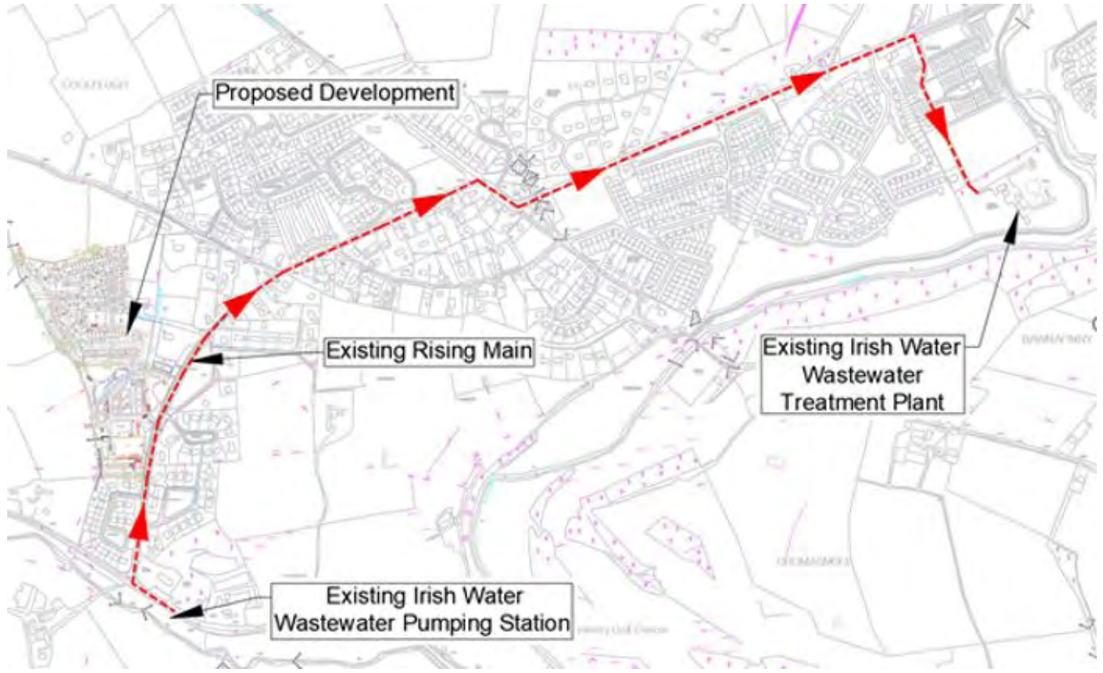

Figure 2.19 Location of existing Irish Water wastewater infrastructure

- A 150mm diameter HDPE watermain is proposed to supply potable water to all units and fire hydrants within the development. The proposed pipe network has no dead ends with loops serving a minimum of 4 units in accordance with Irish Water Code of Practice for Water Infrastructure Doc IW-CDS-5020-03. The 150mm mains will be connected to the existing mainline present on R617.

Figure 2.20 Proposed Watermain layout

2.5.6 Flood Defence Works

A Site-Specific Flood Risk Assessment prepared by Irish Hydrodata has been prepared and accompanies this EIAR in Appendix 8-1.

A flood storage network with a volume of 1200 m³ is proposed near the southwest corner of the site to compensate for the loss of floodable area following construction. This system will take the form of a ''Stormtech subsurface unit'' that will allow the stream to flood as required (Refer to figure 2.21). The 'Stormtech subsurface unit'' will be located beneath the car park area of the proposed retail unit. In addition to the compensatory flood storage, a headwall with non-return valve is proposed at the outfall of the existing land drain running along the southern boundary of the site. This land drain falls in a westerly direction towards the western boundary stream and is located along the boundary between the proposed retail car park and the Senandale residential development. This non-return valve will remove the risk of any flood waters from the western stream entering the land drain and thereafter flooding into Senandale.

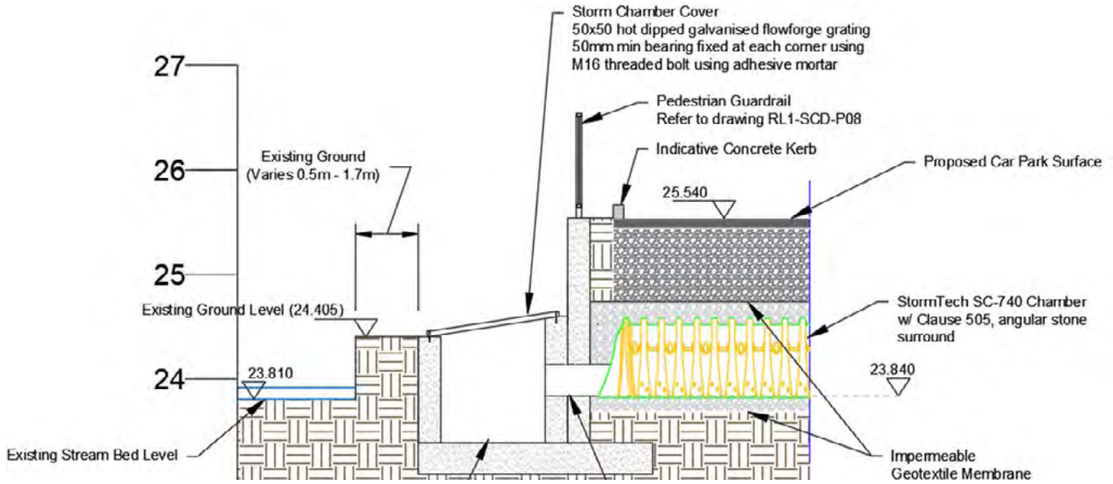

Figure 2.21 Cross-section of proposed flood storage with flood water receiving chamber

The proposed flood storage system is designed to manage the overflow from the western boundary stream during times of flooding and will provide protection to both the proposed development and adjoining properties in the Senandale residential development.

2.5.7 Energy Systems

The Building Lifecycle Report prepared by Aramark (Appendix 12-4 of this EIAR) details proposed building methods and materials to promote sustainability and reduce unnecessary fuel consumption. All lighting to be energy efficient with provision made for low energy lamps such as Compact Fluorescent Lamps (CFLs) which use 80% less electricity and last up to 10 times longer than ordinary light bulbs in the dwellings.

2.6 IMPACT ASSESSMENT

2.6.1 Do-Nothing Scenario

A 'do nothing scenario' will result in no predicted impacts at the subject lands, and the site would remain in its existing undeveloped, agricultural and woodland use. The existing agricultural structures to the north of the site would remain in-situ and the proposed public realm upgrades including the proposed pedestrian crossing, footpaths, cycles lanes and relocated bus stop would not occur. The proposed surface water and flood defence measures would also not take place.

Over time, in the 'do nothing scenario' the subject lands would remain undeveloped and in agricultural use. It is considered likely that the zoned lands to the west, (currently subject to application reference 21/40620) will be developed for residential development, resulting in an increasingly urban setting in the area. The 'do-nothing scenario' over time will also result in the subject lands being still liable to increased flood risk, as well as a continuing leakage of potential retail and economic growth from the settlement.

As referenced previously in this chapter, Tower is set to benefit from improved public transport services through CMATS/ BusConnects. The Draft BusConnects strategy for Cork identifies a potential new bus route from Ballincollig - Cork (via Tower and Blarney) along the R617 with a weekday midday frequency of a service every 60 minutes (Draft BusConnects Reference 16L). Draft BusConnects also identifies a potential additional bus service serving the village core of Tower on the Blarney - Cork via Kerry Pike with an envisaged weekday service of every 120 minutes (Draft BusConnects Reference 53).

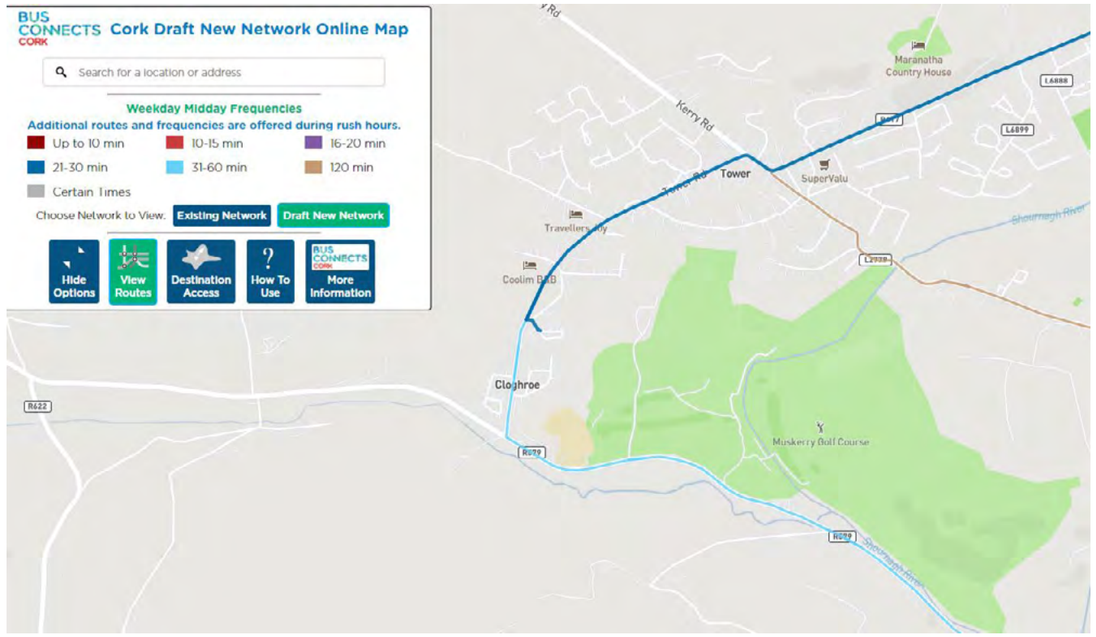

Figure 2.22 Draft BusConnects Interactive Map illustrating potential bus service improvements for Tower.

Over time it is considered the do-nothing scenario will result in an inefficient use of serviced lands, which will have convenient access to public transport opportunities and local amenities.

2.6.2 Construction Phase

The construction phase will be temporary in nature and will be implemented in accordance with the requirements of the accompanying construction management plans. Without the implementation of the proposed mitigation measures, the construction stage of the development could result in potential significant indirect, cumulative and residual effects on the surrounding environment such as impacts on the local road network, potential ground/water contamination, noise, vibration, dust, air quality, pollution and waste management.

2.6.3 Operational Phase

Once constructed, the proposed development will be permanent in nature. The proposed development will result in the construction of an additional 198 no. residential units, retail food store, café and creche.

The 2016 Census confirms that the average household size of Tower is just over 3.0 no. persons per household which translates that the proposed development may provide for an uplift in population of approximately 600 no. persons consistent with adopted planning policy objectives of concentrating population growth around high frequency public transport links in existing settlements.

The proposed residential development will result in several positive effects in the local area by providing a broad range of housing units which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the continued operations of local public transport routes and justify future improvements and investment in local bus routes identified in CMATS.

The proposed increase in population has potential for significant effects on the demand for local services such as water, wastewater, roads, childcare/educational, and on recreation and amenity provision locally without appropriate mitigation measures. When assessed cumulatively with other developments taking place in the area (as detailed in Chapter 1 of this EIAR), the proposed development will result in the increase in housing stock and population in the settlement and profound positive impacts to the local pedestrian and cyclist environment in Tower as well as enhancing access to local public transport opportunities.

As demonstrated in the accompanying Retail Impact Assessment (RIA) prepared by HW Planning (Appendix 13-1 of this EIAR), there is currently a deficit in convenience retail provision in Tower for its inhabitants and those in its rural hinterland. This has resulted in a leakage of potential retail and economic activity from the settlement to other areas such as Ballincollig and Blackpool. The proposed retail unit and café will result in significant long-term positive impacts to the local economy by addressing the current retail shortage in the wider area.

As detailed in Chapter 8 of this EIAR (Water- Hydrology & Hydrogeology) once implemented, the proposed surface water and flood defence strategy will remove the risk of flooding during extreme events in the Senandale housing estate and on the R617, arising from extreme high flows in the western boundary stream. It is anticipated that any long-term impacts relating to flood risk arising from the development will be moderate and positive.

2.7 MITIGATION, MONITORING & RESIDUAL IMPACTS

Chapter 15 of this EIAR, 'Summary of Mitigation Measures and Monitoring' provides a list of all proposed mitigation and monitoring procedures to be implemented during the operational and construction phases of the project.

2.7.1 Construction Phase

The CEMP prepared by MHL & Associates details the proposed mitigation and monitoring procedures which will be implemented during the construction phase of the proposed development. The construction management plans which

have been prepared, include the relevant mitigation measures outlined in the EIAR.

The construction phase will be implemented in accordance with several environmental targets and objectives including.

- Zero pollution incidents
- Segregation of site waste to include timber, general waste and other materials
- Completion of environmental checklists
- Fuel spill kits to be present on each site at all times
- Reduce waste, water and energy use on the project including within all of the site offices;
- Reduce the carbon footprint of the development;
- Reduce the amount of construction waste and excavated material generated which goes to landfill;
- Recycle construction waste where possible;
- Maximise beneficial reuse of the materials: and
- Ensure that all waste documentation (waste transfer dockets, permits etc.) is available for inspection at the site office / in head office.

The following is a short summary of proposed mitigation and monitoring measures proposed.

2.7.1.1 Training and Awareness

An initial Site Environmental Induction and ongoing Training will be provided to communicate the main provisions of the Environmental Plan to all site personnel.

- Two-way communication will be encouraged to promote a culture of Environmental Protection. The information which must be communicated to Site Staff include:
- Environmental Procedures of the C.E.M.P.
- Environmental Buffers and Exclusion Zones
- Housekeeping of Materials and Waste Storage Areas
- Environmental Emergency Response Plan
- Reporting Procedures

2.7.1.2 Tree Felling

Tree Protection Fencing will be installed prior to other works commencing on site. Fencing will be installed at 2m offsets from hedgerows to be retained (drawing L103 prepared by Forestbird Design) and will remain in place for the duration of construction. Fence panels shall be open mesh to ensure continued light and air circulation, with 150mm ground clearance to ensure continued small fauna movement. All trees and other vegetation to be retained, shall be clearly marked on site.

2.7.1.3 Construction Impact Assessment

- The moving and storage of excess material has been kept to a minimum and has informed the phased delivery of the scheme.
- Excavated material will be stored on-site to be re-used for later stages of the development.
- The site investigations have identified that certain quantities of subsoil can be re-used as structural fill via soil strengthening methods. These works will be carried out on site within the designated area and measures shall be implemented within this area to control the run-off of storm water.
- Given the topography of the site, control measures to protect surface waters from contamination will be put in place prior to the commencement of any site works.

2.7.1.4 Control of Surface Water Run-off

The control measures relating to surface water run-off during the construction phase of the development shall follow best practice as recommended by CIRA 2010 and ISO 14001:2015 – Environmental Management Systems and C741 Environmental good practice on site guide (4th edition) and CIRIA (2015) Coastal and marine environmental site guide (second edition) (C744).

Measures to be implemented will consist of:

- Surface water shall be directed to settlement ponds where topographically feasible. Where this is not practicable, the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated waste-water treatment plant, if excessive build-up of surface water on site occurs.
- Protection of surface water gullies or drains using silt fences.
- Use on-site bund structures (including incorporating existing ditches) on site to retain surface waters on site and to prevent runoff.
- Minimal and short-term storage and the removal of excess materials (soil, stones and construction wastes) off site in an efficient manner.
- Daily checks of surface water regime on site and logging of same.
- Works associated with excavations or earth moving shall not to be undertaken in periods of forecasted bad weather.
- Drainage channels beside construction roadways shall direct surface water to settlement areas and allow for natural percolation to ground.
- Ensure good site management is maintained at all times during the construction phase including regular site clean-ups and use of appropriate bins.
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and plant re-fuelled via delivery trucks in specific bunded re-fuelling areas, rather than the storage of large quantities of fuel on site in a designated bunded area.
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a control and isolated manner, preventing the possibility of any pathway to a surface water source.

2.7.1.5 Biodiversity and Invasive Species

Biosecurity protocols shall be implemented during the proposed project to prevent the introduction of invasive species, in particular those listed on the 3rd Schedule of the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), to site and the further spread of diseases.

The following measures will be adopted:

- All equipment intended to be used at the site shall be: -
  - power steam-washed at a suitably high temperature or at least 65 degrees, or
  - disinfected with an approved disinfectant, e.g. Virkon or an iodine-based product. The manufacturer's instructions shall be followed and, if required, the correct contact times are allowed for during the disinfection process. Items that are difficult to soak shall be sprayed or wiped down with disinfectant.

- During the duration of the proposed project, if equipment is removed off-site to be used elsewhere, the equipment shall be cleaned and disinfected prior to being brought back to the works area of the proposed project.
- Appropriate facilities shall be used for the containment, collection, and disposal of material and/or water resulting from washing facilities of vehicles, equipment, and personnel.
- Importation of materials shall comply with Regulation 49 of the EC (Birds and Natural Habitats) Regulations 2011.
- Appropriate measures will be taken to ensure that trees and hedges being retained are protected in line with British Standard 5837:2012 and National Roads Authority 2006a guidelines. Protective fencing of at least 2.3m in height will be implemented.
- To compensate for the loss of hedgerow and partial removal of woodland, substantial native tree and hedgerow planting will be established on the site. The planting schemes shall ensure connectivity to linear/ woodland habitats of bats in the wider landscape.
- Construction lighting shall incorporate the use of accessories such as hoods, cowls, louvres, and shields to direct lighting away from all hedgerow/ treeline habitats to be retained during the bat activity period (April to September).
- Removal of vegetation such as grassland, woodland, and hedgerow will be carried out outside the breeding bird season (March 1st to August 31st, inclusive).

2.7.1.6 Traffic Management

In addition to the CEMP, a Construction Traffic Management Plan (CTMP) prepared by MHL & Associates accompanies this EIAR (Appendix 2.3), which details the proposed traffic management/mitigation measures during construction. Measures include.

- Appropriate construction signage shall be placed on the local road network during construction.
- Given the width of the existing R617 as it runs adjacent to the works, a temporary centre line will be introduced to facilitate existing traffic flow during construction.
- The construction phase will accommodate pedestrians via a lateral safety zone along the length of the public realm works. A temporary pedestrian crossing will be provided at the site entrance to facilitate safe crossing for pedestrians accessing the existing bus stop to the north of the entrance.
- All public roads, accesses, drains, ditches, and grips will be kept clear of all dirt, mud and material arising from the execution and completion of the works and suitable clearing equipment and labour will be provided for this purpose. Attention will also be given to the loading of lorries carrying bulk materials into the site and spoil from the site to ensure that these will not be overloaded or loaded in such a way that spillage is avoided. Any dirt or mud adhering to the tyres or chassis of any vehicles will be thoroughly cleaned off before the vehicle is permitted to leave the site. In the case of delivery to the site, vehicles will be thoroughly cleaned before they leave the point of collection.
- As referenced previously, wheel washing facilities will be provided throughout the construction phase at the entrance of the site.

Measures to minimise construction vehicular movements will include.

- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods;
- Use of precast/prefabricated materials where possible;
- 'Cut' material generated by the construction works is to be re-used on site where possible, through various accommodation works;
- Adequate storage space on site will be provided;
- Car sharing among the construction staff following Covid-19 safety guidelines may be used to reduce traffic numbers.
- Public Transport: An information leaflet to all staff as part of their induction on site highlighting the location of the public transport services in the vicinity of the construction site.

Deliveries will be also co-ordinated to prevent queuing of vehicles which could adversely affect traffic flow and to minimise disruption to local traffic. Deliveries will be timed and co-ordinated to avoid conflict with collection of waste, other deliveries (particularly adjoining landowners) and rush hour traffic (AM & PM peak hours). Large deliveries will be scheduled outside peak hours to minimise disruption.

On occasion, only with the agreement of the Planning Authority, out of hours deliveries and collections may be implemented, for example, in relation to out-sized loads to facilitate the smooth continuation of works and minimise disruption.

Special consideration will be given to the busy drop off and collection times at St. Senan's Cloghroe National School. The school day begins at 8:50am, ending at 1:30pm for Junior/Senior infants and 2:30pm for classes I to VI.

2.7.1.7 Noise and Vibration

The control of noise and vibration during the construction phase shall comply with the general recommendations set out in the Code of Practice BS 5228-1:2009 +A1:2014: *"Code of practice for noise and vibration control on construction and open sites"* together with the specific requirements outlined in the CEMP.

All vehicles and mechanical plant used for the purpose of the works, will be fitted with effective exhaust silencers and maintained in good and efficient working order. In addition, all diesel engine powered plant shall be fitted with effective air intake silences. Noise levels during construction will comply with the following levels as identified in the CEMP.

Day	Time	Level (dbA) (measured over any 1 hour period)	L. Max (dbA)
Monday-Friday inclusive	07:30 - 18:30	65 leq	75
Monday - Friday inclusive	18:30 - 22:00	60 leq*	65*
Saturday*	08:30 - 15:30	65 leq	75
Sunday* and Bank Holidays*	08:30 - 12:00	60 leq*	65*
*** Where agreed by the Planning Authority and/or necessary for emergency works. Measurements will be taken and recorded using a Digital Seismograph and Sound Level Meters**			

Figure 2.23 Noise Level Limits during construction.

Noise control audits will be conducted at regular intervals through the construction phase of the development. In the first instance it is envisaged that such audits will take place monthly.

2.7.1.8 Dust Management

Mitigation Measures to be implemented to control dust caused by construction traffic and works include.

- Wetting of haul road and storage areas;
- Covering or dousing of any dry, imported or excavated material;
- Reducing the duration for stockpiling in fill materials;
- Use of a wheelwash for construction traffic.

- The siting of construction activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions to minimise the potential for significant dust nuisance. In addition, good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or using effective control measures quickly before the potential for nuisance occurs.

The dust minimisation measures will be reviewed at regular intervals during the construction phase, to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust using best practice and procedures.

2.7.1.9 Waste Management

As detailed in Section 4 of the CEMP, it is anticipated that a significant amount of material arising from the works will be classified for re-use as fill material under roads and pavements. The objective is to ensure the absolute minimum amount of material leaves the site as waste. All wastes generated during construction will be managed, collected, stored, and segregated in separate areas and removed off site by a licensed waste management contractor at regular intervals.

2.7.2 Operational Phase

Once operational, the proposed development will result in several long-term positive impacts for Cloghroe/Tower and the local area. The proposed development will result in the provision of an additional 198 no. residential units at a location which will have improved access to a regular bus route (which is due for future improvements as identified in CMATS). The proposed development will contribute to an increase in population, which can support public transport services and local businesses in the general area including Cloghroe/Tower, Blarney and Ballincollig.

The proposed creche, café and retail uses will provide for a diversification to the existing economy and childcare provision of the settlement. It is expected that the sites' location adjacent to the terminus of the 215 no. bus route and the public realm upgrades proposed, will result in a greater uptake of walking, cycling and public transport opportunities, underpinning national, regional and local planning objectives to improve sustainable modes of transport and reducing dependency on the private vehicle. It is considered that the proposed development is of an appropriate scale, form and quality that can make a significant positive contribution to the settlement and Metropolitan Cork into the future.

The proposed retail unit will result in the long-term benefit of the reduction of potential retail slippage from the settlement as evidenced in the prepared Retail Impact Assessment, included as Appendix 13-1 of this EIAR. The proposed creche facility will provide for the childcare requirements generated from the development, as well as contributing to the childcare provision in the wider settlement.

The proposed landscape/recreation and amenity strategy capitalises on the sites natural resources and setting by incorporating existing natural features into the wider layout. This includes the provision of an amenity parkland, streamside amenity walkway and replacement planting, which mitigates the necessary loss of existing tree cover. The proposed flood relief and storage works will also positively impact the existing flooding context at the site and surrounding areas. As detailed in EIAR Chapter 8 and the Site-Specific Flood Risk Assessment (Appendix 8-1), the proposed flood prevention strategy will prevent the western stream flood waters from reaching dwellings in Senandale and the R617 road.

The proposed evolution of the site, from existing agricultural to proposed mixed-use, will result in an increase in energy consumption and demand on local infrastructural services. The proposed layout and public realm upgrades will enhance accessibility to public transport links, promoting active and sustainable modes of travel. The proposed buildings have been designed to incorporate sustainable building methods and materials, to reduce unnecessary energy usage and capitalise on the sites south facing aspect.

2.8 REFERENCES

www.cso.ie

https://www.corkcoco.ie/en/planning/planning-enquiry-online-submissions

http://planning.corkcity.ie/searchtypes

https://busconnects.ie/busconnects-cork/

CHAPTER THREE
Alternatives Considered

CHAPTER THREE
Contents

CHAPTER THREE

3 Alternatives Considered

3.1 INTRODUCTION

Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU states that.

d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;

f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

Annex IV point 2 expands further.

2) 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 project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001, as amended, requires the following information to be furnished in relation to alternatives:

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

The purpose of this Chapter is to describe the reasonable alternatives considered by the developer, including alternatives considered through the design and consultation phases of the project, taking into account and comparing environmental effects and illustrating the manner in which, and reasons for, choosing the proposed development.

Regarding 'Reasonable Alternatives', the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) states that:

> *''The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.*
>
> *Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each.* ***A 'mini- EIA' is not required for each alternative studied.''***

Further the Draft 2017 Guidelines are also instructive in stating:

> *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'".*

This chapter provides an outline of the main alternatives examined throughout the design and consultation process to indicate the primary reasons for choosing the proposed development, considering and providing a comparison of the environmental effects.

3.2 ALTERNATIVE LOCATIONS

As stated above, regarding alternative locations, Section 3.4.1 of the Draft 2017 EPA Guidelines, recognise that 'in some instances some of the alternatives described below will not be applicable' – e.g. there may be no relevant 'alternative location'…".

The subject lands are situated within the 'Settlement Boundary' of Tower as defined in the Blarney Macroom Municipal District Local Area Plan 2017 and are the only lands within the settlement in the ownership or control of Cloghroe Development Limited.

The 2017 Local Area Plan and current Cork County Development Plan 2014, which are the two development plans in force for Tower, have been subject to Strategic Environmental Assessment which will have taken into account of environmental considerations associated, for example, with the cumulative impact of an area zoned for industry on a sensitive landscape.

We note the Draft 2017 EPA Guidelines, which state.

> *'Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'*

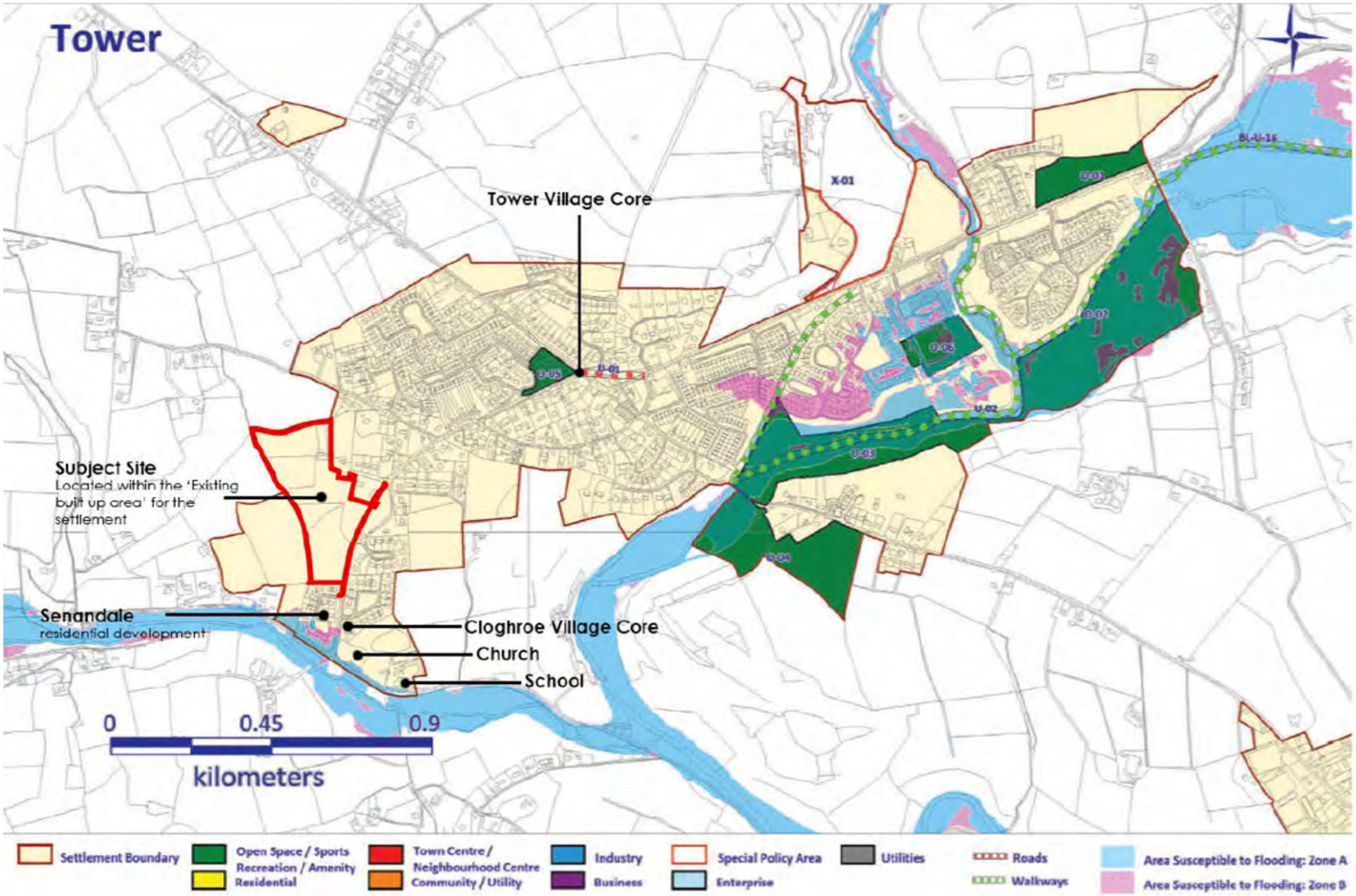

Figure 3.1 Site Location within 'Settlement Boundary of Tower in the current 2017 Local Area Plan.

3.3 DO-NOTHING ALTERNATIVE

The consideration of alternative sites in Tower for a mixed-use residential/retail development would result in the 'do-nothing' scenario. This would reflect that serviced and zoned greenfield lands, within the defined settlement of boundary of Tower, would remain undeveloped and in agricultural use. The 'do nothing' scenario would also result that the proposed public realm upgrades to the R617 would not take place and the proposed pedestrian crossing, footpath, cycle lanes and flood defence measures would not occur.

Over time, in the 'do nothing scenario', the subject lands would remain undeveloped and in agricultural use. It is considered likely that the zoned lands to the west, (currently subject to application reference 21/40620) will be developed for residential development, resulting in an increasingly urban setting in the area. The 'do-nothing scenario' over time will also result in the subject lands being still liable to increased flood risk from the western boundary stream, as well as a continuing leakage of potential retail and economic growth from the settlement.

A "do-nothing" scenario is considered to represent an inappropriate unsustainable and inefficient use of these serviced residential zoned lands within the defined settlement boundary of Tower.

3.4 ALTERNATIVE USES

The subject lands are identified specifically as being within the 'Existing Built-up area' zoning objective of Tower in the LAP. Regarding these areas, Objective ZU 3-1, of the Cork County Development Plan 2014 aims to;

> *'Normally encourage through the Local Area Plan's development that supports in general the primary land use of the surrounding existing built up area. Development that does not support, or threatens the vitality or integrity of, the primary use of these existing built-up areas will be resisted.'*

In assessing the most suitable land uses at the subject site, an assessment of the sites existing context was undertaken. The subject lands are bound to the south by the Senandale residential development, to the north by a mix of open agricultural lands and one-off dwelling houses with the Cloghroe Neighbourhood Centre to the southeast. Cloghroe Neighbourhood Centre provides a range of services for the settlement and its surrounding rural catchment, including a local newsagent/post office, pharmacy, hairdressers/beauticians, fitness studio, catholic church and primary school. The site is also situated adjacent to an existing bus stop serving as the terminus of the No. 215 Cloghroe – Mahon Point bus route providing a half hourly service to urban centres including Blarney, Blackpool, the City Centre and Mahon. The proposed mixed use residential and retail development with central amenity parkland is consistent with the existing character and land uses in the sites immediate vicinity and the provisions outlined in Objective ZU 3-1.

It is not considered appropriate to provide land-uses such as high-intensive employment or industrial development would be appropriate in the site's immediate context. It is considered that the sites location proximate to existing residential properties and neighbourhood centre uses, would result in potential negative impacts on the amenities of the area, including overbearance on residential properties to the south and unsustainable traffic congestion at peak times. The provision of high-intensive employment or industrial development is also inconsistent with the planning policy objectives for Tower as outlined in the current 2017 Local Area Plan, with section 4.8.23 of the Plan stating regarding economic and employment growth of Tower.

> *''Given the proximity to larger scale employment opportunities in Ballincollig and Blarney and the relatively poor quality road access, particularly for freight traffic, there is limited potential for future employment related development in the area.''*

It is also considered that an alternative consisting of only open space, recreation, community or education uses would not reflect the most efficient use of the lands, due to the presence of an existing bus stop to the east of the site, providing half hourly services to other urban centres including Cork City. In this context, the proposed mixed-use development, which contributes to Towers future retail and residential needs, comprises the most appropriate land-use alternative of the lands, and is in accordance with the proper planning and sustainable development of the area.

3.5 ALTERNATIVE LAYOUTS

Throughout the duration of the project, the developer considered several different layouts and options for the development of the subject lands. Each stage of the project required a reappraisal of the design strategy of the project and an evaluation of how each proposed layout responded to the site's context. The design rationale for the proposed development adopted several key principles which underpinned the wider development strategy for the lands including.

- The creation of an appropriately scaled, mixed-use residential/retail development which positively contributes to the local area, providing new residential and economic opportunities for Tower.
- That any layout directly responds to the site's topography, natural features and surrounding environment.
- That the scale of residential development is reflective of the site's existing and evolving context in the settlement of Tower. A key consideration of the proposed development has been to ensure that the residential amenities of existing residents in the area are not negatively impacted.
- That any proposed works do not negatively impact flood risk of surrounding properties and lands particularly along the R617, the Senandale residential development and the adjoining lands to the west which identified within the development boundary of the settlement.
- That high quality public open spaces and communal areas are provided, which will benefit the wider community and the creation of enhanced public realm and pedestrian/cyclist upgrades, which will not only serve the proposed development, but the wider settlement of Tower.

3.5.1 Alternative A – November 2020

A Section 247 pre-application consultation meeting took place on 5th November 2020 of Cork City Council. The layout presented at the Section 247 meeting is illustrated in Figure 3.2 as shown.

Figure 3.2 Alternative A – November 2020

Alternative A comprised of the construction of 181 no. residential units with a mix of detached, semi-detached, terraced and duplex/apartment units. Following initial discussions with Cork City Council's Roads Department, a pedestrian crossing was proposed to the southeast of the site and the provision of a footpath along the sites eastern boundary integrating with the existing footpath network, which terminates at Senandale to the south and the cul-de sac to the north. The layout provided for residential development in the northern areas of the site with retail/commercial uses in southern areas.

An outline drainage strategy for the development, consisted of utilising Sustainable Urban Drainage Systems (SUDS) and underground attenuation system, which would connect to the public storm sewer network on the R617 and discharge to the Owennagearagh River to the south.

An overview of the key statistics of Alternative A is summarised in Table 3.1 as shown.

Key Figures of Alternative A Layout	
Total Site Area	7.5 hectares
Residential Developable Area	6.0 hectares
No. of residential units	181 no. units
Residential Density	30.1 no. residential units per hectare (residential developable area)
Housing Mix	63 no. 4 bedroom detached, semi-detached & detached HSE units - (34.8%). 46 no. 3 bedroom semi-detached townhouse units - (25.4%) 44 no. 2 bedroom townhouse, apartment, duplex and step-down bungalow units - (24.3%) 28 no. 1 bedroom apartment units - (15.5%).
Public Open Space (Residential Area)	19% of total residential developable area – 12% of useable developable area
Car Parking (Residential)	293 car spaces. This equates to approx. 2 spaces for each of the detached and semi-detached units and 1.25 spaces per townhouse and apartments. This does not include the parking requirement for proposed creche.
Creche	A 42-no. child capacity creche is to be provided.
Access to Residential Development	Access provided via a new entrance from the R617. Separate access to 2 no. detached units will be provided via an existing cul-de-sac to the north.
Commercial/Retail developable site area	0.81 ha
Retail foodstore floor area	1,895 sqm (gross) - 1,315 sqm (net)
Café floor area	186.3 sqm (gross) – 155.5 sqm (net)
No. of car parking spaces	101
No. of bicycle parking spaces	26 no. spaces serving retail foodstore/café building.
Access	Access provided via an upgraded existing agricultural entrance from the R617 Cloghroe – Blarney Road. This represents a separate access point from the residential development to the north.

Table 3.1 - Alternative A – November 2020 – Key Statistics

The design rationale for the proposed development was revisited following the planning authority's observations made during the pre-application consultation process, including.

1. The provision of three storey apartment/duplex/townhouse units within the central area to form a strong built edge and streetscape fronting onto the public road and to create a more urban character.
2. Relocation of the proposed step-down apartment building to a more central prominent location where it forms part of the central urban fabric of the site.
3. Re-design of the central parkland establishing hedgerows/planting/and watercourses as key features and enhancing the biodiversity strategy for the site. Proposed units to the north and south have been clustered around this space which will form a valuable amenity for the residents.
4. Pedestrian link proposed to the northeastern corner of the site, providing pedestrian connectivity and a 'desire line' to Tower village centre to the northeast. Reorientation and redesign of units to the north of the woodland.
5. Revised details relating to the sites frontage with the R617 road, including reserving a route for a potential future bus lane, footpath, cycle path and relocation southwards of the existing bus stop.

Figure 3.3 Alternative A – Amendments

As a result, five amendments were considered to Alternative A – which are shown on the figure above.

3.5.2 Alternative B – March 2021

A tripartite meeting took place on 5th March 2021 with representatives of the developer, planning authority and An Bord Pleanála. The observations of the planning authority made during the Section 247 meeting were reflected in the Alternative B layout, relating to.

- Stronger building edge and streetscape onto the R617.
- Relocation of the proposed step-down apartment building.
- Re-design of the central parkland establishing hedgerows/planting/and watercourses as key features and enhancing the biodiversity strategy for the site.
- Pedestrian link is proposed to the northeastern corner of the site, providing pedestrian connectivity and a 'desire line' to Tower village centre to the northeast.
- Revised details relating to the sites frontage with the R617.
- A comprehensive drainage and flood defence strategy for the site.

Figure 3.4a Alternative B Layout (Northern Areas) – March 2021

Figure 3.4b Alternative B Layout (Southern Areas) – March 2021

Alternative B comprised of a development of 189 no. residential units with a mix of detached, semi-detached, terraced and duplex/apartment units. Like the concept for Alternative A, the layout provided for residential development in the northern areas of the site with retail/commercial uses in southern areas. Having considered the observations made by the planning authority during the pre-application process, Alternative B provided for a future bus corridor along the R617, and sufficient land reserved to incorporate a 3.25 metre bus corridor, as and when required.

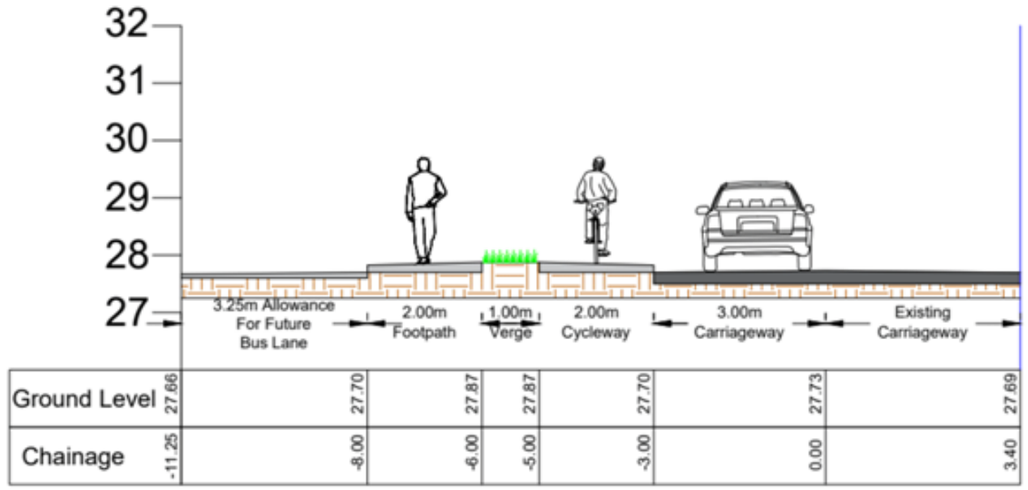

Figure 3.5 Public Road Cross Section prepared by MHL & Associates Consulting Engineers

A more detailed drainage strategy was presented for Alternative B in accordance with SUDS principles. The strategy divided the site into six (6) drainage catchments: all of which are proposed for attenuation utilising Stormtech Underground Chamber systems. Each attenuation system is designed with a controlled flow rate of less than the greenfield run-off rate for the catchment area. The attenuated systems would ultimately discharge into the Owennagearagh River via the public storm sewer present on the R617.

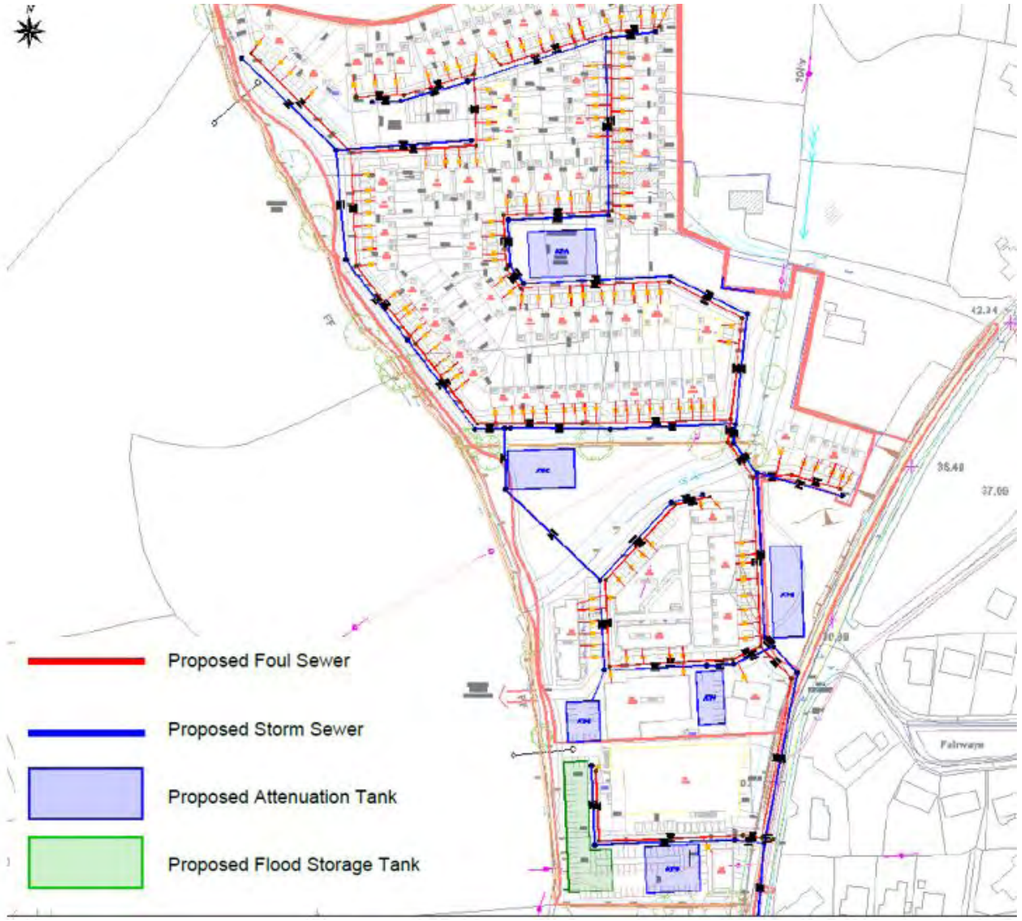

Figure 3.5 Alternative B Drainage/Flood Storage Strategy - MHL & Associates Consulting Engineers

An overview of the key statistics of Alternative B is summarised in Tables 3.2 and 3.3 as shown.

Key Figures of Alternative B Layout – Residential	
No. of units	189 (124 houses & 65 apartment/duplex units)
Site Area	7.5 ha
Developable Site Area	5.86 ha
Density (Residential Developable site area only)	Within the proposed residential developable area 187 no. residential units are proposed reflecting a residential density of 31.9 units per hectare.*
Plot Ratio	0.327 (per developable residential site area)
Open Space provision	20% - (14% useable open space)
Creche Details	A two storey 404.9 sqm 42 no. child capacity creche
Total Residential Car Parking spaces	296
Total Residential Bicycle spaces	54 no. serving apartment units
Access	Provided via a new access from the R617 Cloghroe – Blarney Road
Retail foodstore floor area	1,895 sqm (gross) - 1,315 sqm (net)
Café floor area	186.3 sqm (gross) – 155.5 sqm (net)
No. of car parking spaces	101
No. of bicycle parking spaces	26 no. spaces serving retail foodstore/café building.
Access	Access provided via an upgraded existing agricultural entrance from the R617 Cloghroe – Blarney Road. This represents a separate access point from the residential development to the north.

Table 3.2 - Alternative B – March 2021 Key Statistics (Residential)

* *2 no. additional apartment units are proposed are first floor level of the proposed café building within the defined 'commercial developable area' of the proposed development. For the purposes of calculating the residential density of the proposed development these 2 no. units have not been factored into density calculations.*

Key Figures of Alternative B Layout – Retail	
Commercial/Retail developable site area	0.81 ha
Retail foodstore floor area	1,895 gross floor area (1,315 sqm net retail area)
Café floor area	186.3
No. of car parking spaces	101
No. of bicycle parking spaces	26 no. spaces serving retail foodstore/café building.
Access	Access provided via an upgraded existing agricultural entrance from the R617 Cloghroe – Blarney Road. This represents a separate access point from the residential development to the north.

Table 3.3 – Alternative B – March 2021 Key Statistics (Retail)

Following the receipt of the ABP opinion (ABP-308980-20) in March 2021, further amendments to the layout were considered in order to address the matters raised, which included residential density and interaction of the site with the R617 and pedestrian/connectivity proposals. It was considered that Alternative B should be amended having regard to the Boards Opinion including.

1. It was considered appropriate to increase the density of residential development in the area to the south of the Central Parkland to ensure a strong urban edge/backdrop is formed in this area. 2 no. two storey units previously proposed would be replaced by a three-storey duplex block containing 4 no. residential units.

2. It was also considered appropriate to increase the quantum of residential development in the area to the east of the site to the north of the existing woodland area. 5 no. detached/semi detached dwellings would be replaced by a three storey duplex apartment building, providing 12 no. residential units.

3. In order to improve connectivity and pedestrian safety to the R617, Alternative B would be amended to provide a signalised toucan crossing to improve connectivity with Tower to the north. traffic calming measures including the provision of a signalised toucan crossing to improve connectivity with Tower to the north.

Figure 3.7 Alternative B - Amendments

The meeting minutes of the November 2020, Section 247 meeting and March 2021 tripartite meeting Opinion are contained in Appendix 3-1 of this EIAR.

3.5.3 Alternative C – Proposed Development

A full description of the proposed development for which permission is sought pursuant to this application is provided in Chapter 2 of this EIAR.

The end result of the various alternations and layout revisions is the proposed development. The proposed density of the scheme has been increased and the proposed 198 no. residential units on developable site area 5.6 hectares reflects a residential scheme of 35 units per hectare. This represents an increase from that presented at pre-consultation stage where a development of 31.9 units per hectare was proposed.

An overview of the key statistics of the proposed residential development is provided in Table 3.4 as shown.

Key Figures of Proposed SHD Development	
No. of units	198 (117 houses and 81 apartment/duplex units)
Site Area	7.5 ha
Residential Developable Site Area	5.6 ha
Density (Residential Developable site area only)	Within the proposed residential developable area 196 no. residential units are proposed reflecting a residential density of 35 units per hectare.*
Plot Ratio	0.352 (Net Developable Residential Area)
Open Space provision	16% of residential developable site area – (14% is useable public open space)
Creche Details	A two storey 404.9 sqm 42 no. child capacity creche
Total Residential Car Parking spaces	287
Total Residential Bicycle spaces (including creche)	126 no. serving apartment units
Total Creche Car Parking Spaces.	9
Access	Provided via a new access from the R617 Cloghroe – Blarney Road

Table 3.4 – Key Statistics of Proposed Residential Development

* *2 no. additional apartment units are proposed are first floor level of the proposed café building within the defined 'commercial developable area' of the proposed development. For the purposes of calculating the residential density of the proposed development these 2 no. units have not been factored into density calculations.*

Figure 3.8 Proposed Residential Development

The layout of the proposed retail development has not deviated significantly from originally proposed.

Key Figures of Proposed Retail Development	
Commercial/Retail developable site area	0.81 ha
Retail foodstore floor area	1,895 sqm (gross) – 1,315 sqm (net)
Café floor area	186.3 sqm (gross) – 155.5 sqm (net)
No. of car parking spaces	101
No. of bicycle parking spaces.	26 no. spaces serving retail foodstore/café building.
Access	Access provided via an upgraded existing agricultural entrance from the R617 Cloghroe – Blarney Road. This represents a separate access point from the residential development to the north.

Table 3.5 – Key Statistics of Proposed Retail Development

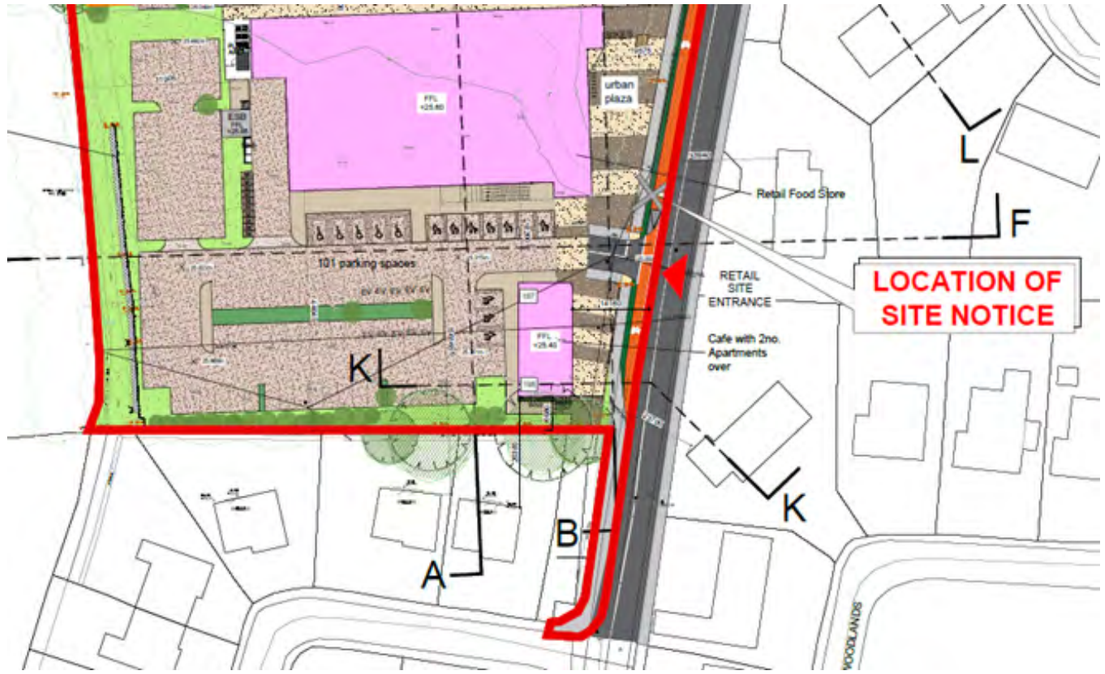

Figure 3.9 Proposed Retail Development

The proposed retail development layout forms part of the overall drainage/flood defence strategy which has remained relatively consistent from that presented in Alternative B. As requested in the ABP Opinion, the applicants consulted with Cork City Councils Drainage Department regarding the proposed surface water management.

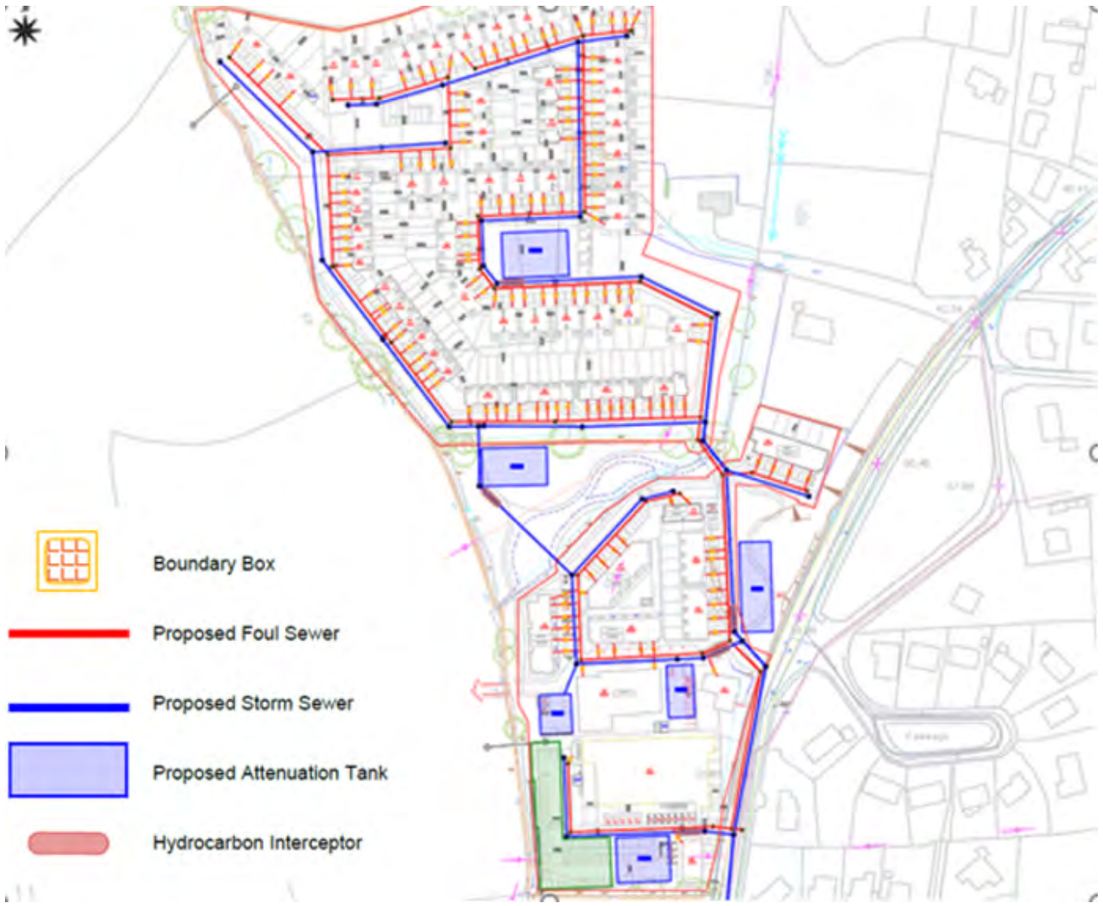

Figure 3.10 Proposed Drainage /Flood Storage Strategy - MHL & Associates Consulting Engineers

The proposed development provides for, or facilitates proposed upgrades to the R617, dedicated pedestrian and cycle paths along the subject site's roadside boundary, and a signalised toucan crossing, promoting sustainable mobility in the settlement.

Figure 3.11 Proposed Upgraded Bus Stop with Shelter on the R617

3.6 COMPARISON OF ENVIRONMENTAL IMPACTS – CONSTRUCTION PHASE

This section provides a summary of the comparison of environmental impacts during the construction phase between the various alternatives outlined above.

3.6.1 Landscape & Visual

It is not considered that landscape and visual considerations differ significantly between the various alternatives described. Each alternative assessed would require similar levels bulk excavation and the removal of existing vegetation, to accommodate the proposed dwellings/roads and underground utilities.

3.6.2 Traffic & Transportation

Due to the higher number of residential units in Alternative C, it is likely that there will be some level of increased construction traffic from previous alternatives. The evolution of the scheme to provide for a Pedestrian crossing on the R617, the relocation of the existing bus stop and introduction of footpaths/cycle lanes, may potentially result in some short-term negative traffic impacts in Alternative C.

However, the construction mitigation measures identified in the CEMP and CTMP, developed in detail in advance of Alternative C, will result that any impacts will not be significant in nature, and any negative impacts will be short term in duration.

3.6.3 Services, Infrastructure & Utilities

It is not considered that services, infrastructure and utilities considerations differ significantly between the various alternatives described. The increase in the number of residential units between Alternatives A-C will result in a higher demand for connections to services and utilities. However, in the context of the wider development, this is not considered to be significant.

3.6.4 Land, Soils & Geology

It is not considered that land, soils and geology considerations differ significantly between the various alternatives described. The increase in residential units between alternatives A-C is offset by the rationalisation of the wider landscape strategy, which seeks to include a large central parkland in Alternatives B-C. This was not originally included within Alternative A.

3.6.5 Water & Hydrology

It is not considered that water (hydrology & hydrogeology) considerations differ significantly between the various alternatives described. The principles of the flood defence, surface/foul water strategies have remained relatively consistent across all alternatives proposed.

3.6.6 Biodiversity

It is not considered that biodiversity considerations differ significantly between the various alternatives described. Detailed construction mitigation measures were developed as the project evolved and are detailed in the accompanying construction management reports.

3.6.7 Noise & Vibration

In the absence of appropriate mitigation measures, noise and vibration levels during construction may increase throughout alternatives due to the proposed increase in housing numbers. However, as detailed in the CEMP, noise and vibration limits will be rigorously monitored throughout construction and will not exceed the standards outlined in the CEMP. It is not considered that noise and vibration considerations differ significantly between the various alternatives described.

3.6.8 Cultural Heritage

It is not considered that cultural heritage considerations differ significantly between the various alternatives described.

3.6.9 Air Quality & Climate

The increase in the proposed number of residential units throughout the various alternatives, may result in some increased levels of dust emissions during construction. However, with the dust management plan and other mitigation measures enforced, it is considered that any negative impacts relevant to air quality and climate are not significant across all alternatives.

3.6.10 Population & Human Beings

The increase in the number of residential units throughout the various project alternatives, may result in some additional impacts relating to population and human health. These may include a longer construction period, higher construction traffic numbers and nuisances such as noise, vibrations and dust. The differential in the number of residential units between Alternatives A-C is 17 units, in addition to the upgrades to the public road and other aspects. Although there may be some inconveniences to the local population resultant from Alternative C, it is considered that with the proposed mitigation measures in place, that these will be temporary/short term in nature and not significant.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	=	=	=
Traffic & Transportation	=	X	=
Services, Infrastructure & Utilities	=	=	=
Land, Soils & Geology	=	=	=
Water & Hydrology	=	=	=
Biodiversity	=	=	=
Noise & Vibration	=	x	x
Cultural Heritage	=	=	=
Air Quality & Climate	=	x	x
Population & Human Beings	=	x	x

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.6 – Comparison of Impacts

3.7 COMPARISON OF ENVIRONMENTAL IMPACTS – OPERATIONAL PHASE

This section provides a summary of the comparison of environmental impacts during the operational phase between the various alternatives outlined above.

3.7.1 Landscape & Visual

It is considered that the evolution of the project from Alternative A -C, results in an enhanced landscape and visual amenity context. The provision of a central amenity parkland and more appropriate public open spaces within the proposed scheme, results in a higher quality residential amenity and reflects the sites existing context.

3.7.2 Traffic & Transportation

It is also considered that proposed Alternative C results in an improvement in traffic and transportation matters, and specifically pedestrian and cyclist connectivity. The proposed works to the R617, including the provision of cycle lanes/ bicycle lanes and potential future bus corridor first proposed in detail in Alternative B, will result in significant positive impacts in the area and enhance access to existing public transport links. One aspect which proposed Alternative C includes but which was not included in Alternatives A/B, is the signalised pedestrian crossing on the R617 as agreed in principle with Cork City Council.

3.7.3 Services, Infrastructure & Utilities

The servicing proposals for the proposed development have remained relatively consistent throughout the design phase of the proposed development. The layout of the proposed retail development has not deviated significantly, and the quantum of residential numbers has remained within 180-200 no. unit range. As detailed further in chapter 5 of this EIAR, and the accompanying engineering documentation prepared by MHL & Associates, the surrounding road and service network can accommodate the proposed development. The proposed flood storage and drainage strategy will reduce the likelihood of flooding resultant from the existing stream adjacent to the western boundary, and the proposed public realm upgrades on the R617 will enhance traffic and pedestrian/cyclist safety.

3.7.4 Land, Soils & Geology

It is not considered that land and soil considerations differ significantly between the various alternatives described.

3.7.5 Water & Hydrology

The rationale of the surface water/flood defence strategy has remained consistent throughout the duration of the project and has influenced the evolution and form of the proposed layout. The proposed wastewater strategy has remained constant for the duration of the project.

3.7.6 Biodiversity

As the design and layout of the scheme has evolved the creation of the central parkland, replacement planting and treatments re. the western boundary watercourse has resulted in an enhanced biodiversity and ecological context as the scheme has evolved.

3.7.7 Noise & Vibration

It is not considered that noise and vibration considerations differ significantly between the various alternatives described.

3.7.8 Cultural Heritage

It is not considered that cultural heritage considerations differ significantly between the various alternatives described.

3.7.9 Air Quality & Climate

It is not considered that air quality and climate and considerations differ significantly between the various alternatives described.

3.7.10 Population & Human Beings

The evolution of the proposed layout has resulted in a continuous improvement in terms of human health and impacts on the local population. The proposed public realm upgrades, public open spaces, drainage strategy in addition to the delivery of new housing, retail and childcare uses have evolved since project inception stage.

Table 3.7 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlines above.

Criteria	Alternative A	Alternative B	Alternative C
Landscape & Visual	X	✓	✓
Traffic & Transportation	X	✓	=
Services, Infrastructure & Utilities	X	✓	=
Land, Soils & Geology	=	=	=
Water & Hydrology	X	✓	=
Biodiversity	X	✓	=
Noise & Vibration	=	=	=
Cultural Heritage	=	=	=
Air Quality & Climate	=	=	=
Population & Human Beings	X	✓	✓

✓ Where it has been considered that there has been an improvement from the previous alternative

= Where the impact is considered similar for all options

X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.7 – Comparison of Impacts

3.8 MAIN REASONS FOR THE OPTION CHOSEN

When all construction and operational aspects are assessed, it is objectively considered that 'Alternative C', consisting of 198 no. residential units, creche, retail food store and café building, and public realm improvements to the R617 is the most appropriate and efficient alternative layout assessed. Alternative C reflects the observations of Cork City Council and An Bord Pleanála made during Section 247 and tripartite discussions, and represents a more efficient development than that previously proposed in Alternatives A and B.

- Alternative C provides for a more efficient density of residential development, reflective of the site's location adjacent to an existing suburban public transport route, and within walking distance of various services and amenities provided for in Cloghroe/Tower.
- The landscape, visual and amenity strategy has evolved throughout the scheme design, to provide for a central amenity parkland, which was not initially envisaged in Alternative A. The Alternative C layout also provides for an enhanced relationship between the built environment and the central amenity parkland, from that proposed in Alternative B.
- The proposed upgrades to the R617, including the provision of footpaths, cycle lanes, pedestrian crossing and the safeguarding of potential future BusConnects infrastructure, improved incrementally across all alternative layouts. The chosen layout will succeed in facilitating internal pedestrian movements within the site and integrate into the existing settlement, satisfying desire lines to local destinations, including Cloghroe Neighbourhood Centre and Tower village core.
- The proposed drainage/flood defence strategy will not only serve the site, but also benefit surrounding areas including the Senandale residential, development to the south.
- It is considered that the proposed layout has incrementally improved across all alternative layouts considered and will positively contribute to the future residential and economic growth of the settlement. Once operational the proposed development will result in several positive environmental and socio-economic impacts to the locality.

CHAPTER FOUR
Landscape & Visual

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CHAPTER FOUR

4 Landscape & Visual

4.1 INTRODUCTION

This section of the EIAR appraises the existing landscape of the site at Cloghroe, Tower, Cork and the greater context within which it lies. It will then assess the likely landscape and visual impacts arising from the proposed development on these lands. The assessment will also take into account the cumulative impact from nearby recent development and unbuilt zoned lands. It will also describe the proposed landscape mitigation measures and the resulting residual landscape and visual impacts.

Forestbird Design, Landscape Architecture (Cloyne, Co. Cork) was commissioned to conduct a Landscape and Visual Impact Assessment (LVIA) of the site and environs. Project documents prepared by architectural, engineering and planning consultants, as well as archaeology and ecology investigations were reviewed. Forestbird Design has visited the site on five different occasions during all four seasons, from September 2020 – December 2021. The photomontage images were taken in May and December 2021.

4.2 METHODOLOGY

The landscape appraisal which has been undertaken is made with regard to the sensitivity of the landscape and its ability to undergo change. The methodology is based on national and local policy guidelines and best practice methodology as outlined in the references below:-

- *Environmental Impact Assessment of Projects: Guidelines on the Preparation of the Environmental Impact Assessment Report* (EIAR) (2017); European Commission (EC)
- *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (2013); EC
- *Guidelines on Information to be Contained in Environmental Impact Assessment Reports* (2017 Draft); Environmental Protection Agency (EPA)
- *Guidelines on Landscape and Landscape Assessment (*2000); Department of the Environment, Community and Local Government (DOE)
- *Guidelines on Landscape and Visual Assessment* (2002); Irish Landscape Institute (ILI)
- National Landscape Strategy 2015-2025; DOE
- National Biodiversity Action Plan (2017-2021)
- Cork County Development Plan 2014-2020 (CountyDP); Cork County Council
- Cork City Development Plan 2015-2021 (CityDP); Cork City Council
- *Guidelines for Landscape and Visual Impact Assessment* (GLVIA), third edition (2013), Landscape Institute (UK)
- *LCA and LVIA of Specified Infrastructure Projects – Overarching Technical Document (*Dec 2020); Transport Infrastructure Ireland (TII)
- *Visual Representation of Development Proposals*, Landscape Institute (UK, 2019); Technical guidance notes for photomontages
- *Amenity Trees and Woodland: A Guide to their Management in Ireland* (2010); Tree Council of Ireland

In addition to the above documents, Ordnance Survey and National Monuments Service historical maps were used to help identify past land uses, landscape components and historic landscape evolution. In a modern context, aerial images from 1995 to the present also informed landscape changes.

A landscape and visual assessment consists of two distinct components. The first being *Visual Impact*, which is the extent that the new development and its' landscape alterations can be seen by a viewer. The second being *Landscape Character Impact*, which examines innate responses to the changes created by the proposed development. This assesses both natural and cultural criteria and is an amalgamation of the impacts on landform, ecology, noise, traffic, viewsheds, historical and cultural elements.

It should be noted that the construct of the chapter follows EC and EPA guidance, which are generally aligned. In applying technical terminology specific to LVIA, the EPA guidelines are followed. However, the GLVIA is more informative and prescriptive, with additional analysis methodology allowing for improved assessment. In such instance, GLVIA guidance is incorporated (with reference).

Prior to assessment of impact, layers of baseline information are required. Two stages of review provide the necessary layers.

- **Stage 1: Existing Landscape Description.** The composition of the site (terrain, vegetation, structures and features) is developed, including the visual context surrounding the site. This is established by means of site visits and desktop reviews of statutory plans, topographical surveys, Ordnance Survey maps and historic documents. This information will provide a baseline level of sensitivity and actual level of visibility.
- **Stage 2: Proposed Development Description.** Site layout plans, proposed structures, roads and landscaping are reviewed. Heights, materials and anticipated site activity are taken into account. Development inevitably has a degree of impact on the existing landscape as a result of removals or landform alteration, which are also considered.

The assessment of Visual Impact is based on what is visible to the standard human eye. The result is *perception* and it is moulded by terrain, vegetation and physical structures. View locations can include public roads, any registered historical sites or structures, scenic routes, areas of conservation, public gathering areas, public transport nodes, areas of special interest as identified in official policy guidelines, as well as adjacent lands in so far as they are accessible. This assessment results in a *Zone of Theoretical Visibility* (ZTV) (formerly *Zone of Visual Influence* or *Visual Envelope*). This identifies the context from where the site is physically visible.

The assessment of Landscape Character involves the attempt to scientifically measure feelings and perceptions of the site and its environs. Because character is difficult to scientifically define, extensive cross referencing is required to achieve an impartial assessment. Historical and contemporary documents, other chapters of this EIS, the current site status, relationship to adjacent uses, as well as unwritten community perception of the site all play a role in defining landscape character. The criteria for measuring impact is outlined in tables under Part 4.6 – Potential Impacts.

Once the parameters are understood, a number of view locations are visited and reviewed. This results in a select group of Key Visual Receptors, chosen for their sensitivity, degree of impact and/or unique attributes or relationship to the site. The Key Visual Receptors are represented as photomontages (existing and proposed images), whereby 5 no. receptors have been selected and described in Section 4.8. Written descriptions of the receptors, sensitivities, their relationship to the site and anticipated impact incurred from the development proposals are included. Additionally, 12 other Potential View Receptors Considered have been investigated and described as to why a photomontage was unnecessary.

4.3 RECEIVING ENVIRONMENT – SITE CONTEXT

The proposed development site is located within the Cork City boundary, but is more than 8km northwest of the city centre, 3.5km west of Blarney and 3.5km north of Ballincollig. It is served by the R617 regional road, which gives it a close association with the village of Tower.

The site is located on lower elevations (25-50m) in a greater landscape of undulating hills that reach 90-120m elevation. Figure 4.3a illustrates the site in context of elevated ground.

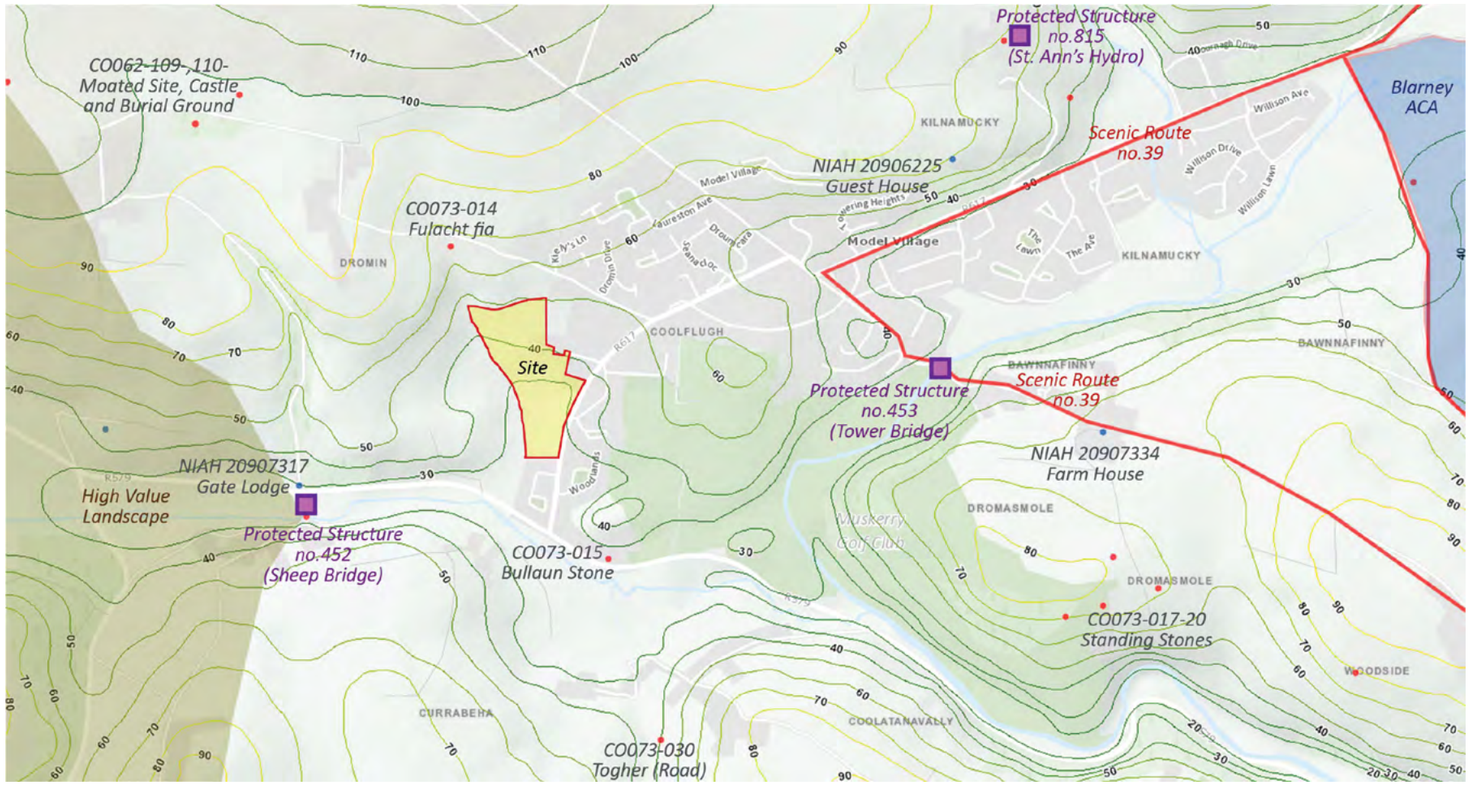


Figure 4.3a – Ordnance Survey base map highlighted with information to illustrate the larger site context in terms of landform (with 10m contour lines), pertinent statutory landscape designations and historical monuments. The full map width is 4.2km.

The number of statutory designations and National Monuments in close range (less than 200m) or moderate range (less than 1000) to the site is below average when compared to other lands on the urban fringe for this region. There is 1 no. feature within 200m and 8 no. additional within 1000m. These features are also highlighted on Figure 4.3a. Listed in order of distance from the site they include:

- Fulacht fía, National Monument (NM) CO073-014 (180m north). Refer Chp11 Cultural Heritage for full description of monument.
- Ballaun Stone, National Monument CO073-015 (330m south). Refer Chp11 Cultural Heritage for full description of monument.
- Gate Lodge, National Inventory of Architectural Heritage (NIAH) 20907317 (630m southwest). Refer Chp11 Cultural Heritage for full description of monument.
- Sheep Bridge, Protected Structure no. 452 (and NM CO073-013; 640m southwest). Refer Chp11 Cultural Heritage for full description of monument.
- High Value Landscape (640m southwest). From CountyDP Part 13.6.8, to protect high value and high sensitivity landscapes that have county and national importance.
- Scenic Route no. 39 (Clogheen to Tower to Blarney Road, 750m northeast). From CountyDP Objective GL7-2, to protect the character of designated views and prospects.
- Togher (Road), National Monument CO073-030 (860m south). Refer Chp11 Cultural Heritage for full description of monument.
- Moated Site, Castle and Burial Ground, National Monuments CO062-109/110 (900m northwest, cluster). Refer Chp11 Cultural Heritage for full description of monuments.

- Tower Bridge, Protected Structure no. 453 (1000m east). Old stone bridge. From CountyDP Objective HE4-1, to protect the special character of heritage structures from adverse impacts. Also forms part of Scenic Route no. 39.
- St. Ann's Hydro, Protected Structure no. 815 (1550m northeast). Ruins of 19th century hydropathic facility. From CountyDP Objective HE4-1, to protect the special character of heritage structures from adverse impacts.
- Farm House, NIAH 20907334 (2000m east). Recently renovated 19th century farm buildings. Also forms part of Scenic Route no. 39.
- Standing Stones, National Monument (NM) CO073-017/020 (2100m east). On east side of hilltop.

The site is located in the *Landscape Character Area* titled "Broad Fertile Lowland Valleys 6A". According to the Cork County Draft Landscape Strategy 2007 (and CountyDP Appendix E), it can be characterised as a mosaic of fertile agricultural land set within rolling hills formed by the rivers, punctuated by mature broadleaf hedgerows. This area carries a Landscape Value of "High", a Landscape Sensitivity of "High" and a Landscape Importance of "County". It is not categorised as a "High Value Landscape", but of the 26 no. Character Areas, Area 6A ranks as no. 8-9 in terms of overall value and sensitivity.

The site is not within the *High Value Landscape* zone, which is located 640m to the west, beyond intermediate hillsides.

Scenic Route no. S39 travels east of the site at a range varying from 750 to 3km away. Volume 2, Chapter 5 of the CountyDP describes the route as having urban areas mixed with pastoral fields and trees. In addition to settlement views, key views include Blarney Castle and grounds and views over the Lee Valley. It carries an overall landscape value of "High-Very High". There is no *sense of remoteness* along this route and the *rural character* is not prevalent.

Modern cultural association with the site is experienced primarily from the R617. For many, it forms a green buffer between Cloghroe and Tower when passing by in the car. There is a modest visual relationship between the site and the Cloghroe shops (100m away), but there is no public footpath at the site to experience it directly. Kiely's Lane (110m away) north of the site receives some pedestrian use as a rural amenity walk and would have elevated views towards the site.

The adjacent context consists of detached residential neighbourhoods to the east and south. Unzoned agricultural land lies to the north. Agricultural land, zoned residential, lies to the west. The confluence with the western parcel forms a low point where a local stream flows (primarily on adjacent lands). The aerial image in Figure 4.3b graphically shows these relationships.

Figure 4.3b – Diagram illustrating the site relationship to the dense residential clusters of Tower. Contours are shown to illustrate the lower elevation of the site relative to existing developed lands.

4 no. detached residences share the southern site boundary. 1 no. detached residence (former landowner) adjoins the site at the northeast boundary.

4.4 RECEIVING ENVIRONMENT – SITE

The site is located within undulating terrain at the fringe of a well-developed residential suburb. The site is generally divided into two large agricultural parcels, currently in use as pasture. The southern half of the site is flat and can be considered the bottom of the valley. The northern half of the site is on rising ground, but still well constrained within the valley hillsides. Four different types of boundaries characterise the site.

East Boundary – The R617 is a broad commuter artery that was expanded in the late 20th century and forms the eastern boundary. Refer figure 4.4a. The build-out of this road gave rise to the boundary vegetation seen today. The vegetation is a mix of tree species with no defined ditch or hedgerow. Non-native species (85%) include commercial coniferous trees and tall Poplars. Native species (15%) include a cluster of volunteer Willow and a single specimen Oak. There is no footpath at this boundary, yet it does include a bus stop. The mix of vegetation does provide the sense of a green buffer between Cloghroe and Tower. The Poplars provide visual cues when viewed from a distance. Refer Figure 4.4b.

Figure 4.4a – Image of 25-inch map (early 1900's) illustrating the original route of the current R617 (dashed orange line). The diversion would most likely have been circumventing a valley or recess in the terrain. (bottom) Aerial image showing the new R617 road with the old road still in existence.

Figure 4.4b – (top) Image of the R617 looking north, at the junction to the Fairways estate. It shows the modern diversion rising higher than the original road (narrow lane to the right). This has altered the landscape and landform on site.

Figure 4.4c – Image of the east boundary, looking north. Note the transition of commercial conifers to Willow to Sycamore, Elder and Poplars, with no defined hedgerow or footpath.

North Boundary – At the very northern end of the site, the boundary consists of a long-established sod and stone ditch topped by mature thorn trees and Ash. It is a quality traditional hedgerow with native species. At the northeast corner, adjacent to the existing residence, a double row of mixed broadleaf planting (primarily Birch) forms a tall visual buffer, but is only physically separated by a post and wire fence. Refer Figures 4.4d and 4.4e.

Figure 4.4d – Image of the northern boundary from within the site. Note the defined ditch with Ash trees in excess of 20m.

Figure 4.4e – Image of the northeast boundary from within the site. Defined by trees in excess of 15m. Note the rise in elevation to the house itself.

West Boundary – A local unnamed stream flows along the entire western boundary. The stream is flanked by a low sod and stone ditch, giving way to a continuous band of mature tree planting. The vegetation is diverse with a strong presence of Oak. This is a good example of the pastoral landscape alluded to in the Cork County Draft Landscape Strategy 2007 description of Area 6A. Refer Figure 4.4f.

Figure 4.4f – Image of the western boundary from within the site. Tree species include Oak, Birch, Ash, Willow, Hawthorn and Poplars, averaging heights of 10-18m.

South Boundary – The entire southern boundary is shared with the rear gardens of existing detached residences. It consists of a planted sod ditch, fronted by a field drain on the site side. Quality Oak trees occupy the southeast corner and are visible to the R617. The vegetated ditch transitions to dense Willow, Gorse and Bramble clusters further west.

Figure 4.4g – Image of the southern boundary from within the site. Background houses are from 10-14m from the site boundary (centre of ditch).

Internally, the site contains 4 no. notable landscape features. These are described below:

- East-West Hedgerow (WL1) – Dividing the site between the flat and sloping ground is a mature hedgerow with native Oak, Holly and Hawthorn. It serves as spatial definition and as a fauna commuter link to the stream. Refer Figure 4.4h.
- Northeast Field Drain (WL1/FW4) – This is a pronounced drainage swale flanked by mature native trees, including Oak, Hawthorn and Willow. The understorey is open, with views through. Refer Figure 4.4i.
- Wet Willow Woodland (WN6) – At the toe of the eastern slopes, the land drains poorly. This has resulted in a dense Willow woodland with vegetation of roughly the same age. This habitat would appear to be a consequence of the R617 construction. Refer Figure 4.4j.
- Broadleaf Hillside (WD1) – Also a result of infill along the R617, this is elevated ground containing a mix of Sycamore, Willow and Elder. It is uniform in age and provides a multi-layered visual buffer to the R617. Refer Figure 4.4k.

Figure 4.4h – Image of Internal hedgerow with focal point Oak flanked by Hawthorn and Willow.

Figure 4.4i – Image of northeast field drain, looking north. Most mature trees flank the eastern side of the drain, which averages 1m in depth. The hedge to the right forms the site boundary.

Figure 4.4j – Image of the damp woodland at the toe of the slope, populated almost exclusively by Willow.

Figure 4.4k – Image of the mixed broadleaf woodland as it transitions from the R617. There is woodland uniformity with most trees being the same age.

4.5 CHARACTERISTICS OF THE PROJECT

Cloghroe Development Ltd. is seeking planning permission for a strategic housing development. For the overall project description refer Chapter 2. Interventions and proposals specific to the landscape character and potential impact on visibility are described below.

4.5.1 Modifications to Existing Conditions

The central grassland areas will change to absorb the development. Of greatest interest is the extent of tree removal. In this context, it is noteworthy that the entire northern, western and southern boundary hedgerows are retained in their entirety. Drawing L103 identifies the extent of removals elsewhere on the site. The offset to the western boundary and stream is sufficient to accommodate level changes without detrimentally impacting the existing trees. There are significant modifications to the eastern boundary and interface with the R617.

All trees bounding the southern half of the R617 (at the eastern boundary of the site) are being removed. The removals constitute a wide mixture of species, including Sitka Spruce, Fir, Sycamore, Elder and volunteer Willow. Refer Figure 4.5a. Descriptions of these tree clusters are provided in detail on drawing L104. Approaching the bus stop, the existing Oak is retained and all boundary trees north of this are retained, including the tall Poplars. It should be noted that the roadside modifications to provide a footpath do not result in tree removals, as the road is actually narrowed to accommodate this. In total, approximately 85 trees will be removed. All of them are young-mature trees (15-40 years old). 40 no. trees form a coniferous plantation, while 45 no. are broadleaves. No mature or veteran trees will be removed.

Figure 4.5a – Extract from the Retention and Removals Plan on drawing L103, highlighting the removals along the R617.

Internally, the central hedgerow is retained in its entirety. The trees along the northeast field drain are also fully retained. Internal removals include a cluster of non-native Monterey Cypress on the hillside. It is mature and such trees are incompatible in a residential setting. Removals also include a portion of the native wet Willow woodland. Drainage will also be improved to this area, improving the understorey habitat of the remaining woodland.

The manmade landform adjacent to the R617 will be altered to accommodate underground stormwater storage tanks.

4.5.2 Proposed Development

The proposed development aims to provide an integrated development consisting of residential and retail elements. The structures are set within a high quality landscape that has a strong emphasis on biodiversity links (refer Figure 4.5b). There is significant change to the R617 road frontage and more than 325 semi-mature trees are proposed for planting. The proposed landscape works are illustrated at a high level in the Appendix drawings L108a and L108b.

Figure 4.5b – Diagram of biodiversity links overlaid onto the Landscape Masterplan. The pink dashed lines indicate contiguous tree planting and habitat corridors, with the aim of linking back to the stream along the western boundary. Four primary biodiversity zones (A-D) are highlighted.

As key features of the scheme, the four large biodiversity zones highlighted in Figure 4.5b provide an improved ecosystem across the site. A summary of each zone:

- A – New Native Woodland – Replacing the mixed species woodland and following ground level alterations, a new 100% native woodland will be replanted. There is a short-term negative impact with vegetation removal, but in the medium term and beyond, with the growth of the new planting, the biodiversity opportunities will be measurably enhanced.
- B – Central Attenuation – Taking cues from the existing stormwater system on site, this area becomes a large wildlife basin. It attenuates large volumes of water during heavy storm events then evolves into a damp meadow. This will be a strong pollinator corridor and is anticipated as a good source of food for birds and bats using the stream (refer Ecology Chp9).
- C – Quadrangle – Linked to the northeast field drain by lines of trees, this space has winter flowering shrubs and high nectar trees.
- D – Hilltop Garden – This amenity space is linked back to the stream by an avenue of large canopy trees. The garden is designed with pollinator-friendly planting.

Figure 4.5c – Visualisation of the central amenity and attenuation area. Seeded with native wildflower species for damp meadows and planted with plugs of Rush and Flag Iris for biodiversity and water filtration.

Figure 4.5d – Visualisation of the quadrangle with winter pollinator shrub beds and spring flowering trees.

In terms of public perception of the site, significant change occurs in the frontage treatment of the R617. A climbing cycle lane and broad pedestrian path are provided, designed to give the sense of a village centre. Large canopy avenue trees provide a degree of visual filtering to the structures behind. The architectural quality of the road frontage is presented as commercial mixed-use and not as a residential estate. As the R617 rises, the retained trees and woodland near the bus stop create a definitive edge to the built form.

Figure 4.5e – Visualisation of the proposed R617 road frontage, looking north.

Internally there are 2 no. playgrounds, 2 no. large level active grass amenity areas and 4 no. ancillary grass kickabout areas. Overall, open space amenity constitutes 15% of the site area. This number is within statutory parameters and would be considered a higher than average percentage.

over 800 lin.m. of designated amenity paths. The western amenity path (420 lin.m.) provides the opportunity for the public to experience the streamside environment and mature trees that categorise *Landscape Character Area* 6A.

The routes of existing waterways are being retained and attenuation basins are proposed to enhance natural stormwater management in accordance with SuDS best practice. These are in combination with engineered storage tanks, but act as supplemental temporary retention, percolation and discharge. This stormwater management system is deemed to have a positive impact on site biodiversity and tree health.

Tree planting serves to enhance the urban realm and provide commuting links to the various habitats. The aim is to improve visual screening while enhancing biodiversity. 85% of the planting will be deciduous, with 15% evergreen. There are pockets with clusters of 100% native species and urbanised zones where all of the trees are non-native, for performance in urban conditions. On balance, 75% of the trees and shrubs will be native. With the embargo on the movement and planting of Ash trees due to *Ash Dieback* disease (Hymenoscyphus fraxineus), none are specified. It is noted that some of the non-native species could, in time, be replaced by Ash if the embargo is lifted. Table 4.5.1 outlines the proposed tree species.

Tree Planting Species – General Site	
Acer campestre (*Field Maple*) 6%	Prunus avium (*Wild Cherry*) 7%
Acer platanoides (*Norway Maples*) 8%	Quercus species (*Oak*) 9%
Betula species (*Birch*) 14%	Salix aurita/caprea (*Willow*) 20%
Carpinus betulus (*Hornbeam*) 4%	Sorbus aucuparia (Rowan) 5%
Fagus sylvatica (*Beech*) 2%	Tilia cordata (Lime) 10%
Malus species (Apple/*Crabapple*) 8%	Other Mixed Trees 6%
Pinus sylvestris (*Scots Pine*) 1%	

Table 4.5.1

Tree Planting Species – Woodland	**Transplants**
Alnus glutinosa (*Alder*) 6%	Populus tremula (*Quaking Poplar*) 1%
Betula pubescens (*Downy Birch*) 4%	Prunus avium (*Wild Cherry*) 3%
Corylus avellana (*Hazel*) 5%	Prunus spinosa (*Blackthorn*) 8%
Crataegus monogyna (*Hawthorn*) 4%	Quercus robur (*Pedunculate Oak*) 5%
Euonymus europaeus (*Spindle*) 8%	Salix aurita/caprea (*Willow*) 28%
Ilex aquifolium (*Holly*) 10%	Sambucus nigra (*Elder*) 8%
Malus sylvestris (*Crabapple*) 2%	Viburnum opulus (Guelder Rose) 8%

Table 4.5.2

4.6 POTENTIAL IMPACTS

The methodology used to assess the impacts of the development on the landscape is based on the terminology given in the guidelines by the Environmental Protection Agency, as outlined below.

Potential impacts are concerned with the *likely* and *probable* impacts of the proposed development. The impacts include those which are *planned* to take place and those which can be *reasonably foreseen* to be inevitable consequences of the construction and operation of the development.

In determining potential impact, an understanding of the sensitivity of the site is necessary. A value is applied to the landscape resource and is based on the following Table 4.6.1. This is referred to as *Landscape Sensitivity*. Within this assessment, statutory conditions of the site are also considered.

Sensitivity Level	Criteria
High	Exhibits a strong positive character with valued elements and is highly sensitive to change.
Medium	Exhibits positive individual elements or positive general character, but is compromised by past or current use and is somewhat sensitive to change.
Low	Exhibits a character that is neutral or even negative, with few or no valued elements and is amenable to change.

Table 4.6.1: Landscape Sensitivity Values

A key measurement in assessing visual impact is the magnitude to which the change is perceived. The same element can impact visual receptors in very different ways as a result of proximity, receptor orientation and landscape context. Table 4.6.2 outlines the criteria for assessing this impact.

Impact Level	Criteria
Imperceptible	An impact capable of measurement, but without noticeable consequences. No discernible deterioration or improvement in the existing view.
Slight	An impact which causes noticeable changes in the environment without affecting its sensitivities. The impact has been minimised by its scale or intervening topography and vegetation.
Moderate	An impact that alters the character of the environment as a result of changes to an appreciable segment of the view or intrusion in the foreground.
Significant	An impact by which its character, magnitude, duration or intensity alters a sensitive aspect of the environment. Where a view is obstructed or so dominated by a proposed scheme that it becomes the focus of attention.
Profound	An impact on a view that removes all sensitive characteristics or completely obstructs or alters the view.

Table 4.6.2: Landscape Significance Criteria

These ratings are further assessed by the Type of Impact, which may be viewed as Neutral, Positive or Negative and as outlined in Table 4.6.3. As a baseline (Part 4.4), the existing landscape has a neutral character with some positive natural features representative of rural typologies.

Type of Impact	Criteria
Neutral	Represents a change that does not affect the quality of the environment.
Positive	Represents a change that improves the quality of the environment.
Negative	Represents a change that diminishes the quality of the environment.

Table 4.6.3: Criteria for Assessing the Type of Landscape Impact

Impact level also takes into consideration the duration of the impact and is considered to be one of the following outlined in Table 4.6.4.

Impact Duration	Timeframe
Temporary	lasting less than 1 year
Short Term	lasting between 1 and 7 years
Medium Term	lasting between 7 and 15 years
Long Term	lasting between 15 and 60 years
Permanent	in excess of 60 years

Table 4.6.4: Criteria for Assessing the Duration of Landscape Impact

Impacts are also assessed at different stages of the project. The construction stage works quite often have a negative visual impact to varying degrees, but these impacts are often temporary. Of greater concern are the impacts evident at operational stage.

Part of the methodology in assessing the potential visual impact of a proposed development is identification of the Zone of Theoretical Visibility (ZTV). The baseline ZTV is a map identifying where the site is potentially visible from and is based solely on landform relative to site elevations, orientation and the proposed development. The ZTV is then refined by field investigations that take into consideration existing vegetation, minor landform changes and structures. Site visibility typically diminishes as distance from the site increases. ZTV viewing height is 1.7m. In this suburban setting, direct visibility of illumination is considered in the ZTV, but not the potential for indirect glow. Refer Figure 4.6a for extent of the ZTV.

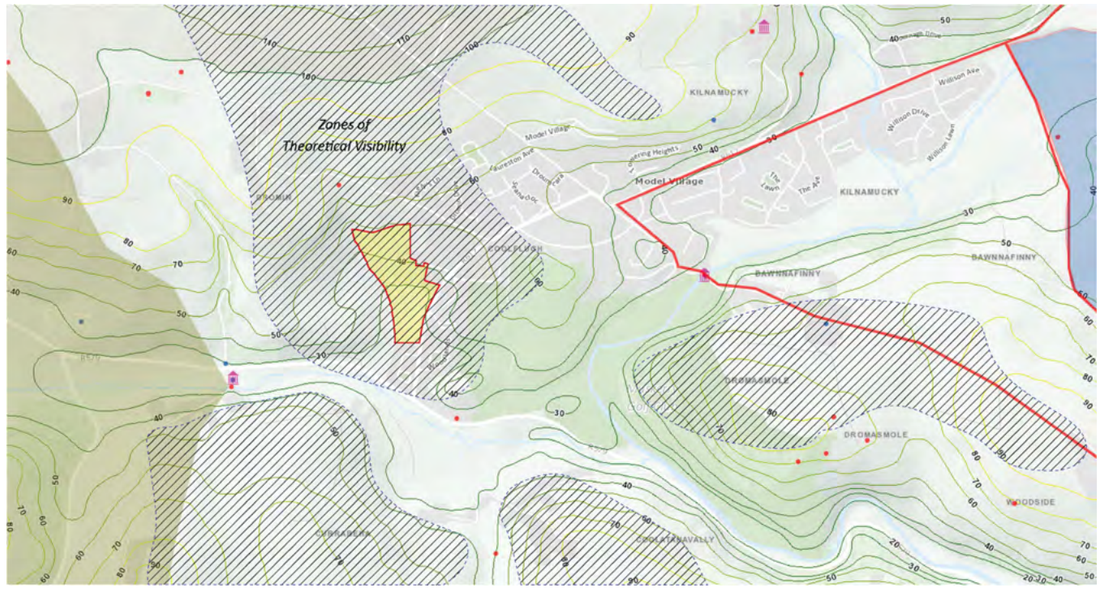


Figure 4.6a – Zone of Theoretical Visibility Map.

4.7 PROPOSED MITIGATION MEASURES

During the design and construction stages of the project, consideration should be given on how to avoid any adverse impacts on views from the visual receptors and impact on greater landscape character. As with any development, some degree of impact is inevitable and, wherever possible, measures should be identified to mitigate the adverse nature of these impacts. In this instance where there is a public presence and potential for impact on community character, the proposed mitigation prioritises minimising negative impacts at this interface.

4.7.1 Mitigation Measures at Design Stage

- A vegetated buffer will be retained or constructed at the northern part of the R617 to ensure that a green transition between Cloghroe and Tower is clearly evident.
- Proposed development will be designed to protect the existing Oak trees at the southeast corner, to ensure their continued visual and habitat value.
- The existing Poplar trees and lone Oak along the northeast boundary of the R617 will be retained for their visual contribution to the streetscape.
- The urban frontage to the R617 will include large canopy tree planting at offsets no greater than 12m, to visually soften and filter proposed buildings.
- Paving and landscape furniture to the R617 commercial frontage will reflect town centre materials, to enhance the character and definition of the village.
- All trees within 5m of the stream will be retained, for habitat benefit and visual framework.
- The central east/west hedgerow and associated sod and stone ditch will be retained, in particular protecting the Oak and Hawthorn trees. This is to ensure the long-term character of traditional field parcelling is maintained and for the habitat benefit of the hedgerow as a commuting corridor.
- Proposed development will be offset from the southern boundary to enable an additional layer of tree planting between the existing hedgerow and edge of development, for the visual benefit of neighbouring houses. 2 layers of new planting is recommended.
- To minimise visual impact, roofing material to any structures will be non-reflective with a dark colour tone.
- Planting within 10m of the stream will consist solely of native plant species, for the benefit of natural systems.

4.7.2 Mitigation Measures at Construction Stage

- Trees to be retained should be fenced off at the commencement of construction to avoid inadvertent felling or use of the ground under canopies for construction purposes.
- The mixed broadleaf woodland adjacent to the R617 should only be felled when the stormwater tank is to be installed, to stagger the visual and environmental impact of felling (the tree lines south of the woodland will be felled first).
- The central attenuation basin should be constructed during the first phase of construction and planted minimum 6 months prior to its use as stormwater attenuation, to ensure soil settlement and vegetation establishment.
- Salvaged topsoil should not be stored more than 6 months if kept in piles more than 1m high. Rotate stockpiling to fit this time period, to ensure healthy aerated soil for use in the completed development.

4.8 PREDICTED IMPACTS

It is a feature of this site that there is a lack of visibility from high-sensitivity receptors. Visibility is generally limited to close-range views (within 200m). Residual close-range impact is localised, non-statutory and based more on the degree of change in landscape character rather than visibility.

However, it can be inferred from the information set out above, that the site does have a *Medium* level of Landscape Sensitivity (Table 4.6.1). It has a general positive landscape character in that it is vegetated and serves as green relief between the suburbs of Tower and Cloghroe. However, it is neither a physically accessible site nor a visually accessible site and the poorest quality landscape fronts the public road (R617). It thus has the ability to absorb a certain degree of change. The degree of change is then dictated by the sensitivity of the receptor from which it is viewed.

When selecting receptors, views from historic structures, public roads, schools, churches, private residences, statutory areas, archaeological features and areas of local or cultural significance were reviewed and assessed based on the level of impact presented by the proposed development. The desktop study indicates that the site transitions from a flat valley floor to a south-facing hillside sloping at 1:12, but with the entire site being measurably lower than surrounding elevations. This would initially suggest a certain degree of long-range visibility from southwest to southeast and close-range visibility from the north. However, there are significant undulations in the surrounding terrain. Combined with intervening vegetation and the dearth of public access points, the result is a narrow range of visibility. When reviewed in combination with the limited number of sensitive receptors, the impacted views are few. As a result, 5 no. View Receptors have been selected to represent sensitive locations that might have the greatest potential visibility. Each receptor has a full text description and photomontages associated with it. Their locations are highlighted on the *View Receptor Map,* which also highlights the nearby statutory features and framework. Refer Figure 4.7a.

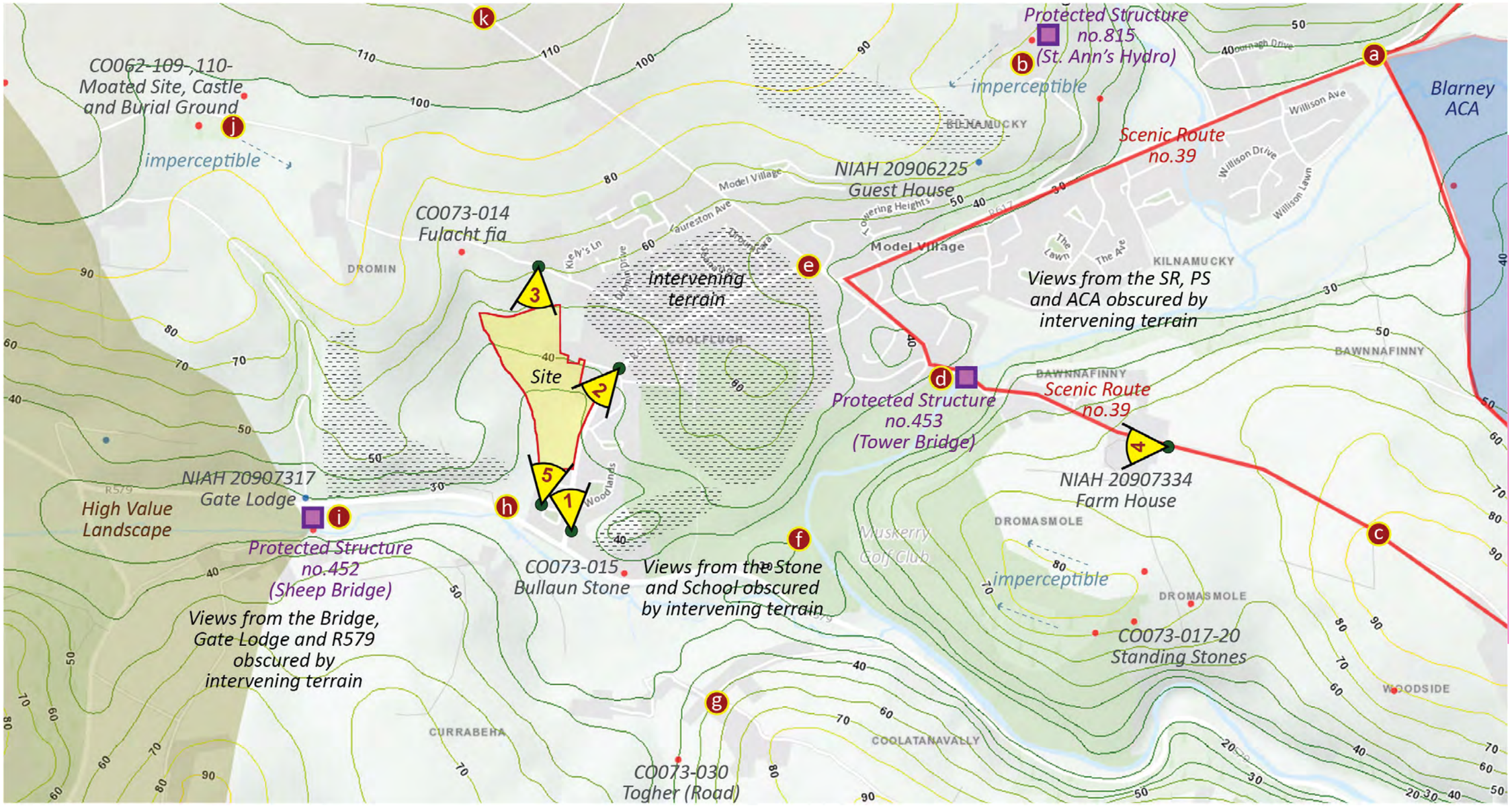


Figure 4.8a – View Receptor Map (width of map 4.2km).

The following Visual Impact Summary Table (Table 4.8.1) lists each receptor and identifies the duration, type and degree of impact. Each view receptor is represented in several layers of images. All 5 views have been photographed with 'late spring / early summer' foliage, with images shot 6th May 2021. Tree foliage is not at full density, as would be June-August, but at this time of year it does have a greater capacity for screening than in winter. To ensure comprehensive representation, 'wintertime' images are also included for 3 of the view receptors (there would be no impact on the other 2). The 'winter' photos were shot 2nd December 2021.

All view receptors include an 'Existing' image. This is the actual, unedited photograph representing the existing conditions on the day of photography. All montages use this as the baseline image. All view receptors also include a 'Proposed' image, illustrating the proposed development when completed. In these images, planting is shown at 5 years after installation. In photomontages where the proposed development is not clearly discernible, an additional image is included where a red line represents the outline of the extent of proposed buildings. This provides a sense of the degree of screening. The compendium of photomontages is presented at the end of this chapter as a series of images under the title *Verified Photomontages and CGI's*.

SUMMARY OF KEY VISUAL RECEPTORS

Receptor No.	Title of Receptor	Distance from Site	Receptor Sensitivity	Degree of Visible Change	Predicted Impact and Duration construction	short medium long permanent	Key Factors Contributing to Predicted Impact
1	R617 at St. Senan's Church	160m	Medium	Low	Neutral	Moderate, Positive	Improved road frontage and village character, roadside parking removed, variation in roadside tree planting
2	R617 Approaching from Tower	80m	Medium	Low	Neutral	Moderate, Positive	Improved road frontage, retention of tall trees, presentation of creche
3	Kiely's Lane North of Site	110m	Low	Medium	Negative	Moderate, Neutral	Change from greenfiled to suburban development, Extent of visibility with minimal impact, retention of trees
4	Scenic Route no. 39 at Bawnafinny	2000m	High	None	None	Imperceptible	Distance and intervening terrain, low elevation of site
5	Senandale Estate	52m	Medium	Low	Negative	Slight, Neutral	Development offset to boundary, existing buffer supplemented by extra trees and screen fencing

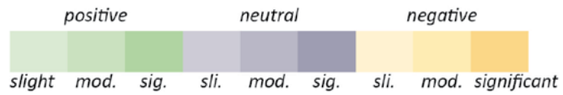


Table 4.8.1 - Visual Impact Summary Table

With regards *Impact Duration*, impact was considered permanent if a receptor had a distinct alteration to the horizon line or if views of a structure would continue to remain visible. During assessment, the landscape was also considered in the context of permanency. For example, retained mature trees were considered permanent, with management and evolution. New woodland tree planting at the eastern end of the site would in itself become a permanent screening feature due to size and density. Street tree planting was considered to have filtering contribution, but as a single tree layer was not a permanent screening element. In this appraisal, *Type of Impact* was considered positive only if the proposals contribute to the character of the locality *and* would not be detrimental to the rural association. A negative *Type of Impact* might occur if for example, the proposals diminished the experience of the R617, diluted the character or functioning of Cloghroe village or had detrimental impact on large volumes of quality existing trees.

4.8.1 View Receptor Descriptions

View 1 (*View from R617 at St. Senan's Church, looking north*) – Distance from nearest site boundary = 160m

View 1 - Reason for Receptor Selection: The R617 is a busy Regional Road. The majority of residents experience this road on a regular basis, both in a northerly and southerly direction. In identifying the most appropriate view receptor location, three primary factors were considered:

(a) Are there any statutory designated sites or historic sites along this road?

(b) Where do we find a high degree of local activity?

(c) Which angle has the clearest view of the site?

Churches are an integral part of communities. The entrance to St. Senan's has a clear, linear view towards the site. The view context includes the neighbourhood shops to the right (busiest area) and the recently installed pedestrian crossing. The church is new, but the location is steeped in local history and is also a passing point for the local school (to the southeast). A close-up CGI (refer compendium) has been provided at the same viewing angle to understand the direct visual relationship to the R617.

View 1 - Existing Site Character from this Receptor: The western edge of the R617 appears significantly more 'green' than the eastern edge. Parts of the Senandale estate are visible behind the green corridor. A tall, distinct Oak tree identifies the transition from the existing residential estate to the site lands. The existing site appears as a continuous green band, punctuated by tall, narrow Poplar trees at the northern end of the R617. The taller trees would be considered features. The vegetation between the Oaks and the Poplars provides greenery, but is not perceived as quality planting. There is no footpath along the site, so users accessing the bus stop walk on the tarmac verge. Car parking periodically occurs along this verge.

View 1 - Analysis of Proposed Development: The road improvements are clearly visible. This will eliminate roadside parking from the entrance to Senandale north. The cafe and the creche buildings are the most prominent structures. They have a scale and character that reflects local character. With new avenue tree planting, views of the structures are filtered. The prominent existing trees at the north and south ends of the site are retained, limiting the degree of change along the green corridor. The presence of the development will add activity to the northern end of the village, but with low-level structures in a strong landscape setting, this is deemed positive.

View 1 – Perceived Changes in Winter View: The removal of the existing roadside vegetation along the R617 is already evident in the 'summer' view. The reduced leaf volume in winter alters the colour scheme, but has no perceptible impact on degree of visibility. Changes in vegetation density are primarily background elements. The 3m evergreen hedge along Senandale estate in the middleground is a significant visual impediment, which will obscure views year round.

View 1 Predicted Impact (level of impact, type of impact) = **Moderate, Positive**.

View 2 (*View from R617 as approaching from Tower, looking south*) – Distance from nearest site boundary = 80m

View 2 - Reason for Receptor Selection: As a busy Regional Road, the southbound R617 reaches a point where the town of Tower transitions to the village of Cloghroe. On commuter routes such as this, it is important to ensure that defined transitions between communities are retained or provided. On this approach, there are no designated or historic sites. Beyond Tower Hall (at Model Village Road) a long stretch of the R617 is defined by detached residences leading to Cloghroe. The aim of this receptor is to capture that point of transition and assess the resultant change. The junction of the R617 with the Upper Woodlands estate provides this, as it begins to noticeably turn downhill. On the opposite side of the road, the stone pillar identifying arrival in Tower corresponds to this location.

View 2 - Existing Site Character from this Receptor: It is at this point where the R617 achieves a distinct 'green' character after several kilometres of development. It is green on both sides of the road, loosely creating a gateway to Cloghroe. The Poplars, Sycamore, Oak and conifer trees framing the R617 create a tall, distinct green wall at the site. The existing bus stop is also visible.

View 2 - Analysis of Proposed Development: The proposals remove the coniferous trees and some of the Sycamores. But, the tall Poplars are retained and the design intent to retain a green transition zone to the R617 is evident. The creche is the first visible structure. Combined with the retail area, this provides a clear dichotomy between the built and unbuilt zones. The green buffer is substantial enough to ensure a recognisable transition between Tower and Cloghroe. The extension of the footpath, road crossing and bus stop improvements add a degree of urban tidiness and are likely to reduce traffic speeds, enhancing character. With the backdrop of a strong landscape setting, these changes are deemed positive.

View 2 – Perceived Changes in Winter View: The removal of the existing roadside vegetation along the R617 is already evident in the 'summer' view. The reduced leaf volume in winter alters the colour scheme, but has no perceptible impact on degree of visibility. The proposed development is at such a low elevation relative to the R617 that tree canopies (and associated reduced leaf volumes) have no impact on visibility. Low level vegetation is the intervening screening element and the user would be looking through 4-10 layers of planting, resulting in a dense year-round visual filter.

View 2 Predicted Impact (level of impact, type of impact) = **Moderate, Positive**.

View 3 (*View from Kiely's Lane, Coolflugh, looking south*) – Distance from nearest site boundary = 110m

View 3 - Reason for Receptor Selection: This local road has a close proximity to the site and open countryside views. It serves a number of residences and is characteristic of the potential impact on the rural setting and on residences north of the site. It is also a popular walking route, where viewing durations are long. In this regard, it is important to ascertain the impact of close range development on long range views.

View 3 - Existing Site Character from this Receptor: The site appears as farmland in a larger mosaic of pastures and mature hedgerows. The agricultural warehouse is clearly visible at the eastern edge of the site. The developed residential areas of Cloghroe are also visible, but given that most have been in place for several decades, tree coverage aids in transitioning the suburban lands to the rural environs. The foreground pasture is not part of the site and creates a buffer to the Kiely's Lane.

View 3 - Analysis of Proposed Development: The residences at the northern end of the site are clearly visible. The rooflines and roof materials play an important role in the visual impact. Given the natural terrain, these houses screen the lower areas of development. The apartment duplexes and retail buildings are not visible. The proposals sit significantly below the background ridgeline and do not obscure the hillsides. Note that tree canopies along the western boundary stream are still visible above the house rooflines. The boundary hedgerow is also fully retained, providing an existing mature partial filter. The proposals are visible, but they feel like a natural extension of the suburban village and appear nestled into the hillside. The development sits within the landscape even better than anticipated, with a certain degree of positive attributes. But, the extension into greenfield lands has an inherent impact due to evolution of use. However, views of the surrounding countryside are fully retained and the presence of the development is unlikely to impact enjoyment of the road.

View 3 – Perceived Changes in Winter View: This receptor provides a clear view of the site where there would be no measurable visual difference between a summer and winter view. As seen in the photo, the Ash trees (tallest trees) are not yet in leaf and would have a similar winter appearance. Production of a winter view is unnecessary, as it would provide no additional assessment information.

View 3 Predicted Impact (level of impact, type of impact) = **Moderate, Neutral**.

View 4 (*View from Scenic Route no.39 at Bawnafinny, looking southwest*) – Distance from nearest site boundary = 2000m

View 4 - Reason for Receptor Selection: Scenic Routes have a high statutory designation. Protection (or enhancement) of their inherent qualities is a key planning concern. The elevated nature of Scenic Route 39 provides the opportunity for potential visibility. The development plan extract on drawing L101 identifies the key characteristics of this route. Long range views towards the River Shournagh and Lee Valley set within pastoral fields and trees would be the greatest concern for impact. The landscape value is high-very high, but there is not a sense of remoteness or prevalent rural character (it is intertwined with development). The full length of the Scenic Route was assessed, with the view above and higher up the hill at Kerry Pike being the most likely candidates for potential visibility. Open countryside views are available from the ESB substation near the top of the hill, but at 2400m away, the site was obscured. The receptor above was selected because of the increased sensitivity due to the presence of the historic farmhouse in the foreground (National Inventory of Architectural Heritage structure no. 20907334) and the ability to identify streamside trees on site.

View 4 - Existing Site Character from this Receptor: At a distance of 2km, site detail is difficult to ascertain. Through binoculars, we could identify the tops of the Poplar trees and streamside vegetation along the western boundary of the site. The site sits in a valley, with a rising hillside characterised by pastures and dense tree lines. The north end of the golf course provides an intermediate visual impediment due to intervening terrain and tree planting. The site would form a landscape layer behind the golf course.

View 4 - Analysis of Proposed Development: All structures sit comfortably below intervening visual impediments. Since the development is not removing any of the tall trees along the western boundary, the proposed development will not be visible along Scenic Route no. 39.

Note: In the image above (and View 5), the redline identifies the outline of the proposed structures as viewed from this angle and distance. This graphic method is used to aid understanding of the relationship to proposed development, as the proposals would not be visible.

View 4 – Perceived Changes in Winter View: The proposed development sits behind undulating hills and multiple layers of vegetation. Even in winter, these natural elements will obscure views of the site. Production of a winter view is unnecessary, as it would provide no additional assessment information.

View 4 Predicted Impact (level of impact, type of impact) = **Imperceptible**.

View 5 (*View from Senandale Residential Estate, looking north*) – Distance from nearest site boundary = 52m

View 5 - Reason for Receptor Selection: Senandale shares a boundary with the site. The internal estate road provides excellent site orientation with an unobstructed foreground. This estate provides the best example of the visual relationship to nearby residences. This receptor was selected based on the potential to capture all of the developed site without foreground obstructions. Closer to the site, the row of existing houses results in a large percentage of visual obstruction. Further away, the road level decreases, reducing the potential for visibility.

View 5 - Existing Site Character from this Receptor: The south boundary hedgerow is visible between houses. To the east are some larger Oak trees, while the remainder of the hedgerow consists of Willow clusters. , The Willow has dense, fine branching and is one of the first trees to leaf out, so one can anticipate a year-round filtered screen. However, since most plants are deciduous, the potential for increased visibility during winter must be assessed.

View 5 - Analysis of Proposed Development: The cafe is the closest structure to the boundary. The retail building is more than 40m from the boundary, with the apartment duplexes even further away. Before developing the photomontages, it had been calculated that visual impact was likely to be minimal given the heights of the structures and large offsets. Nonetheless, it was still surprising to find how benign the visual relationship was between the proposals and existing estate with no evidence of overbearing. There will be some changes to landscape character, particularly to the rear gardens of houses 1-4. However, this is mitigated by the landscape boundary improvements shown on dwg. L112. To the other residents, the proposed development impact will be slight to imperceptible in terms of visibility and landscape character.

View 5 – Perceived Changes in Winter View: With the low building heights at the southern end of the site, the rooflines do not rise above the existing tree canopies. The bulk of the development is seen through the retained dense layer of existing low-level planting. Supplemented by 2 layers of additional planting, winter views are quite filtered. From the estate road, there is minimal perceived difference between summer and winter views.

View 5 Predicted Impact (level of impact, type of impact) = **Slight, Neutral**.

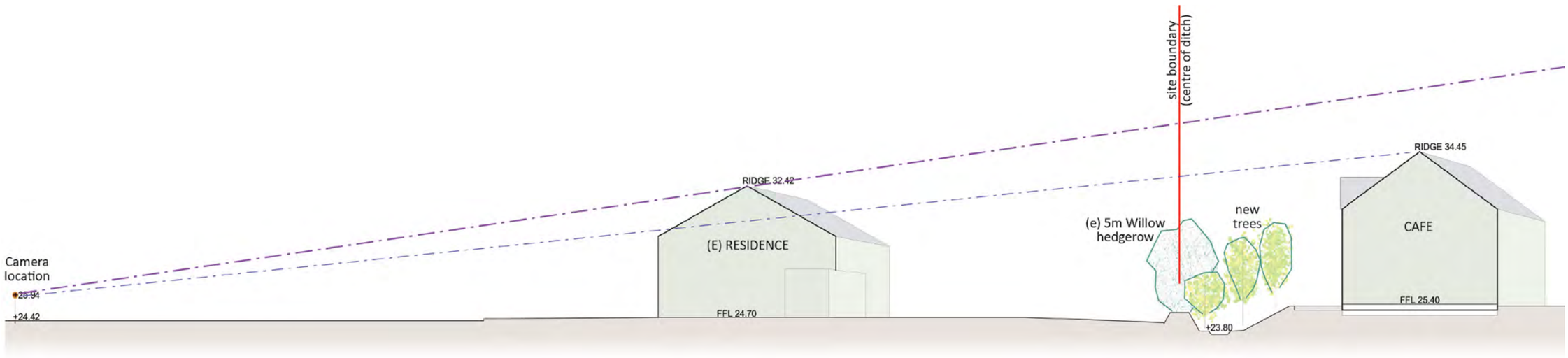


Figure 4.8g – Section from View Receptor no. 5 – This section was carried out as a control measure to double-check photomontage accuracy. It is based on the location of the camera and relates it to the proposed Café building at the southeast corner (the nearest proposed structure) and survey data of existing houses.

The LVIA also includes 4 no. *Computer Generated Images* (CGI's). These are modelled visualisations based on the Architectural and Landscape proposals. They are accurate in terms of layout, size, scale and materials, but are not geo-referenced images. They are not representative of an existing sensitive view receptor. Their benefit resides in the fact that they are close-up views and give a good sense of the character of the architecture and extent of landscape. The CGI's are often internal and generally representative of the experience within a completed development. The key informative features of the CGI's are described below.

CGI 1: Taken along the site entry road looking north, this image is a good representation of the degree of replanting along the hillside on the righthand side of the road. It also shows that within the valley floor, the proposed hillside development is typically obscured by the lower buildings.

CGI 2: Taken along the R617 looking northwest, there is a degree of realism and accuracy in this view. It gives a good sense of the revised scale of the road and clarity between bicycle lane and pedestrian zone. It also illustrates the concept of a public plaza, rather than just a footpath. The retained Oak tree frames the left side of the image and a regular avenue of tree planting shows the potential for a continuous green framework.

CGI 3: Taken internally at the bridge crossing, this receptor is slightly elevated, approaching a birds-eye view. The aim is to illustrate the extensive attenuation basins and relationship of the active open spaces either side of it. It also shows an acceptable scale of apartment blocks, providing secondary supervision but without overbearance.

CGI 4: Taken internally at the quadrangle open space, this is a bird's eye view looking west. The scene captures the amount of space the central green provides and how the terracing creates 3 levels of usable amenity space.

4.8.2 Alternative Views Considered

Additional landscape character areas and designations were considered and reviewed with the result that there was either **Slight** or an **Imperceptible** impact to these areas, but not greater than those identified above. The other locations included nearby archaeological features, other portions of the designated Scenic Route, Protected Structures (2 no. bridges), amenity spaces and residential estates (as viewed from the public road). The alternative views considered are also identified on the *View Receptor Map* (Figure 4.7a) and summarised below.

Alternative View A - View from Blarney ACA and east end of Scenic Route no. 39 - Highly sensitive receptors, at more than 2km away they are visually separated from the site by the ridgeline in Tower.

Alternative View B - St. Ann's Hydro Protected Structure no. 815 - A sensitive receptor perched on a hillside with views over the Blarney valley. At 2.5km away, views towards the site are obscured by intervening terrain.

Alternative View C - Scenic Route no. 39 at Kerry Pike - At the crest of the hill, the Scenic Route has a panoramic view towards Blarney and towards the site. At a distance of 2.4km, the intervening hill at the golf course obscures the site.

Alternative View D - Tower Bridge Protected Structure no. 453 on Scenic Route no. 39 - A sensitive receptor with multiple designations, the bridge sits at a low elevation and is fully obscured from site views.

Alternative View E - Tower Crossroads - As a key junction in town and associated with the town park, impact on character is important. The site sits on the opposing side of the hill and is imperceptible.

Alternative View F - Muskerry Golf Course - A popular amenity spot with varying terrain, the site is not visible from the clubhouse or driveway. Figure 4.3a illustrates the contours at the golf course and how the rising ground between holes 1 and 3 obscures all other views of the site to the east. The site sits at a low elevation, making it a negligible feature in a larger context of suburban housing.

Alternative View G - Old Togher Road (part of local road L68442) - A portion of this road is a National Monument (CO073-030) on a hillside facing towards the site. Much of the historic togher is on inaccessible farmland. Away from the actual togher above a junction in the road, an open view provides the greatest potential for visibility. Refer Figure 4.8h. The site is 750m to the south boundary, but the low-laying area of the commercial area and apartments would certainly not be visible. Of interest would be the upper layer houses at a distance of more than 1000m. The Ash trees at the upper edge of the site are only visible through dense trees arising in the middleground. The terrain and multiple layers of trees behind the church and school provide heavy screening. Coupled with the existing houses above and east of the site, any slivers of views through the middleground trees would result in an imperceptible impact.

Alternative View H - Estates East of the Site (Upper Woodland, Fairway, Woodlands) - Being in close proximity to the site, estate roads were driven and views assessed. Most public road views are obscured due to orientation and the presence of houses. The Fairways would have the greatest visibility, but their views are opposite the woodland along the R617. Proposed structures are deep within the site and views from the estates will remain quite green. View 2 captures the Upper Woodlands estate entrance, resulting in a positive visual impact. Consequently, the proposed development will not have adverse effects on the residential amenity east of the R617.

Alternative View I - R579 Eastbound - Before reaching Cloghroe, views across an open field parcel are available towards the site. As all visible site boundary vegetation is retained and the low level of impact illustrated by View 5, impact will be either Slight or Imperceptible.

Alternative View J - Sheep Bridge Protected Structure no. 452 - This bridge provides a slightly elevated view with an open view corridor down the river. Due to distance, intervening rolling hills and with multiple layers of intervening vegetation, the site is imperceptible.

Alternative View K - Archaeology on Kiely's Lane - Further up the hill from View 3 and at 800m distance is a cluster of archaeological sites (Moated Site, Castle and Burial Ground). With a higher sensitivity than View 3, views from here are obscured by intervening vegetation and middleground houses.

Alternative View L - St. Senan's Cemetery - At an elevated position with panoramic views of the surrounding hills, this is a place of solace that relies on its relationship with the greater landscape. Assessing impact on this character is important. Elevation drops quickly beyond the cemetery grounds, allowing the panoramic views to occur. Given the distance and low site elevation, proposed development would be imperceptible.

Private Residential Gardens - There are only 5 no. private residences adjacent to the site with other rear gardens separated by roads or field parcels. They will receive a degree of impact due to change of land use. But, the scheme is designed to avoid overlooking and provide comfortable offsets for minimal impact.

Figure 4.8h – Alternative View G - View from the local road L68442 looking north towards the site. This receptor sits above the historic Togher Road (NM CO073-030) (views from the togher itself are imperceptible). Terrain and large trees at the golf course render the site virtually imperceptible. Existing housing 20-30m higher in elevation than the top of the site is visible to the righthand side of the photo.

4.8.3 Do Nothing Scenario

The site, which is currently under agricultural use as pastureland, would likely remain under agriculture and resemble its' current condition under the *Do Nothing Scenario*. The coniferous trees at the roadside would likely become hazardous and require removal, but most other elements would evolve naturally (growth, death, regeneration). Natural regeneration of the Oak is minimal. Without intervention, the Oaks would die out and as evidenced on site, Willow and Poplars will gain a greater stronghold. There is no evidence of new planting over the past decade, so it can be anticipated that the site would devolve in terms of biodiversity.

4.8.4 Temporary Impact

As witnessed on housing sites across the country, construction of the development would add temporary machinery to the landscape and cause high levels of soil disturbance. With trees removed from the R617, the construction scene will be extremely visible. The portion of the site from the café to the proposed entrance road will be denuded of vegetation and replaced with temporary security fencing or hoarding. This is a *Negative* visual and landscape character impact, but it is a *Temporary* one. Implementation of short term mitigation measures include tree protection measures and the phasing of vegetation removal. This will help mitigate negative impact on the local community.

4.8.5 Irreversible Impact

The most significant *Irreversible* landscape impact is the loss of agricultural land. As low-moderate quality agricultural lands that are increasingly being surrounded by development, loss of land here is perceived as better than loss of other peripheral agricultural land. Secondary *Irreversible* landscape impacts consist of partial tree removal along the R617, increase in impermeable surfaces and modification of natural drainage patterns. These are viewed as having a *Slight, Positive* impact, as the development compensates for and improves upon them. In terms of landscape character, the increase of the conceptual village centre becomes permanent. This is a significant change and viewed as a benefit, resulting in a *Significant, Positive* impact.

4.8.6 Cumulative Impact

Cumulative Impact is the incremental impact created by the proposed development in the context of surrounding land uses, recent changes and considered future development. In this chapter, cumulative impact assesses the visual alterations in the landscape and the potential modification to the rural and suburban setting as a result of all recent and proposed development, regardless of who carried or will carry out the actions. In assessing future works, only reasonable, foreseeable actions are considered.

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 9 as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *Protect and, where appropriate, enhance the character, diversity and special qualities of landscapes in County Cork.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 9.

EPO 9 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *Protect and, where appropriate, enhance the character, diversity and special qualities of landscapes in County Cork.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 9.

In a larger context, the areas of Tower and Cloghroe have expanded substantially over the past 30 years. They have reached the point where they have a 'suburban' identity, evolving from their 'village' identity; Cloghroe to a lesser degree than Tower. But despite having undergone extreme change, the size and nature of this development has the potential for further change in the context of cumulative impact (refer Chapter 2 for description of other permitted development and zoned lands) and **Table 4.8.1** below

Table 4.8.1: Summary of developments assessed

Application Reference	Description	Outcome/Current Status
Cork City Council Ref: 21/40620	Construction of 73 no. residential units, Upgrade of existing access from the R579, flood mitigation works which include works to the R579, culverting of existing streams	Application is currently being assessed by Cork City Council.
Cork City Council Ref: 20/39202	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.
Cork County Council Ref: 19/4718	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019. Construction has commenced on site
Cork County Council Ref: 18/7111	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019. Decision upheld by An Bord Pleanála submission of third-party appeals (Ref: ABP-305373-19).
Cork County Reference 18/6802	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final Permission granted on 4th December 2019
Cork County Council Ref: 18/5562	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018. Construction has commenced on site with some units completed and occupied.

The proposed development adds two components, the commercial element and housing. Apart from car parking expansion at Cloghroe School, all other permitted nearby development is for housing (all schemes less than 100 units). Most of the permitted developments have no visual relationship to the site, so their cumulative impact is limited. However, the recently permitted housing development directly west of the site, opposite the stream, (Cork City application no. 21/40620) has a significant cumulative impact. As permitted, the permitted scheme feels detached from the village centre. The proposed scheme creates continuity between the village and permitted scheme, improving potential links and access to public amenities. It also makes the retail centre more central to the village. Cumulatively, the proposals have a *positive* impact on village development.

In terms of landscape character, the school adds a large area of tarmac and no other permitted housing contributes notable streetscape improvements. In this regard, the cumulative impact is *improved* with the addition of this development.

4.9 RESIDUAL IMPACTS

The increased roadside animation and improved landscape character is likely to enhance the identity of Cloghroe as a village.

With walking paths, large open spaces and play areas, the proposed development is likely to draw in locals who live beyond the site boundary.

The planting of native woodland combined with wildflower meadows and improved stormwater management will provide long-term improvement to local habitat and result in a greater diversity of flora and fauna. This is assessed even in the context of development, as the long term use of lands for grazing imposes its own habitat limitations and environmental impacts.

LAP and CDP references to Cloghroe primarily refer to the risk of flooding and stormwater management. In a landscape context, the proposed scheme illustrates a nature-based solution to improving these conditions with the central attenuation basins.

The proposals provide a visual relationship to the stream from the public realm, which had previously been limit

Verified Photomontages and CGI's of

Proposed Mixed Use Development at

Cloghroe, Co. Cork

Date: June, 2021

Project:
Mixed Use Development

Prepared for:
Deady Gahan Architects Co Ltd
Eastgate Village
Little Island
Co. Cork

Prepared by:
G-Net 3D
NSC Campus, Mahon, Cork
Tel: 021-2307043,
info@gnet3d.com

Photomontage Methodology

Photography

The photos for all the views were taken on the May 6th, 2021.
A Canon Eos T5i camera was used for all the photography.
Leica GS08plus Smart Antenna was used to accurately record the viewpoint coordinates and height levels. Viewpoint locations are indicated in the viewpoint map and at the table to the right.

Modelling

Preparation of an accurate 3D model of the proposed buildings and site plan including landscaping and infrastructure.

Setup

The following information is used to accurately position the 3D model into the photographs:
-Site survey,
-Photographs,
-The camera location of each photograph is accurately marked on the location OSi map.
-Camera height is 1.62m higher than the Orthometric Height indicated on the table.

To match the 3D camera view with the photograph we have taken the following steps:
The camera height is taken from information gathered on the levels from where the photos are taken. The height levels of the proposed development are outlined on the site. Focal length is based on the photograph EXIF info.

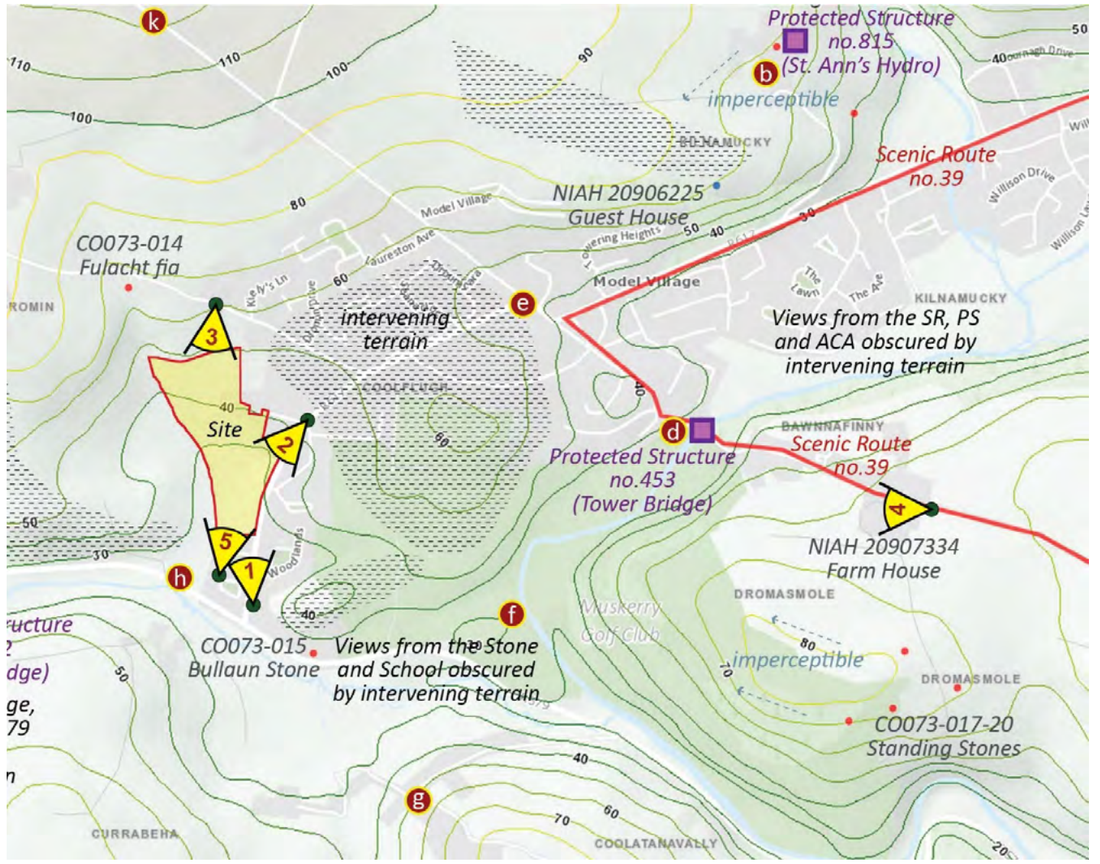
This data is imported into our 3D software and the 3D camera is matched with the selected photographs. To match the 3D camera accurately we use all the above data and the reference 3D models. The reference 3D models are existing structures ie. buildings, roads, lamps, etc which are visible on the photographs. These items are modelled based on the survey information. After all above conditions are fulfilled and we are satisfied that the camera matches correctly, we proceed to the next step.

Rendering

We apply the materials and textures prior to rendering the photomontage images. Light settings are adjusted to match the brightness of the photographs and sun is positioned according to the date and time the photo was taken.

Post processing

This process means incorporating a 3D rendered model of the proposed development into the photograph to achieve the result.



Photomontage viewpoint positions.

VIEW No	Easting (m)	Northing (m)--	Orthometric Height (m)	Camera Focal Length
VIEW 1	559533.6533	574348.8960	78.1054	18mm
VIEW 2	557577.7606	574708.0838	43.1335	18mm
VIEW 3	557265.5819	575016.7653	68.2060	18mm
VIEW 4	559533.6533	574348.8960	78.1054	37mm
VIEW 5	557370.8142	574368.1748	24.4146	10mm

View 1. Existing.

View 1. Proposed.

View 1. Proposed development outline.

View 1. Existing in Winter.

View 1. Proposed in Winter.

View 1. Proposed in Winter development outline.

View 2. Existing.

View 2. Proposed.

View 2. Proposed development outline.

View 2. Existing in Winter.

View 2. Proposed in Winter.

View 2. Proposed in Winter development outline.

View 3. Existing.

View 3. Proposed.

View 4. Existing.

View 4. Proposed development outline.

View 5. Existing.

View 5. Proposed development outline.

View 5. Existing in Winter.

View 5. Proposed in Winter development outline.

CGI 1.

CGI 2.

CGI 3.

CGI 4.

CHAPTER FIVE

Material Assets – Traffic & Transport

CHAPTER FIVE
Contents

CHAPTER FIVE

5 Material Assets – Traffic & Transport

5.1 INTRODUCTION

A detailed development description is included in Chapter 2.

The structure of this Chapter is in accordance with the European Commission EIAR Guidance and draft EPA EIAR Guidelines (both 2017) and TII Document, Traffic and Transport Assessment Guidelines, 2014 and is developed using data from independently commissioned traffic counts at key junctions/locations, and local data extracted from the 2016 National Census.

5.2 METHODOLOGY

A Traffic and Transportation Assessment (TTA) has been prepared in accordance with the NRA's 2014 publication "Traffic and Transport Assessment Guidelines" and the "Guidelines for Traffic Impact Assessments" as published by the Institution of Highways & Transportation U.K. in 1994. The purpose of a TTA is to assess the potential traffic impact of a development on the existing road network and propose any necessary mitigation measures to best accommodate the expected traffic volumes generated by the proposed development. It is also a requirement to ensure that proposals promote more efficient use of investment in transportation infrastructure, reduce travel demand and promote road-safety.

Key parameters relating to the traffic modelling carried out included: junctions to be assessed, trip generation, modal shift targets, trip distribution, and assessment years.

A total of 3 turning count surveys were undertaken as part of the study on Thursday 6th May 2021, as outlined in the following figure, Figure 5.2.2, Traffic Count Survey Locations. These surveys were carried out simultaneously using video cameras at each of the junctions for a 12-hour period.

The following graph, produced by Transport Infrastructure Ireland (TII), compares 2019, 2020 and 2021 traffic patterns in Cork for the purpose of deriving a Covid Factor. In this instance when May 2021 is compared to May 2019 a reduction of 12.8% is seen.

Traffic counts carried out in May 2021 as part of this assessment will be increased by this factor to represent 'normal' flows. It should be noted that following Covid there is an expectation that 'normal' travel behaviour will change hence the use of this factor will produce conservative results until the new norm is found.

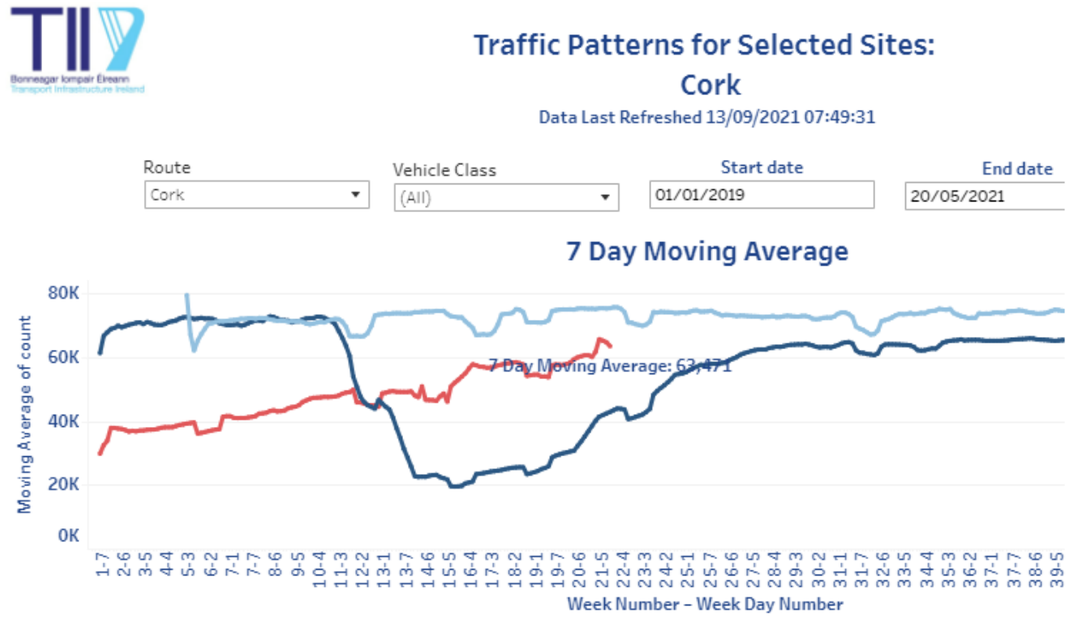


Figure 5.2.1: TII, Comparison of Traffic Patterns, Cork.

Figure 5.2.2: Traffic Count Survey Locations

The aim of this TTA is to identify the characteristics of the site of the proposed development and surrounding area, examine the likely transport implications, ensure sustainable accessibility is maximised and appropriate infrastructure provided to accommodate the proposed development.

The key issues that are addressed in the TTA, with reference to the size and location of the development proposal, are as follows:

- Review of the site location, composition, and local roads network.
- Analysis of Road Safety data.
- A review of the relevant planning and transport policy.
- Description of the development proposal.
- Forecast trip generation.
- The use of appropriate and agreed traffic modelling software for the assessment of individual junctions.
- Provide With/Without Development assessment for each of the critical junctions.
- Assess significance of development generated traffic upon the surrounding transport infrastructure and identify any necessary mitigation.

The opening year is the year of expected completion of the scheme (298 units) including the creche and is taken to be 2026. In accordance with the NRA's "Traffic and Transport Assessment Guidelines", a traffic analysis is required to be undertaken for the **Base Year – 2022, Opening Year – 2026, Opening Year +5 – 2031 and Opening Year +15 – 2041.**

5.3 EXISTING ENVIRONMENT

The following site-specific characteristics are noted:

- The application site is located on the R617 Blarney Road in the village of Cloghroe within a 50kph speed limit zone.
- The site is bounded by the residential estate of Senandale to the south with no existing footpath provision serving the development lands.
- Within 10 mins walk time from the site:
  - Cloghroe Retail Park
  - Cloghroe Church
  - Cloghroe National Primary School
  - Muskerry Golf Course
- Within 20 mins walk time from the site:
  - SuperValu Tower
  - Tower Medical Centre
  - DayBreak Circle K Tower
  - Aunties Bar
  - The Hunstman
  - Local Chinese

The site is served with public transport provision which can be directly accessed from the development, the 215 and 235 services. The 215 currently operates on a half hour frequency and links to Mahon Point via Blarney and the City Centre. This service is set to be improved as part of CMATS with an increased frequency and will depend on an increased demand along its corridor to ensure it's continued viability. This route has also been identified as part of the Bus Connects Project with a commitment to funding being recently announced.

The following key junction was identified to be assessed within the study.

Junction 1: R617/R579 Cloghroe Junction

This junction serves as an important vehicular access between north/west Cork and the greater Cork City urban area including its use as a link to the N20 Cork/Limerick Road.

The measured two-way AADT (Annual Average Daily Traffic) on the R579 is 7,500.

Image 5.3.1: Image of R617/R579 Priority Junction

Image 5.3.2: Image of R617/R579 AM Peak Flows

Image 5.3.3: Image of R617/R579 PM Peak Flows

The proposed development will access onto the R617 by means of two proposed new Priority Controlled 'T' Junctions. These two new junctions were modelled using the Junction 9: Picady Software with development traffic. Junction 1 was modelled with/without development traffic.

5.3.1 Existing Traffic Conditions

A variety of different data sources have been used, including:

- 12-hour classified turning counts (3 sites, refer Figure 5.2.2);
- Background OS Mapping and aerial photography;
- On-site junction measurements including saturation flows, link speeds, queue length measurements, pedestrian movements at signalled crossings and geometric data for each of the modelled junctions;

A total of 3 no. turning count surveys were undertaken as part of the study on Thursday 6th May 2021. On-site measurements including lane widths, junction turning radii, lane lengths and saturation flows were undertaken by MHL and were incorporated in the constructed models.

The following figures present the recorded 12-hour traffic profile, percentage of classified vehicles and turning movements for each of the modelled junctions carried out on Thursday 6th May 2021:

Image 5.3.4: 12 Hour Traffic Profile Junction1

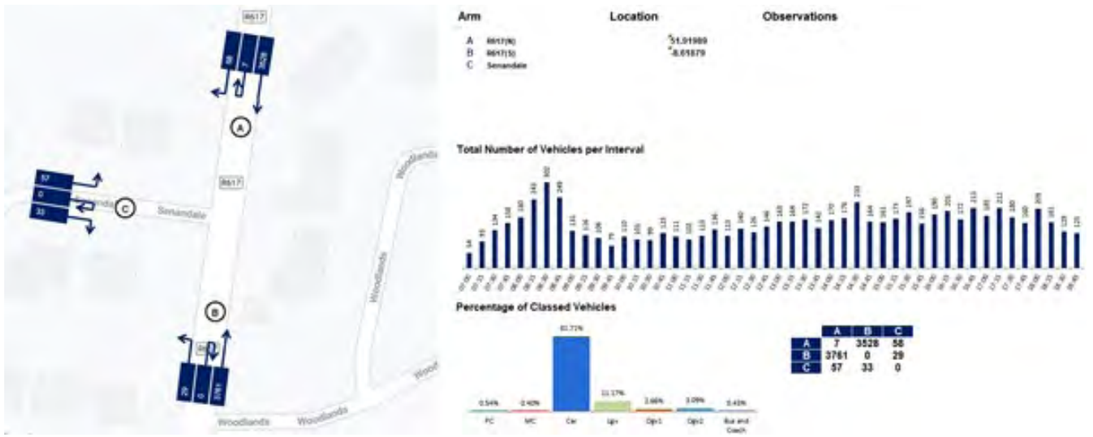


Image 5.3.5: 12 Hour Traffic Profile Junction 2: Senandale

Image 5.3.6: 12 Hour Traffic Profile Junction 3: Woodlands Junction

The data presented in the above figures show the peak hour traffic periods for both morning and evening respectively as being 08:00-09:00 and 17:00-18:00. For the purpose of the modelling analysis, each of the above peak hour traffic periods are included in order to obtain the worst-case traffic build-up results. This ensures a robust analysis of the road network is conducted.

The percentage of classified vehicles was used within the generated traffic models to reflect existing conditions more accurately.

As a result of the time lapse between the original traffic survey, May 2021, and the date of lodging the full application to An Bord Pleanala, it was deemed appropriate to procure more up to date traffic counts for the main R617/R579 junction. Traffinomics Ltd were engaged to carry out 12-hour (07:00-19:00) manual classified junction turning counts on the 30th November 2021. The following graph presents a comparison between the recorded turning count movements during the peak periods for May 2021 and November 2021. The results between the two dates are negligible.

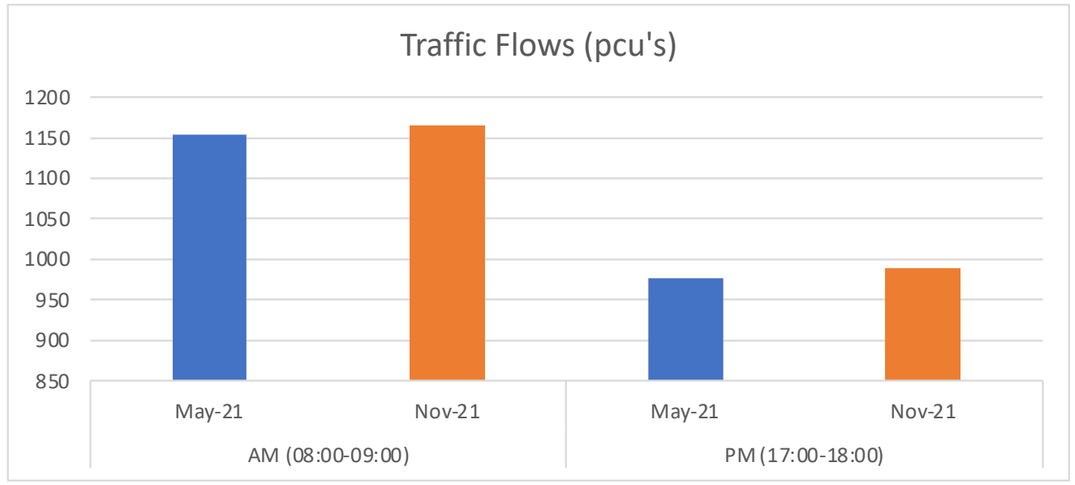


Figure 5.3.1: Comparison of Traffic Count Data May 2021/Nov 2021

5.3.2 RSA Collision Data

A review of the RSA Road Collision Statistics was undertaken for the area in the vicinity of the applicants' site accessing Ireland's road collisions database produced from the Road Safety Authority, included as shown in Figure 5.3.2.

It can be seen that there have been a number of road traffic incidents on the R617 and at Junction 1 over the 2005 to 2016 time period. These incidents have been minor in nature.

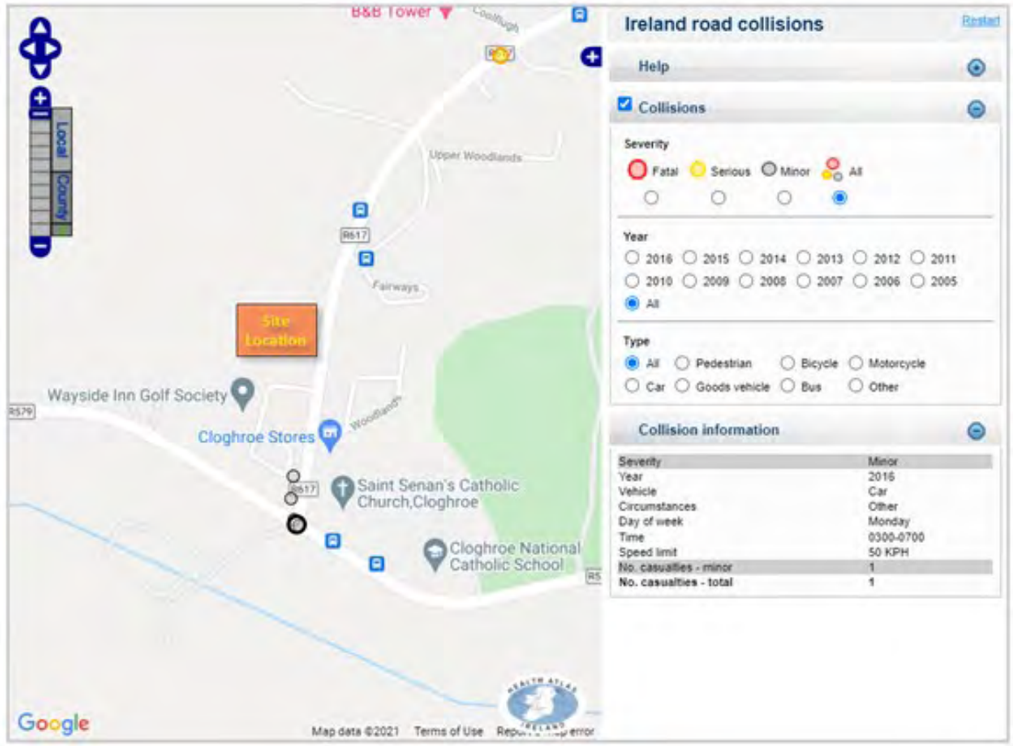


Image 5.3.2: Collision Statistics for Roads in the vicinity of the site

5.4 PROPOSED DEVELOPMENT

5.4.1 Description of Proposed Development

The proposed strategic housing development comprises 198 no. units (117 no. dwelling houses consisting of 5 no. 4 bedroom detached houses, 44 no. 4 bedroom semi-detached houses, 8 no. 4 bedroom townhouses, 14 no. 3 bedroom semi-detached houses, 24 no. 3 bedroom townhouses and 22 no. 2 bedroom townhouses) and 81 no. apartment/duplex units consisting of 2 no. 3 bedroom, 35 no. 2 bedroom and 44 no. 1 bedroom units. 79 no. of the proposed apartment/duplex units will be provided in 6 no. 3 storey apartment buildings with ancillary communal areas and bicycle parking facilities. 2 no. apartment units will be provided at first floor level of a proposed café building to the south of the site.

The proposed retail development consists of a single storey retail food store with a net sales area of 1,315 m2 (which includes the sale of alcohol for consumption off premises) with ancillary signage, surface car park, servicing areas and bicycle parking facilities. The proposed development includes a proposed two storey café building with café on ground floor and 2 no. apartments at first floor level.

The following Figure 5.4.1 presents the scheme layout, the subject of this application.

Image 5.4.1: Proposed Site Layout

5.4.2 Phasing of Proposed Scheme

The scheme of (198) residential units, and a forty-two (42) child creche, will be completed in two phases starting in 2022 and finishing by 2026. The retail elements of the scheme will also be delivered in this timeframe. The Traffic Impact Assessment includes the proposed opening year of 2024, the opening year +5 (2029) and the design year +15 (2039).

5.5 IMPACT ASSESSMENT

The predicted impact, the mitigation measures required, and the residual impacts are considered under the following headings:

- Do Nothing Scenario
- Construction Phase
- Operational Phase
- Cumulative Impacts

The proposed development will impact on the surrounding roads network during construction and operational stages. It is broadly accepted that operational stage traffic will exceed that of construction stage traffic and will be potentially less manageable in terms of avoiding peak hour traffic periods. Therefore, traffic models of the proposed development access junctions as well as the existing Junction 1 have been developed with operational phase traffic presenting a worst-case scenario.

The results of the analysis of the affected junctions will be presented in the following format.

5.5.1 Do Nothing Scenario

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for the modelled junction (Junction 1). The results tables generated by the Junctions 9 Picady traffic modelling package have been constructed to make it easy to make a direct comparison between the with/without scenarios for each of the years and peak periods, refer to Section 5.5.2.6 Network Modelling Results.

5.5.2 Potential Construction Stage Traffic Impacts

As part of this application a Construction Environmental Management Plan (CEMP) has been developed which includes a proposed Construction Stage Traffic Management Plan. This traffic management plan has identified the optimum route for construction access and quantifies the expected maximum daily HGV movements to and from site (ie, 15 no. HGV's 30 trips)). It is concluded, from a junction capacity assessment perspective, that the operational phase of the scheme will generate more traffic during the peak traffic periods than the construction stage. Operational phase junction models therefore present a worst-case scenario in terms of impact for the modelled network.

The recorded HGV (Heavy Goods Vehicles) content on the R617 is 5.86%. The development of the site will see this percentage increase to 6.02% during the construction stage of the scheme, estimated at a maximum of 15 no. HGV's/ day. This equates to 30 HGV movements per day. In addition, allowance is made for a maximum of 20 workers/staff on-site (4 movements per employee including for lunch break) giving an overall construction phase traffic generation of 110 movements per day. Assuming a worst-case scenario with all development traffic arriving via the R617/R579 junction this would equate to an increase in the AADT of 1.47%

The following table presents the cut/fill requirements for the site based on the developed scheme and the results from site investigation works carried out to date. It is intended to re-use the full quantity of cut material (13,199.43 cu.m) on-site. This quantity includes 3,470.51 cu.m of topsoil which will be used to 'dress' green areas within the scheme.

Summary		
Description	Cut (cu.m)	Fill (cu.m)
Site Extents	13,199.43	34,333.88

The imported structural fill requirement based on the above quantities will be 24,604.96 cu.m. This material will be sourced from available quarries within the wider area and imported to site as the requirement arises based on the phasing of the scheme. Over the 4-year construction stage this would equate to approximately 1,000 HGV trips to the site for imported structural fill material. In addition, the estimated 30 HGV movements per day includes 'normal' construction related materials such as concrete, timber, pipe-work and other finishing materials.

The potential construction phase impacts on traffic will occur as site staff arrive and leave the site, material deliveries and the implementation of the Construction Stage Traffic Management Plan. It is envisaged that deliveries will use the main entrance to the site with the potential to use 'Flag-Men' to ensure that road safety considerations are accounted for all road users. The use of a road-sweeper on the R617 adjacent to the site has the potential to impact on traffic flows. It is envisaged that this will only occur during off-peak hours.

The developed CEMP proposes mitigation measures to minimise the impact of this increase.

5.5.2.1 Mitigation Measures

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting at 07:00 and ending at 18:00 will avoid the recorded peak periods.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.

Construction Traffic Management Plan has been developed and will be implemented when appropriate, ie during the delivery of materials.

- Public realm works will involve the temporary relocation of the existing bus stop. The temporary location will be agreed with Bus Eireann and Cork City Council prior to it being put into use. A Road Safety Audit of all temporary works will be carried out and the audit's recommendations implemented in full.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated on-site within the designated site compound. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. It will be the responsibility of the main contractor to ensure that all vehicles delivering to the site are suitably licensed to use the public road and equipped for this activity.

5.5.3 Operational Stage Traffic Impact

In order to assess the impact of the proposed development on the identified study area, the key junctions have been assessed both with/without development traffic for both AM and PM peak hours. Results are presented for the full operation starting in 2024, 5 years after the full operation start 2029, and 15 years after the full operation start 2039.

The traffic data recorded shows the morning and evening peak hour traffic periods for all junctions to be 08:00 to 09:00 and 17:00 to 18:00, respectively.

5.5.3.1 Traffic Forecasting

The TII Guidelines have been followed when forecasting growth rates for background traffic for the area. Recorded background traffic was factored using TII (Transport Infrastructure Ireland) Project Appraisal Guidelines (PE-PAG-02017) for use in future year scenarios. The following table presents the factors used on recorded PCU's based on Link Based Growth Rates (Central Growth) for Cork.

			Cars/LGV	HGV	Combined
Count %			98%	2%	**100%**
2020	**to**	**2024**	1.069	1.123	**1.070**
2020	**to**	**2029**	1.163	1.298	**1.166**
2020	**to**	**2039**	1.266	1.478	**1.271**

TII Project Appraisal Guidelines for National Roads Unit 5.3
Travel Demand Projections (PE-PAG-0217-02)

Table 5.5.3.1, Background Traffic Growth Rates Per Annum

5.5.3.2 Modal Shift

This section describes the current level of modal shift (the use of sustainable modes of travel) based on available data and compares these to national targets.

The 2016 Census online SAP data was used to assess current modal shift patterns in the Matehy Area which encompasses the site. 5% of people in this area said they were commuting on foot, bike or using public transport.

PDF Excel Print

Population aged 5 years and over by means of travel to work, school or college

Means of Travel	Work	School or College	Total
On foot	33	33	66
Bicycle	5	3	8
Bus, minibus or coach	28	53	81
Train, DART or LUAS	2	0	2
Motorcycle or scooter	9	1	10
Car driver	948	75	1,023
Car passenger	52	551	603
Van	112	2	114
Other (incl. lorry)	9	0	9
Work mainly at or from home	58	0	58
Not stated	73	25	98
Total	1,329	743	2,072

Table 5.5.3.2, 2016 Modal Shift by means of travel to work, school or college.

(Electoral Division of Matehy)

A modal shift of 20% (implying an anticipated increase in public transport or active travel in the immediate area of 15%) for future year models is deemed to be reasonable. This modal shift increase of 15% will be applied to proposed development traffic from the opening year (when the development is fully completed) 2024, up to the design year 2039. It will not be applied to background network traffic.

5.5.3.3 Trip Generation

This section describes the traffic generation from the proposed development and is based on the TRICS Database as outlined in the TTA.

The following table presents residential development traffic for future years. This traffic has been added to existing background flows and distributed through the network to model each of the identified junctions. The results are presented in Section 5.5.5 of this report.

Cloghroe Retail & Residential Scheme		AM PEAK		PM PEAK	
		Arrivals	Departures	Arrivals	Departures
Discount Food Store & Cafe Trip Generation - based on TRICs database (per 100sq.m)					
21	Peak Trics Trip Rates Per Unit	1.660	0.919	5.997	6.449
	Peak Trips	35	19	125	134
	TOTAL	54		259	
New Residential Trip Generation - based on TRICs database (per unit)					
198	Peak Trics Trip Rates Per Unit	0.170	0.532	0.454	0.276
	Peak Trips No. Units	34	105	90	55
	TOTAL	139		145	
New Creche Trip Generation - traffic external to new development					
	Factor of creche traffic external to dev.	0.6			
	Peak Trips	*5*	*4*	*4*	*4*
	TOTAL	*9*		*8*	

Table 5.5.3.3: Proposed Development Traffic in 2026

The above table presents the expected AM/PM traffic generation figures from the various uses within the scheme. This traffic is added to the measured background flows to develop future year traffic models of the identified junctions. The distribution of these 'new' trips onto the roads network will be in-line with recorded patterns of flow. The term 'new' trips implies that it is assumed that all residents and end users of the residential element of the scheme are new to the area. An allowance for transfer trips has been applied to the retail element of the scheme, taken as 40%, significantly less than the recommended 70% as outlined in the TRICS Research Report 14/1 – 'Pass By & Diverted Traffic'.

5.5.3.4 Trip Distribution

Traffic flow matrices have been developed for each Junction for the following scenarios:

- 2024 AM/PM With/Without Dev (Full scheme)
- 2029 AM/PM With/Without Dev
- 2039 AM/PM With/Without Dev

Junction 1: R617/R579

Fig 5.5.3.1: Junction 1 Arm Designation

AM

Origin	Destination A	B	C		Tot
A	0	240	213		453
B	205	0	89		294
C	216	191	0		407
Total	421	431	302		1154

PM

Origin	Destination A	B	C		Tot
A	0	96	206		302
B	223	0	194		417
C	194	64	0		258
Total	417	160	400		977

Table 5.5.3.4 Junction 1: 2021 Existing AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	257	228		485
B	219	0	95		315
C	231	204	0		436
Total	451	461	323		1235

PM

Origin	Destination A	B	C		Tot
A	0	103	221		323
B	239	0	208		446
C	208	69	0		276
Total	446	171	428		1046

Table 5.5.3.5 Junction 1: 2024 Without Development AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	292	259		551
B	237	0	95		333
C	250	204	0		455
Total	488	496	354		1338

PM

Origin	Destination A	B	C		Tot
A	0	129	275		403
B	306	0	208		513
C	268	69	0		336
Total	573	197	482		1253

Table 5.5.3.6 Junction 1: 2024 With Development AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	280	248		528
B	239	0	104		343
C	252	223	0		474
Total	491	502	352		1345

PM

Origin	Destination A	B	C		Tot
A	0	112	240		352
B	260	0	226		486
C	226	75	0		301
Total	486	186	466		1139

Table 5.5.3.7 Junction 1: 2029 Without Development AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	315	279		594
B	257	0	104		361
C	271	223	0		493
Total	528	537	383		1448

PM

Origin	Destination A	B	C		Tot
A	0	138	294		432
B	327	0	226		553
C	286	75	0		361
Total	613	212	520		1346

Table 5.5.3.8 Junction 1: 2029 With Development AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	305	271		576
B	260	0	113		374
C	274	243	0		517
Total	535	548	384		1466

PM

Origin	Destination A	B	C		Tot
A	0	122	262		384
B	283	0	247		530
C	247	81	0		328
Total	530	203	508		1241

Table 5.5.3.9 Junction 1: 2039 Without Development AM/PM Peak Hour Traffic Movements

AM

Origin	Destination A	B	C		Tot
A	0	340	302		642
B	278	0	113		392
C	293	243	0		536
Total	572	583	415		1569

PM

Origin	Destination A	B	C		Tot
A	0	148	316		464
B	350	0	247		597
C	307	81	0		388
Total	657	229	562		1448

Table 5.5.3.10 Junction 1: 2039 With Development AM/PM Peak Hour Traffic Movements

Junction 2: Proposed Retail Access onto R617

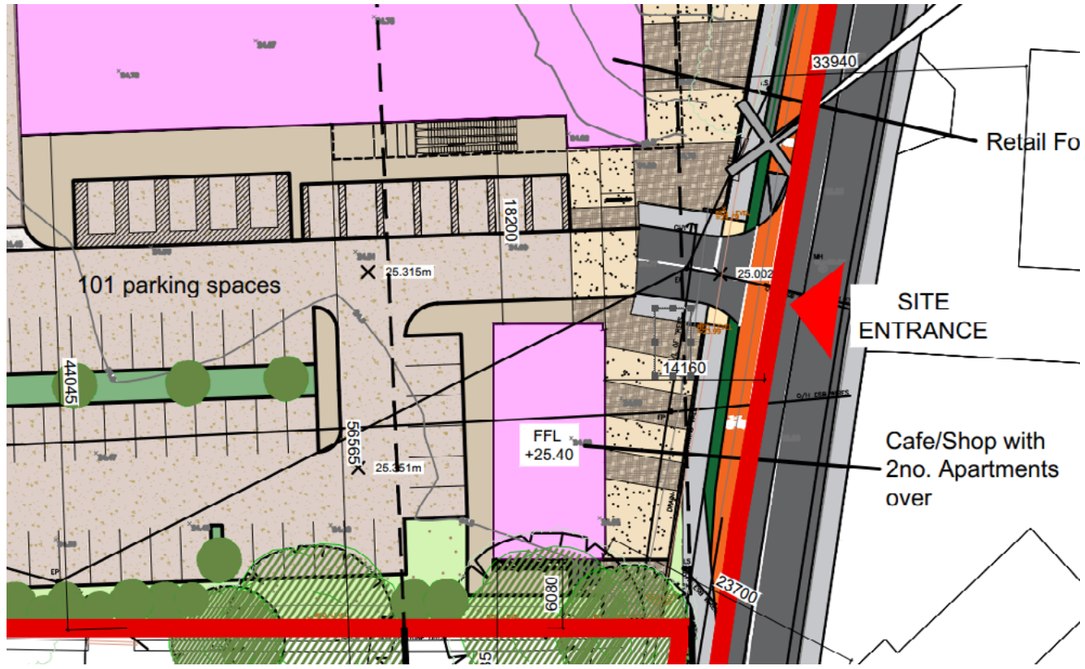


Fig 5.5.3.2: Junction 2 Retail Access (Arm B is the Development Arm)

AM

Origin \ Destination	A	B	C		Tot
A	0	17	450		467
B	10	0	9		19
C	485	18	0		503
Total	495	35	459		989

PM

Origin \ Destination	A	B	C		Tot
A	0	73	553		626
B	56	0	78		134
C	323	52	0		375
Total	379	125	631		1135

Table 5.5.3.11 Junction 2: 2024 With Development AM/PM Peak Hour Traffic Movements

AM

Origin \ Destination	A	B	C		Tot
A	0	17	491		508
B	10	0	9		19
C	528	18	0		546
Total	538	35	500		1073

PM

Origin \ Destination	A	B	C		Tot
A	0	73	603		676
B	56	0	78		134
C	352	52	0		404
Total	408	125	681		1214

Table 5.5.3.12 Junction 2: 2029 With Development AM/PM Peak Hour Traffic Movements

AM

Origin \ Destination	A	B	C		Tot
A	0	17	512		529
B	10	0	9		19
C	576	18	0		594
Total	586	35	521		1142

PM

Origin \ Destination	A	B	C		Tot
A	0	73	657		730
B	56	0	78		134
C	384	52	0		436
Total	440	125	735		1300

Table 5.5.3.13 Junction 2: 2039 With Development AM/PM Peak Hour Traffic Movements

Junction 3: Proposed Residential Access onto R617

Fig 5.5.3.3: Junction 3 Residential Access (Arm B is the Development Arm)

AM

Origin \ Destination	A	B	C		Tot
A	0	20	450		470
B	56	0	52		108
C	485	18	0		503
Total	541	38	502		1081

PM

Origin \ Destination	A	B	C		Tot
A	0	54	553		607
B	24	0	34		58
C	323	39	0		362
Total	347	93	587		1027

Table 5.5.3.14 Junction 3: 2024 With Development AM/PM Peak Hour Traffic Movements

AM

Origin \ Destination	A	B	C		Tot
A	0	20	491		511
B	56	0	52		108
C	528	18	0		546
Total	584	38	543		1165

PM

Origin \ Destination	A	B	C		Tot
A	0	54	603		657
B	24	0	34		58
C	352	39	0		391
Total	376	93	637		1106

Table 5.5.3.15 Junction 3: 2029 With Development AM/PM Peak Hour Traffic Movements

AM

Origin \ Destination	A	B	C		Tot
A	0	20	512		532
B	56	0	52		108
C	576	18	0		594
Total	632	38	564		1234

PM

Origin \ Destination	A	B	C		Tot
A	0	54	657		711
B	24	0	34		58
C	384	39	0		423
Total	408	93	691		1192

Table 5.5.3.16 Junction 3: 2039 With Development AM/PM Peak Hour Traffic Movements

The Distribution of traffic from the proposed development is in accordance with existing recorded traffic patterns on the local roads network. This is standard practice when developing future year traffic flows of a new development. As part of the data collection process traffic flows from the adjoining residential estate of Senandale and from the Woodlands Estate opposite were recorded. The turning movements from these estates were broadly in-line with the direction of traffic recorded on the R617 confirming that the assumption on future generated traffic directional splits are correct.

5.5.3.5 Network Modelling Results

This section presents the results of the traffic modelling of the three identified junctions with the existing R617/R579 Junction presented both with/without development in place for the future year scenarios. Junctions 2 & 3 development access results are presented for both morning and evening peak periods.

The Junctions 9: PICADY modelling software produces an RFC % (Ratio of Flow to Capacity), a Delay figure measured in seconds and a LOS (Level of Service) which are used to compare the effects the development will have on the junction being modelled. An RFC of 85% on a roundabout junction implies that the junction has reached capacity but is still operational with delay incurred. The following table describes the different LOS and the implications for the junction being assessed.

Level of Service A	Free-Flow
Level of Service B	Reasonably Free-Flow (no delay incurred)
Level of Service C	Stable Operation (busy but operational with acceptable delay incurred)
Level of Service D	Borderline Unstable (Junctions reaching capacity – but still operational- delay incurred)
Level of Service E	Extremely Unstable (Junctions at capacity or over, any incident will cause a grid-lock situation- significant delay incurred)
Level of Service F	Breakdown (Junctions over capacity, unacceptable delay traffic at a standstill)

Table 5.5.3.17: Level of Service

The Picady results for the selected junctions both with/without development are presented in the respective Tables below.

Junction 1: R617/R579

The Picady results for the junction both with/without development are presented in **Table 5.5.3.18** below. The current year (2021) results are representative of how the junction currently operates during peak periods. This is borne out in terms of average measured queue lengths and observed delay recorded as part of the data collection process. The constructed model is deemed to be fit for purpose.

The results indicate that the junction currently operates within capacity for both AM & PM peak with measured RFC %'s (Ratio of Flow to Capacity) of 64% & 56% respectively. The junction is working at a Level of Service D.

Future year results, both with and without the proposed development, show a steady degradation in capacity at the junction with significant delay occurring. The With Development results references the scenario without mitigation measures being implemented.

Junction 1: R617/R579		No Development			With Development		
		RFC %	Delay (s)	Level of Service	RFC %	Delay (s)	Level of Service
2021	AM	64.0	30.3	D	N/A	N/A	N/A
	PM	56.0	22.1	C	N/A	N/A	N/A
2024	AM	72.0	39.7	E	83.0	63.2	F
	PM	62.0	26.3	D	80.0	50.1	F
2029	AM	85.0	72.2	F	100.0	148.3	F
	PM	70.0	34.5	D	89.0	82.4	F
2039	AM	103.0	167.9	F	114.0	271.7	F
	PM	80.0	52.8	F	103.0	203.5	F

Table 5.5.3.18: Junction 1: R617/R579

Junction 2: Retail Access onto the R617

The PICADY results for Junction 2 with development are presented in **Table 5.5.3.19** below.

The results indicate that the junction will operate within capacity during both AM & PM peak for all future years.

Junction 2: Retail Access onto R617		No Development			With Development		
		RFC %	Delay (s)	Level of Service	RFC %	Delay (s)	Level of Service
2024	AM	N/A	N/A	N/A	6.0	11.2	B
	PM	N/A	N/A	N/A	40.0	17.6	C
2029	AM	N/A	N/A	N/A	6.0	11.8	B
	PM	N/A	N/A	N/A	42.0	19.1	C
2039	AM	N/A	N/A	N/A	6.0	12.2	B
	PM	N/A	N/A	N/A	44.0	21.0	C

Table 5.5.3.19: Junction 2: Retail Access onto R617

Junction 3: Residential Access onto the R617

The PICADY results for Junction 3 with development are presented in **Table 5.5.3.20** below.

The results indicate that the junction will operate within capacity during both AM & PM peak for all future years.

Junction 3: Residential Access onto R617		No Development			With Development		
		RFC %	Delay (s)	Level of Service	RFC %	Delay (s)	Level of Service
2024	AM	N/A	N/A	N/A	32.0	15.4	C
	PM	N/A	N/A	N/A	17.0	12.6	B
2029	AM	N/A	N/A	N/A	33.0	16.5	C
	PM	N/A	N/A	N/A	18.0	13.3	B
2039	AM	N/A	N/A	N/A	34.0	17.4	C
	PM	N/A	N/A	N/A	19.0	14.2	B

Table 5.5.3.20: Junction 3: Residential Access onto R617

The traffic modelling results show that both proposed junctions serving the development (Junctions 2 & 3) operate within capacity up to and including the design year 2039.

Analysis of Junction 1: R617/R579 shows that the junction currently operates within capacity with a level of service D during the morning peak hour. With the addition of standard growth rates on existing traffic flows the level of service for 2024 goes to E for the AM time period. When development traffic is added the Junction LOS goes to F. The conclusion from the modelling is that the junction will deteriorate over time both with/without development taking place. To resolve this issue, it will be necessary to carry out remedial works, such as the signalisation of the junction, in future years. Other interim measures such as developing right turn lanes on approach roads or improving sight visibility at the junction will also have a positive benefit.

It is proposed thatthe junction will be monitored over time to determine if and when remedial measures will be required. The delivery of Bus Connects will also include modifications to junctions to prioritise public transport, which may impact upon this junction.

A LinSig traffic model of the junction was constructed both with/without development traffic which shows that the junction can operate within capacity up to the Design Year 2039 if the junction is signalised. Table 5.5.3.21 shows the results of the Traffic Signal Controlled junction. An increase in cycle time from 60 seconds to 90 seconds in 2029 is warranted given the continued increase in traffic volumes based on TII (Transport Infrastructure Ireland) growth rates.

Number	Scenario Name	Flow Group	Network Control Plan	Flows	Time	Cycle Time (s)	PRC (%)	Delay (pcuHr)	Status	Mark
1	AM 2021	2021 AM	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	33.5	5.74	Calculated	
2	PM 2021	2021 PM	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	53.6	3.90	Calculated	
3	AM 2024 No Dev	2024 AM No Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	29.9	6.52	Calculated	
4	PM 2024 No Dev	2024 PM No Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	43.2	4.45	Calculated	
5	AM 2024 With Dev	2024 AM With Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	22.2	7.45	Calculated	
6	PM 2024 With Dev	2024 PM With Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	32.7	5.77	Calculated	
7	AM 2029 No Dev	2029 AM No Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	19.3	7.90	Calculated	
8	PM 2029 No Dev	2029 PM No Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	39.1	5.06	Calculated	
9	AM 2029 With Dev	2029 AM With Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	90	13.0	11.49	Calculated	
10	PM 2029 With Dev	2029 PM With Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	90	27.4	8.23	Calculated	
11	AM 2039 No Dev	2039 AM No Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	90	7.7	12.44	Calculated	
12	PM 2039 No Dev	2039 PM No Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	90	29.2	7.39	Calculated	
13	AM 2039 With Dev	2039 AM With Dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	90	4.3	14.95	Calculated	
14	PM 2039 With Dev	2039 PM With Dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	90	18.3	9.60	Calculated	

Table 5.5.3.21 Junction 1: LinSig Signalisation of Junction

5.5.3.6 Mitigation Measures

The scheme is located in an area where local services such as retail provision, schools and church are all within walking distance using existing pedestrian infrastructure. The following mitigation measures to improve pedestrian safety as well as encouraging public transport use have been agreed with the Local Authority.

Extensive boundary treatment measures on the R617 are proposed, in consultation with the road authority . As part of the proposed development, the R617 will be upgraded to include a 2.0m cycle track, a 1.0m planted verge, a 2.0m pedestrian footpath and a reservation of 3.25m for a future Bus Lane as part of Bus Connects. The following cross section details the proposed cross section. In the interim the bus reservation area will be grassed as an inner verge.

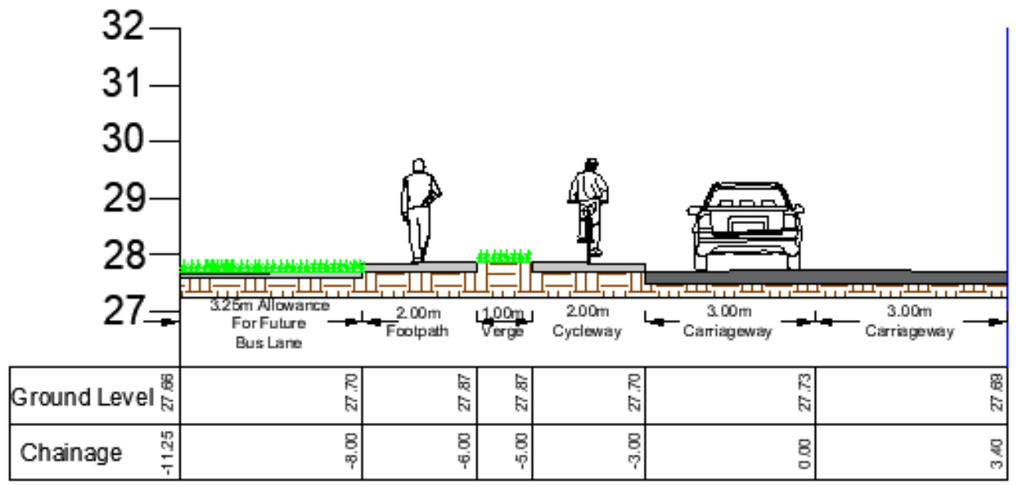


Fig 5.5.3.4: Proposed Cross Section on the R617

In-line with the proposed upgrade works on the R671, the existing 215 Bus Stop is to be upgraded with the provision of a Bus Shelter and a colour-contrasted paved stop area. The proposed development also comprises universal footpath access to the bus stop as well as more direct stepped access. The provision of the controlled pedestrian crossing to the north of the bus stop will facilitate safe and controlled access for existing residents in the area.

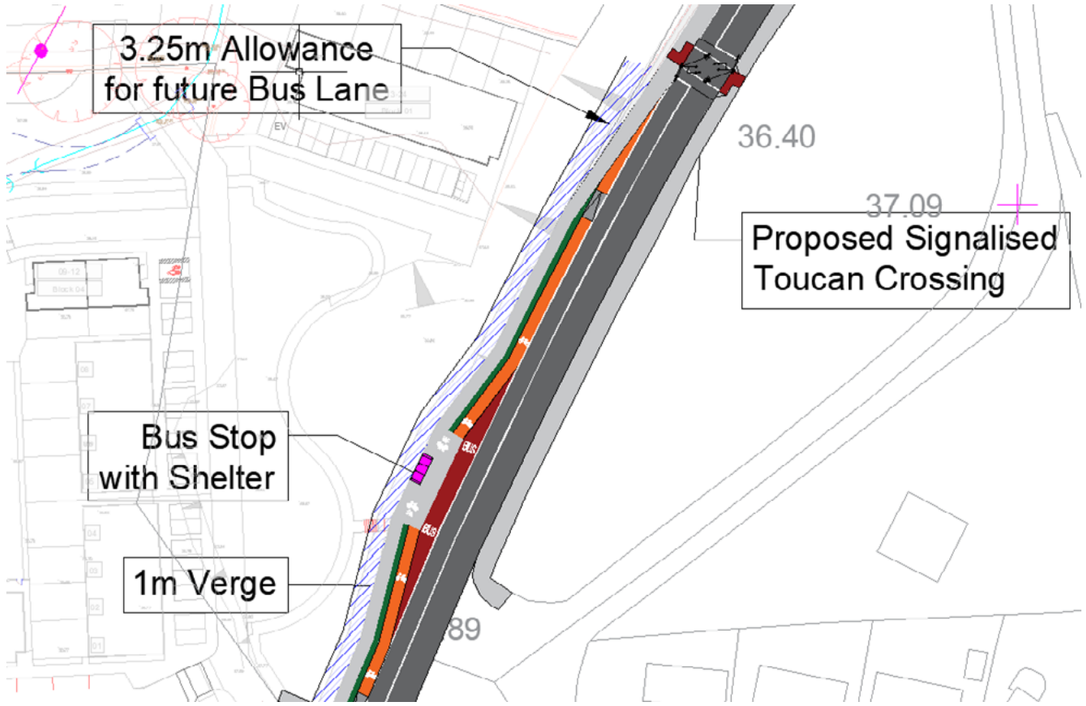


Fig 5.5.3.5: Proposed Upgraded Bus Stop with Shelter on the R617

Government policy to reduce dependence on private car use is directing the development of new residential schemes in areas where public transport and sustainable solutions are available or will be available in the foreseeable future. The proposed development has the potential to positively impact the viability of public transport offerings in the area into the future.

5.5.3.7 Residual Impacts

If government modal shift targets are achieved in the future, there will remain a percentage of new trips on the roads network because of the proposed scheme. These new trips will add traffic to the assessed junctions reducing their operational efficiency.

A summary of predicted operational phase impacts are presented in Table 5.5.3.22.

Mode	Cause	Impact
Operation Stage		
Traffic	Development Generated Traffic onto Roads Network	Slight Negative

Table 5.5.3.22 Junction 1: LinSig Signalisation of Junction

5.5.4 Risk of Major Accidents and Disasters

The likelihood of an accident occurring involving development traffic is unlikely with vehicular access to the site solely from the R617 by means of a priority-controlled junction. The development junctions are designed in accordance with the Design Manual for Roads & Bridges and achieve the required sightlines for the posted speed limit in the area, 50kph. The provision of footpaths on the development side of the R617 coupled with the provision of additional controlled pedestrian crossings will serve to urbanise the area resulting in reduced traffic speed. This essentially traffic calms the R617 at this location.

5.6 CUMULATIVE IMPACTS

5.6.1 Cumulative Impacts

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 10, Material Assets (MA) as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *Make best use of the material assets of the county and promote the sustainable development of new infrastructure to provide for the current and future needs of the population.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 10.

EPO 10 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *Make best use of the material assets of the county and promote the sustainable development of new infrastructure to provide for the current and future needs of the population.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 10.

Industry standard growth rates have been applied to background traffic for future year assessments (to account for further development within the area). These growth rates make allowance for modal shift targets as set by national policy but do not take account of site-specific measures that may be implemented to mitigate against traffic generation from a particular development. The application of these growth rates ensures a robust analysis of the surrounding roads network is carried out both with/without development.

A full list of granted permissions and current planning in the area are included in Chapter **2**.

[The site immediately to the west has now been lodged for planning, proposing 73 residential units, Planning Reference 21/40620. A review of the Traffic Impact Assessment accompanying this application was carried out which concludes that the R617/R579 junction will require some mitigation before 2029, to alleviate congestion. This development is expected to contribute an additional 2.9% to traffic flows on the local roads network. The findings of this study are in-line with the traffic modelling carried out as part of this scheme with the level of traffic generation comparable to using industry standard growth rates to increase current traffic levels.

If both sites were to commence development at the same time it would be expected that similar mitigation measures will be implemented on both. The expected level of construction traffic for both sites combined would have minimal impact on peak hour traffic flows.

A review of the CDP and the LAP did not indicate any major road projects in the immediate area of the site. Bus Connects is currently at draft stage so is unlikely to be implemented in this area prior to the completion of the project, 2026.

5.7 RESIDUAL IMPACTS

The following table outlines the residual impacts of the proposed development on the study area.

Mode	Cause	Quality	Mitigation	Significance	Probability	Duration of Impact
Construction Stage						
Traffic	Development based HGV and other traffic flow onto the existing roads network	Negative	Off-peak construction workers arrival/ departure hours, off-peak delivery to from site, traffic signal-controlled access to the site	Slight	Likely	Temporary (duration of construction phase)
Operational Stage						
Traffic	Normal residential based traffic generated onto the existing roads network	Negative	Promotion of alternative modes of travel by means of providing off-road safe access to Village and bus stop. The local school is accessed via the main junction which links to a controlled crossing of the R617.	Slight	Likely	Long-term

Table 5.7.1: Residual Impacts

CHAPTER SIX

Material Assets – Services, Infrastructure & Utilities

CHAPTER SIX
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CHAPTER SIX

6 Material Assets – Services, Infrastructure & Utilities

6.1 INTRODUCTION

This chapter assesses the material assets that could potentially be impacted by the proposed development including services, utilities, and infrastructure, within and around the site during the construction and operational phases. Impacts can be both positive and negative, direct and indirect, temporary and permanent in nature. This chapter assesses the impact on the existing environment to include the following:

- Storm Water Drainage;
- Foul Water Network;
- Water Supply;
- Telecommunications;
- Waste Management;
- Traffic and Transportation.

The assessment of the proposed development on Traffic and Transportation has been set out in Chapter 5 of this report.

6.2 METHODOLOGY

The significance of the impact of the proposed development on the existing environment will be described in this chapter. A desktop study of the existing services, infrastructure, and utilities serving the development area was carried out utilising the following sources to collate information:

- Irish Water Records (Public Foul Water and Watermain Networks);
- ESB Networks (Electricity Supply);
- Telecommunications Providers - Eir, Virgin Media;
- Aerial Photography;
- OSI Mapping;
- Site Survey (incorporating existing stream and land drain);
- Existing Site Layout Plans;
- OPW Flood Hazard Mapping;
- Flood Risk Assessment (undertaken by Irish Hydrodata Limited).

This information has been supplemented by observations recorded during site visits and consultations with Cork City Council.

The assessment of the elements within this chapter has been completed in line with the relevant standards and guidelines associated with each element. In addition to EPA guidelines, the following standards and guidelines have informed the assessment process:

- BN EN 752-4: 1997 – Drain and Sewer Systems Outside Buildings, Part 4: Hydraulic Design and Environmental Considerations;
- Sustainable Urban Drainage Systems (SUDS) principles;
- Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments
- Irish Water Code of Practice for Wastewater Management Doc IW-CDS-5030-03;
- Irish Water Code of Practice for Water Infrastructure Doc IW-CDS-5020-03;
- EN 13201 Road Lighting – European Standard;
- BS 5489 Design of Road Lighting – British Standard;
- Housing Schemes: Guidebook for ESB Networks Standards for Electrical Services.

6.3 EXISTING ENVIRONMENT

6.3.1 Description of Existing Environment

The proposed development site at present is predominantly a greenfield site of approximately 7.6 ha, and containing two agricultural structures to the north of the site (382 m^2). The site is located within the Settlement Boundary of Tower as identified in the Blarney/Macroom Municipal District Local Area Plan adopted in 2017. Pursuant to the Cork City Council Boundary Extension 2019 resulting from the Local Government Act 2019, the site location is now included within the functional area of Cork City Council. The site is located on the R617 Blarney Road in the village of Cloghroe. The site is bounded to the east by the R617 and to the south by the residential estate of Senandale.

The development works also include upgrades to the public realm along the R617 to the east of the development. Proposed upgrades include new footpaths, controlled signalised pedestrian crossing, cycle facilities, and new bus stop facilities.

Due to the greenfield nature of the site, any existing utilities and services are limited to the existing roads and residential estates in the area.

6.3.2 Ownership and Access

Access to the site is available from the R617 running along the eastern boundary of the development. The lands are in ownership of the applicant, Cloghroe Development Limited, with the proposed works along the R617 under control of Cork City Council.

6.3.3 Storm Water Drainage

An existing storm water sewer runs north to south along the R617 which ultimately discharges into the Owennagearagh River to the east of the Currabeha Bridge. One outfall is proposed from the development's storm water network to tie into this existing sewer.

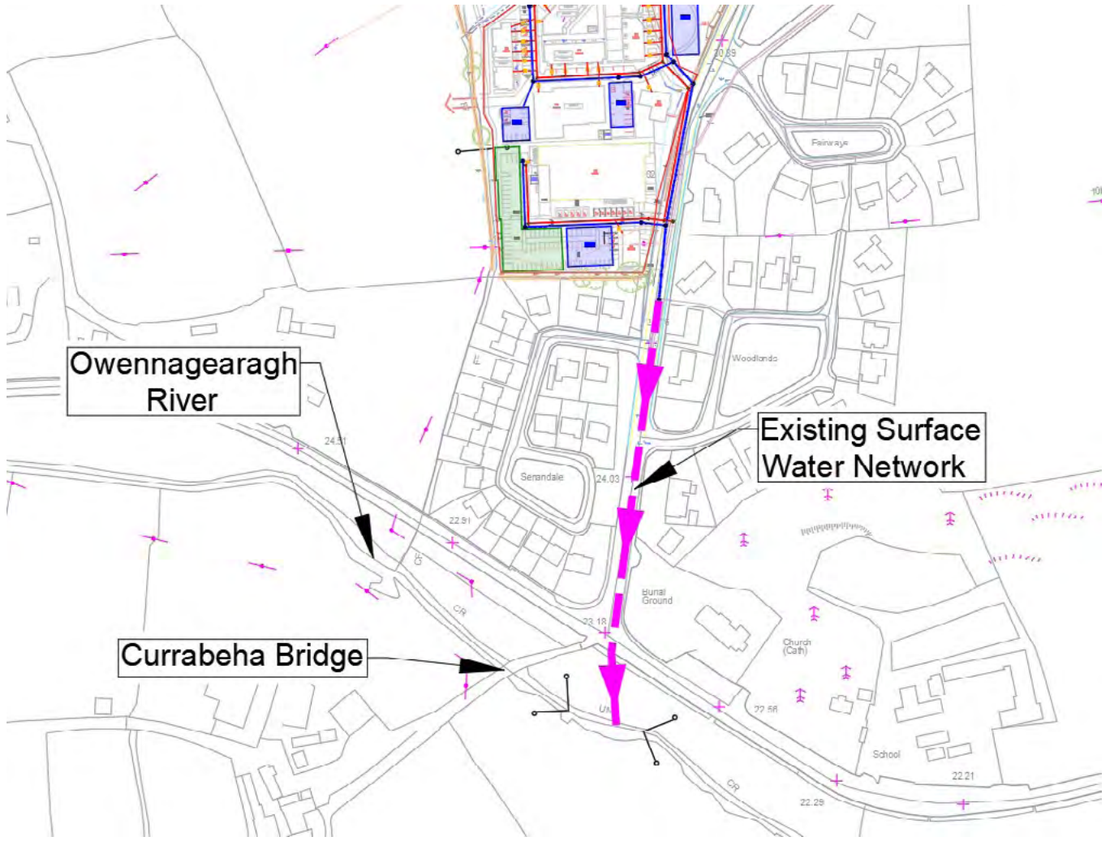


Figure 6.1: Existing surface water network

An existing land drain runs from east to west through the centre of the site before merging with an existing stream running along the western boundary of the development. This existing stream runs north to south along the full length of the proposed developments western boundary.

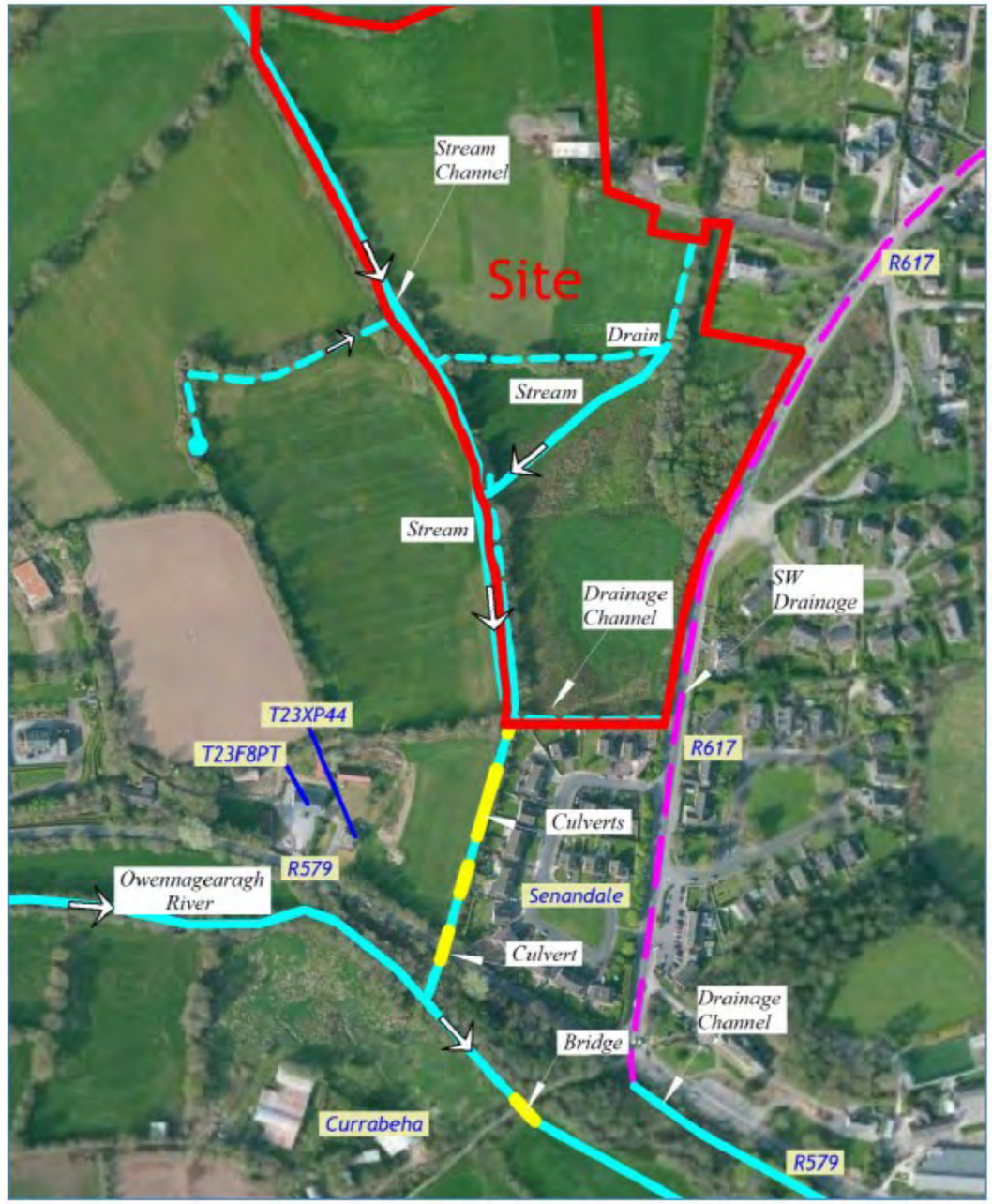


Figure 6.2: Location and direction of watercourses in relation to site>

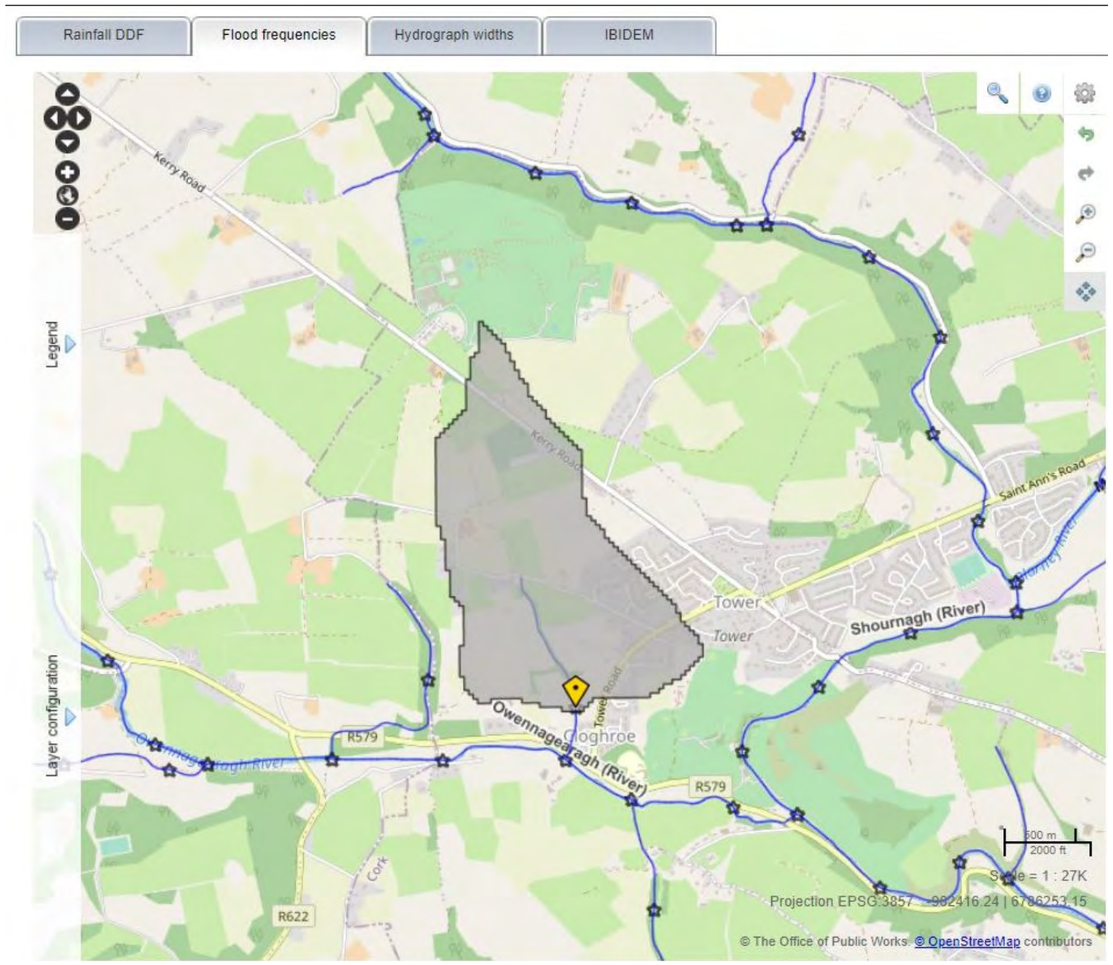


Figure 6.3: Catchment of stream running along the western boundary of the site

OPW Flood Hazard Mapping indicates that there is a recurring flood risk to the south of the proposed development site on the R579 and at its junction with the R617. The flood risk arises as a result of the Owennagearagh River over topping its banks and has been further investigated as part of the OPW Lee CFRAMS Study, refer Figure 6.4 below.

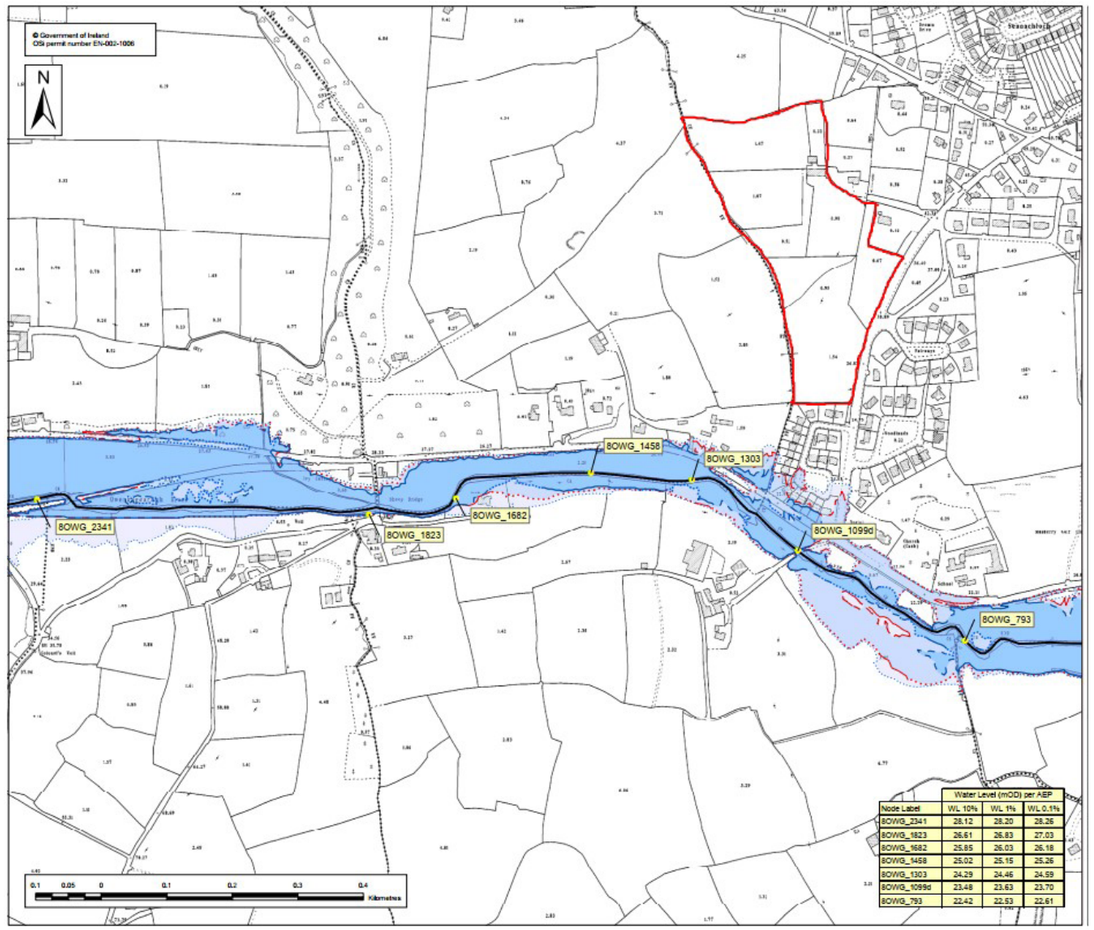


Figure 6.4: Flood Extent Mapping from the Lee CFRAMS Study

However, it is noted that the site of the proposed development itself has not been affected by historical flood events nor is it vulnerable to predicted flood events as part of the Lee CFRAMS Study. It is evident that the adjacent Senandale residential estate is vulnerable and will continue to be at risk unless remedial measures are put in place by the OPW and the planning authority.

The Board is directed to the Site Specific Flood Risk Assessment [SSFRA] undertaken and accompanying this planning application, which demonstrates that the low-lying southern part of the site is subject to flooding during heavy rainfall. This flooding is primarily caused by the western boundary stream over topping its banks and entering the development lands. In a flood scenario, the existing land drains become incapable of carrying surface water away from the development lands due to the increased surface level of the western boundary stream.

6.3.4 Foul Water Network

Information on the location of the existing public foul water network in close proximity to the development site was obtained from Irish Water. An existing Irish Water foul sewer runs north to south along the R617 to the east of the development. In order to accommodate the proposed connection, upgrade works are required at the Cloghroe Waste Water Pumping Station. A Statement of Design Acceptance from Irish Water has been received for the proposed connection from the proposed development to the existing sewer.

6.3.5 Water Supply

Information on the location of the existing watermains in close proximity to the development site was obtained from Irish Water. An existing Irish Water watermain is present on the R617 to the east of the development. It is proposed that the potable water serving the proposed development will be provided from this network. A Statement of Design Acceptance from Irish Water has been received for the future connection works to the existing watermain from the proposed development.

6.3.6 Electrical Supply

The proposed development will be served from the existing ESB network. A number of overhead lines currently traverse the development lands, refer to Figure 6.5 below. The final details for connection are subject to agreement with ESB Networks.

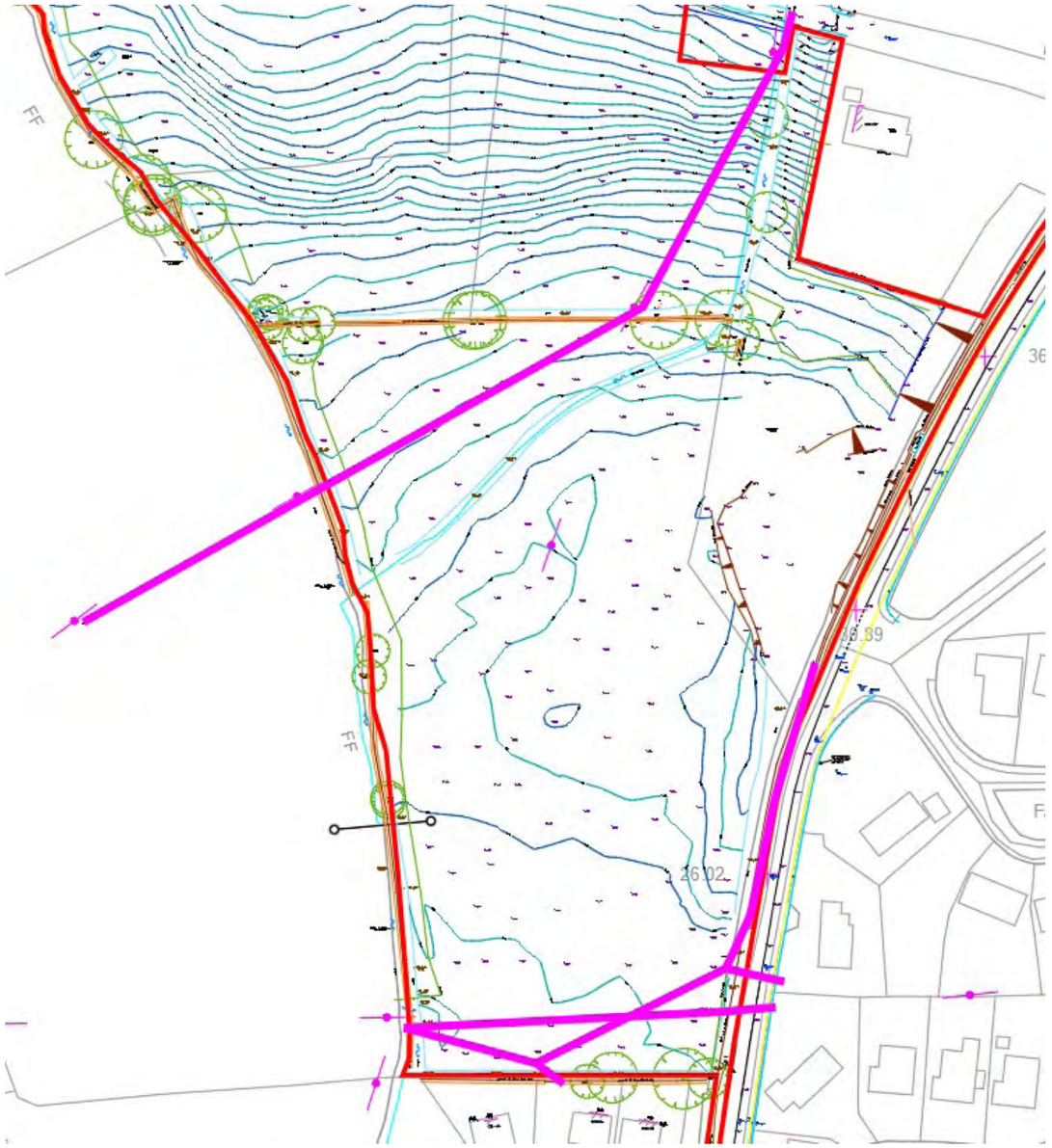


Figure 6.5: Existing Overhead Power Lines traversing the site (shown in magenta)>

6.3.7 Public Lighting

The existing R617 is currently served by public lighting with the columns positioned generally on the western side of the road. The install of a new public lighting scheme, to include the internal estate roads and the R617 as it extends within the eastern development boundary, is proposed within the scheme.

6.3.8 Telecommunications

Review of the National Broadband Ireland online network map indicates that the site is partially served by commercial providers with the remainder lying within the National Broadband Plans intervention area. EIR Fibre Broadband is live in the area with the nearby Senandale residential estate currently availing of the service.

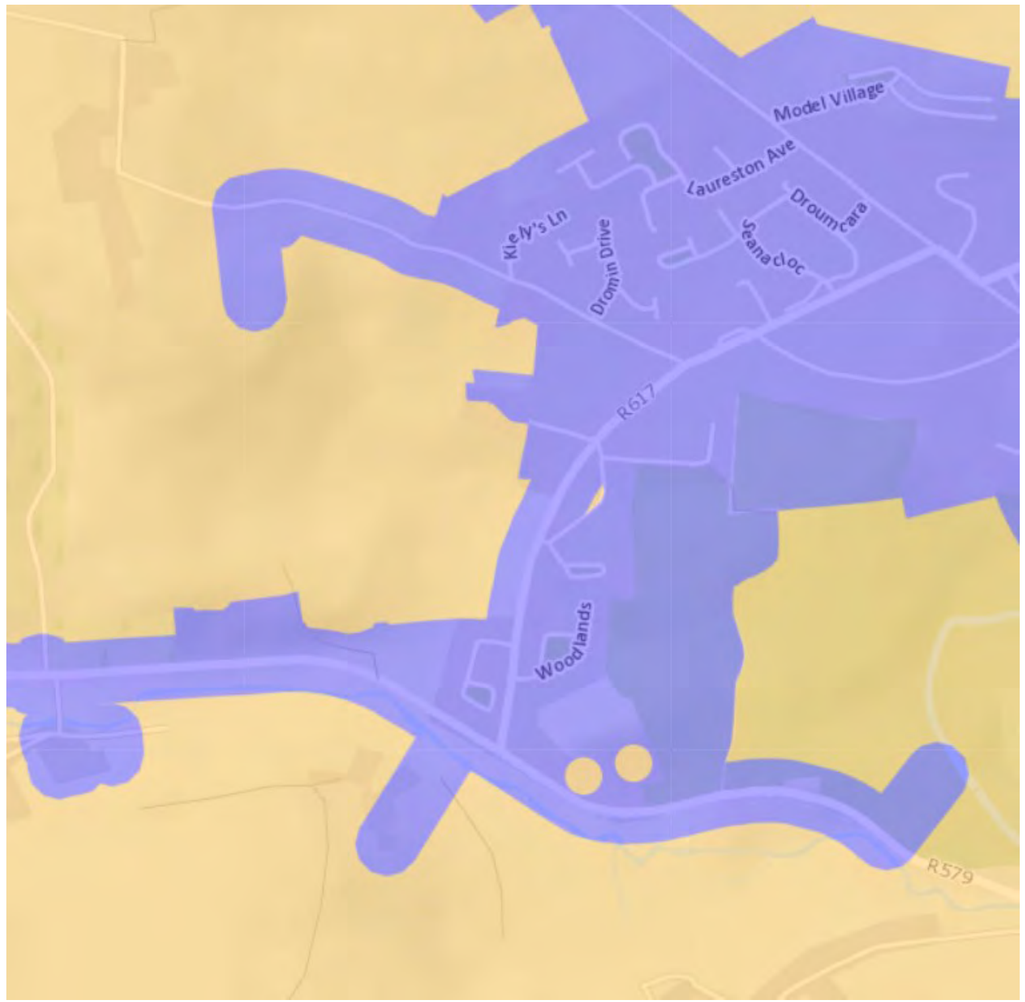


Figure 6.6: National Broadband Plan – High Speed Broadband Map

6.3.9 Waste Management

For the purposes of waste management, the proposed development site is encompassed within the Southern Region and the applicable Southern Region Waste Management Plan 2015. Also applicable to the area are the Cork City Council Bye-Laws regarding Segregation, Storage and Presentation of Household and Commercial Waste 2019 which came into effect on 1st May 2019. In general, kerbside collection remains the most efficient and widely used method of recycling and waste disposal in the region. There are many private waste contractors operating in the Cork City area who are permitted to collect waste. Examples of contractors already covering the Tower/Cloghroe area include Kollect, O'Donoghue Waste, and DMC Waste & Recycling.

6.4 PROPOSED DEVELOPMENT

The proposed project is described in detail in Chapter 2 of this report.

6.4.1 Proposed Storm Water Drainage

The proposed surface water drainage system, refer to Appendix 6-1, is in accordance with Sustainable Urban Drainage Systems (SUDS) principles and divides the site into six (6) drainage catchments: all of which are proposed for attenuation utilising Stormtech Underground Chamber systems. Each attenuation system is designed with a controlled flow rate of less than the greenfield run-off rate for the catchment area. This results in an overall discharge from the site of 20.8 l/s which is less than the greenfield run-off of 25.3 l/s. The attenuated systems will ultimately discharge into the Owennagearagh River downstream of the Currabeha bridge via the public storm sewer present on the R617, refer Figure 6.1 above.

The proposed pipe diameters of the storm sewer were calculated using Causeway Flow software to provide adequate capacity for the development. The minimum and maximum pipe gradients proposed in the development storm sewer network is 1/200 and 1/15, respectively. The storm-runs generally flow in a south-easterly direction to the six proposed attenuation tanks. Petrol interceptors will be installed prior to each attenuation tank to remove contaminants from the captured storm water. The design of the attenuation tanks was informed by the actual site greenfield run-off rate for each catchment using HR Wallingford Methodology IH124. However, to produce a robust design, the surface water run-off rate has been restricted further for each tank. Details of the attenuation tanks design and sizes are included in Table 6.1 below. The proposed attenuation tanks have been designed for a storm return period of 1 in 100 year and with a 20% climate change factor.

Figure 6.7: Proposed storm/foul pipeline, attenuation tank, and flood storage tank locations

Table 6.1: Proposed storm water attenuation tank design and sizing

Attenuation tank ID	Catchment (m^2)	Runoff area (m^2)		Storage volume required (m^3)
		Impervious area (100% runoff)	Green Area (10% runoff)	
AT-A	21,100	11,840	930	815
AT-B	12,300	6525	570	470
AT-C	10,980	6020	500	416
AT-D	8230	6450	180	471
AT-E	3850.	3070	80	210
AT-F	4650	3390	130	235

Reference Document:

- *CIRIA C697 2007: The Suds Manual*

One outfall is proposed from the surface water network to tie into the existing storm sewer running along the R617. As stated previously in this section, and shown in Figure 6.1, the development surface water will ultimately discharge into the Owennagearagh River to the east of the Currabeha Bridge. The proposed storm design greatly reduces the quantity of surface water from the development lands entering the stream running along the western boundary of the site.

The existing land drain running from east to west through the centre of the site is to be expanded by the creation of two basins/wetland meadows prior to merging with the western boundary stream. In addition to slowing the velocity of surface water entering the western boundary stream, the basins provide for a good source of groundwater recharge.

Upon review of the separate Flood Risk Assessment completed by Irish Hydrodata Limited, the southern part of site is low-lying and subject to flooding during heavy rainfall. A flood storage system with a volume of 1,200 m^3 is proposed as part of the development at the southwest corner of the site to compensate for the loss of floodable area following construction, refer to figures 6.7 & 6.8. This system will take the form of a Stormtech subsurface unit that will allow the stream to flood as required, refer to Figure 6.9. This unit will be located beneath the car park area of the proposed retail unit. In addition to the compensatory flood storage, a headwall with non-return valve is proposed south of the flood storage system at the outfall from the existing land drain running along the southern boundary of the site. This land drain falls in a westerly direction towards the western boundary stream and is located along the boundary between the proposed retail car park and Senandale. This non-return valve will remove the risk of any flood waters from the western stream entering the land drain and thereafter flooding into Senandale. Refer to Appendix 6-2 for drawings of the proposed flood storage system.

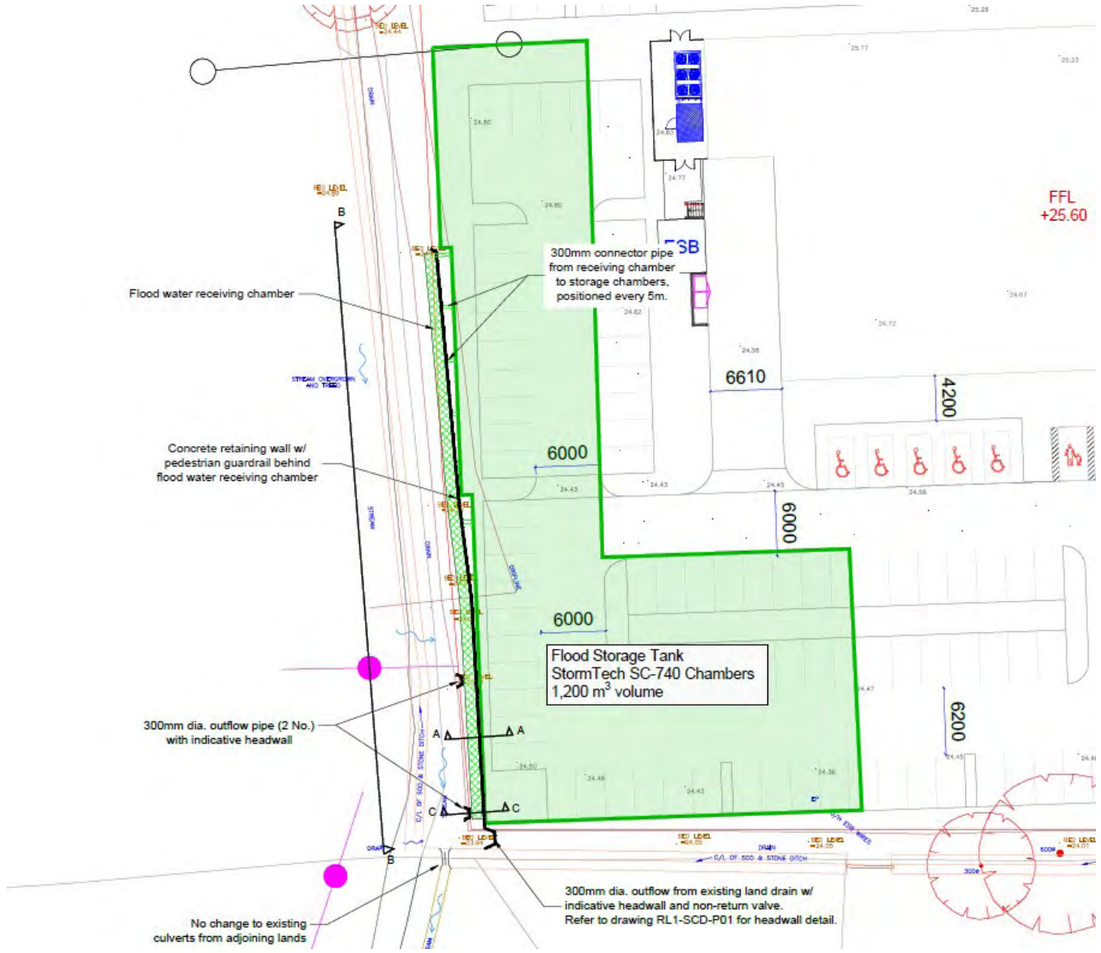


Figure 6.8: Proposed flood storage tank, flood water receiving chamber, and outflow pipes

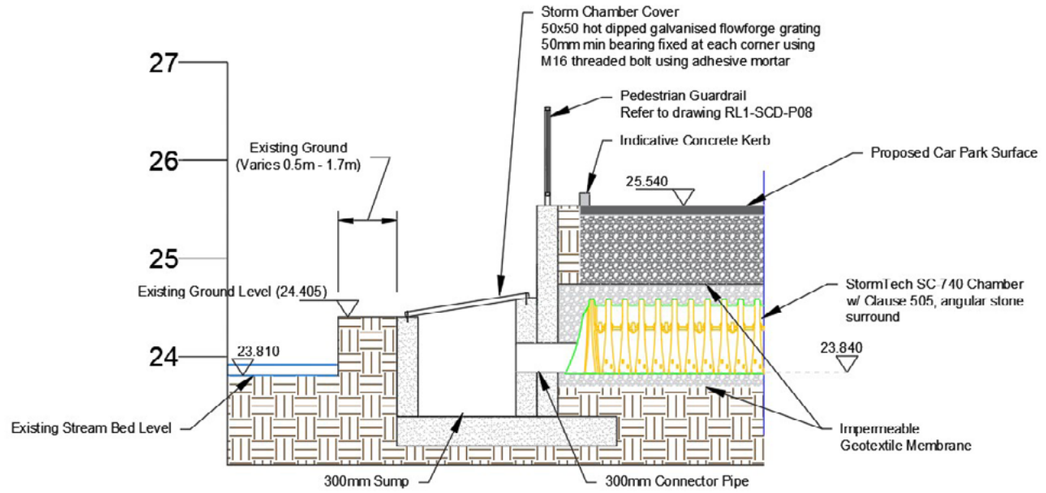


Figure 6.9: Cross-section of proposed flood storage with flood water receiving chamber

6.4.2 Proposed Foul Water Network

A new separate gravity piped foul water network is proposed to serve all units within the new development, refer to Figure 6.7 above. The network was designed in accordance with the Irish Water Code of Practice for Wastewater Management using Autodesk Storm and Sanitary Analysis software. For each pipe run the accumulative number of households contributing to that section of pipework is used to calculate the design flow. Contributions from the creche, retail unit, and café, were also determined and included in the design.

A Statement of Design Acceptance letter has been received from Irish Water for the proposed network. In order to accommodate the proposed connection, upgrade works are required at the Cloghroe Waste Water Pumping Station. In the event that permission is granted in respect of the proposed development, the developer will enter into a PWSA with Irish Water to contribute as required towards the progression of the upgrade works at Cloghroe WWPS.

The construction of the foul sewer pipe network shall be in accordance with Irish Water Code of Practice for Wastewater Infrastructure Doc IW-CDS-5030-03.

Refer to Appendix 6-1 for drawings of the proposed foul water network.

6.4.3 Proposed Water Supply

A 150mm diameter HDPE watermain is proposed to supply potable water to all units and fire hydrants within the development, refer to Appendix 6-3. The proposed pipe network is designed in accordance with Irish Water Code of Practice for Water Infrastructure Doc IW-CDS-5020-03 to incorporate the following design elements:

- All properties shall have separate meters installed in accordance with the Building Control Authority's requirements and subject to review by Irish Water;
- No dead ends included in design with minimum of 4 units served of each loop;
- Hydrants are located so as to be within 46m of all proposed buildings;

- Sluice valves positioned in accordance with Irish Water Code of Practice to isolate sections of watermain if necessary;
- Appropriate positioning of air valves at high points within the design;
- Appropriate positioning of scour valves at low points within the design.

The 150mm mains is proposed to be connected to the existing mainline present on R617 as agreed with Irish Water.

Figure 6.10: Watermain layout

6.4.4 Proposed Electrical Supply

The proposed development is to be served by the ESB via a new network connection to be agreed upon with the ESB prior to construction. An underground LV network will be provided for by the developer along with the supply of mini pillars are required to serve all units within the development. It is proposed that the existing overhead lines within the proposed development boundary will be undergrounded in accordance with ESB Networks design standards.

6.4.5 Proposed Public Lighting

The public road lighting is designed to EN 13201 and British Standard BS 5489 utilising the "Lighting Reality Pro" software package, refer to Appendix 6-4. This design package is used to select an appropriate lantern type and to optimise the lighting design. The selected lantern is designed and manufactured to comply with EN 13201 with IP65 optic and 10 joules shock resistant gear housing. To meet with ecology requirements, in particular regarding local bat activity, all installed lighting in the development will be Warm White (<3000K). Additionally, minor estate roads will receive a step down in lighting classification to P4 instead of P3.

The design and selection of lighting columns is included in the separate public lighting design report included in the application documentation. In response to the ecology report, all estate lighting columns are 6m high instead of 8m (or 10m) on the public roads.

In addition to internal estate roads, it is proposed to install a new public lighting scheme along the extent of the works as part of proposed public realm improvements.

Figure 6.11: Public lighting layout to north-east of development

6.4.6 Proposed Telecommunications

The proposed development is to be served by a new telecommunications network with access provided for all new buildings. Appropriate ducting will be installed through the development primarily under footpaths with appropriate road crossings as required.

6.4.7 Proposed Waste Management

Per section 6.3.9, there are many private waste contractors operating in the Cork City area who are permitted to collect waste. Examples of contractors already covering the Tower/Cloghroe area include Kollect, O'Donoghue Waste, and DMC Waste & Recycling. The layout of the internal estate roads has been designed to allow for the safe manoeuvring of waste collection vehicles around the proposed development.

6.5 IMPACT ASSESSMENT

The potential impact of the proposed development on material assets is considered under four separate headings:

- Do Nothing Scenario;
- Construction Phase;
- Operation Phase;
- Cumulative Impacts.

6.5.1 Do Nothing Scenario

The 'Do Nothing' scenario refers to what would occur should the proposed development not be progressed. In this scenario, the impacts described in this chapter would not emerge meaning that the 'Do Nothing' scenario is considered to have a neutral effect with regards to utilities. The 'Do Nothing' scenario is therefore not addressed further in this chapter.

6.5.2 Potential Construction Phase Impacts

The construction phase of the proposed development has the potential to result in slight and temporary impacts to the existing population in the local area.

The grading required within the development will require some import of material to the development site for areas to be in-filled, with the anticipated fill quantity being greater than the expected material to be generated within the development from excavation. Excavation for grading within the development will disturb the existing ground and has potential to introduce suspended solids into water run-off from the site.

The construction of below-ground services such as watermain, storm & foul pipeline, telecommunication conduits, ESB conduit will require excavation works for trenching. Similar to grading, the excavation work required for the trenches has the potential to introduce suspended solids to water run-off from the site.

Regarding the surface water run-off from the site, there is potential for this to become contaminated from construction activities leading directly to a negative impact on the receiving waters to the west and south of the development. This could result in a moderate short-term negative impact on the water quality in the adjacent western boundary stream and the Owennagearagh River.

Road openings will be required to connect the proposed watermain, storm, and foul, networks to the existing networks on R617. This will require minor local traffic management measures for the duration of the works in the public realm. Traffic management measures will also be required during the upgrade work to the R617 along the east boundary of the development.

The activities during the construction phase will generate effluent and sanitary waste from workforce facilities provided for the duration of the proposed works. A potable water supply will also be required by the contractor for use by the work force and for construction activities. These have the potential for a direct negative impact on the existing water/wastewater infrastructure in the area of the development and may result in a slight short term impact on the capacity of the existing water/wastewater networks.

6.5.3 Potential Operation Phase Impacts

Surface water run-off from the development site during the operation phase has the potential to be contaminated with extra organic material. Inadequate control measures within the development could result in large quantities of surface water discharge from the development lands into the western boundary stream and/or public road. This could lead to significant long-term negative impacts on the water quality and quantity entering the surrounding watercourses.

The operation of the proposed development will result in the generation of effluent and sanitary waste in addition to an increase in water demand. This has the potential, in the absence of mitigation, to have a direct negative impact on the water/ wastewater infrastructure serving the development resulting in a significant long-term impact on the capacity of the water/wastewater infrastructure.

6.5.4 Potential Cumulative Impacts

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 10, Material Assets (MA) as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *Make best use of the material assets of the county and promote the sustainable development of new infrastructure to provide for the current and future needs of the population.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 10.

EPO 10 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *Make best use of the material assets of the county and promote the sustainable development of new infrastructure to provide for the current and future needs of the population.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 10.

The potential cumulative impacts on material assets have been assessed having considered other permitted and planned developments in the surrounding area. The nearby proposed and permitted developments considered are as follows:

Table 6.2: Neighbouring Planning Applications

Application Reference	Applicant(s)	Description	Outcome/Current Status
21/40620	Kevin McDonnell and Paul Coburn	Construction of 73 no. residential units, Upgrade of existing access from the R579, flood mitigation works which include works to the R579, culverting of existing streams,	Application is currently being assessed by Cork City Council.
Cork City Council Ref: 20/39202	Tower Residential Developments Limited	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Gleann Fia Homes Ltd.	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.
Cork County Council Ref: 19/4718	Whitebon Developments Ltd	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019. Construction has commenced on site
Cork County Council Ref: 18/7111	Hydro Estates Ltd	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019. Decision upheld by An Bord Pleanála submission of third-party appeals (Ref: ABP-305373-19).
Cork County Reference 18/6802	The Board of Management of Cloghroe National School	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final Permission granted on 4th December 2019
Cork County Council Ref: 18/5562	Gleann Fia Homes Ltd	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018. Construction has commenced on site with some units completed and occupied.

The cumulative operational impact of the proposed development and other consented development are considered to be slight with regards to services, infrastructure, and utilities as long as proposed mitigation measures are implemented and maintained.

6.6 MITIGATION MEASURES

This section details the measures to be implemented during the construction and operational phases of the development to mitigate the potential impacts outlined above.

6.6.1 Construction Phase

A CEMP, prepared by MHL & Associates, has been appended to this EIAR. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, in addition to all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP.

Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP. For ease of reference, the principal mitigation proposed in relation to the type of construction activities to facilitate the development of material assets on the site include:

- Surface water shall be directed to settlement ponds where topographically feasible. Where this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated waste-water treatment plant if excessive build-up of surface water on site occurs;
- Protection of surface water gullies or drains using silt fences
- Use on-site bund structures (including incorporating existing ditches) on site to retain surface waters on site and to prevent runoff from the site;
- Minimal and short-term storage and the removal of excess materials (soil, stones, and construction wastes) off site in an efficient manner;
- Daily checks of surface water regime on site and logging of same;
- Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather;
- Drainage channels beside construction roadways to direct surface water to settlement areas and allow for natural percolation to ground;
- Ensure good site management is maintained at all times during the construction phase including regular site clean-ups and use of appropriate bins;
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and plant is re-fuelled via delivery trucks in specific bunded re-fuelling areas, rather than the storage of large quantities of fuel on site in a designated bunded area;
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a controlled and isolated manner, preventing the possibility of any pathway to a surface water source.

The construction compound (the location and features of which are identified in the CEMP) will be adequately served regarding foul drainage and water supply for construction staff. Foul effluent and sanitary waste generated during construction will be removed off-site to a licensed facility until a connection to the public foul water network is completed. The potable water supply to the compound shall be agreed between the site contractor and Irish Water and shall be protected from possible contamination by construction activities.

The connection of all proposed utilities to existing infrastructure shall be in accordance with the relevant code of practice as listed below and coordinated by the relevant utility provider. Where the standards and codes below refer to or rely on additional codes, then these additional codes are deemed to apply to these works where they are relevant to the matter under consideration.

- Irish Water Watermain: “Code of Practice for Water Infrastructure”, Doc No. IW-CDS-5020-03, July 2020.
- Irish Water Wastewater: “Code of Practice for Wastewater Infrastructure”, Doc No. IW-CDS-5030-03, July 2020.
- ESB Networks: “National Code of Practice for the Customer Interface”, Doc No. DOC-030303-AEN, April 2021.
- Connection work shall be carried out by approved contractors only.
- Construction waste generated during the construction phase shall be managed in line with Chapter 4 of the CEMP “Construction & Demolition Waste Arising & Management”.

6.6.2 Operational Phase

All installed pipelines, to include watermain, foul, and storm, will be pressure tested and surveyed prior to being made operational. The purpose of this will be to identify any possible defects. Uncovered defects will be made good prior to operation.

Waste generated by the development during operation will be removed by licensed waste contractors only.

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply.

The storm water network has been designed to control the flow of storm water from the development. When the overall site area is included, the resulting reduction in runoff used in the design goes from the greenfield rate of 25.3 l/s down to 20.8 l/s. All positive storm drainage within the site is being redirected to an existing storm sewer in the R617 where it will ultimately outfall to the Owennagearagh River downstream of the Currabeha Bridge, ensuring that current peak fluvial flows from the site entering the western boundary stream have in large been removed.

Flood waters which would have previously occupied the southern part of the development lands will now be redirected into the proposed underground flood storage chambers. The accompanying flood water barrier wall and non-return valve will ensure that flood waters entering the development lands do not get redirected into adjacent properties instead of the storage chambers.

6.7 MONITORING

6.7.1 Construction Phase

Regular site audits will be undertaken during the construction phase to visually monitor the works and ensure compliance with all measures as set out in the CEMP.

Daily checks of the surface water regime put in place during the construction phase will be undertaken with detailed logs maintained.

Communications with utility providers will be maintained during construction. Supervision of work by the respective utility operator as required will be accommodated during the works.

6.7.2 Operational Phase

Water usage within the proposed development will be monitored by Irish Water utilising water meters. The monitored water usage will be utilised to locate and isolate any leaks which may develop over time are present within the network.

The relevant service providers regarding power supply and telecommunications will be responsible for monitoring their respective services.

6.8 RESIDUAL IMPACTS

6.8.1 Construction Phase

In circumstances where the suite of mitigation measures referenced in this chapter are effectively implemented, the residual impacts on material assets will be slight during the construction phase.

6.8.2 Operation Phase

In circumstances where the suite of mitigation measures referenced in this chapter are effectively implemented, the residual impacts on material assets will be slight during the operational phase.

6.8.3 Cumulative Impacts

The cumulative impact of this development with regards to services, infrastructure, and utilities, in both the construction and operational phases, and where the mitigation measures referenced in this chapter have been implemented, will be slight.

6.9 DIFFICULTIES IN COMPILING INFORMATION

The were no notable difficulties encountered when compiling information.

CHAPTER SEVEN

Land, Soils & Geology

CHAPTER SEVEN
Contents

CHAPTER SEVEN

7 Land, Soils & Geology

7.1 INTRODUCTION

This chapter describes the type of land, soils and geology likely to be encountered beneath and in the general area of the proposed development. It also addresses the potential impact of the proposed development on land, soils and geology together with the mitigation measures that will be employed to eliminate or reduce any potential impacts. The proposed strategic housing development comprises the construction of 198 no. residential units, a 42-child creche, a retail food store, and a café on a site within the settlement boundary of Tower village in County Cork. A detailed description of the proposed development is presented in Chapter 2 - Project Description.

7.2 STUDY ASSESSMENT AND METHODOLOGY

The following scope of works were undertaken in order to complete the land, soils and geology assessment presented in this chapter;

- Desk-based study including review of available historical information; and,
- Site Walkover Survey by an experienced Geo-environmental Scientist.
- Ground investigations.

This assessment has been completed in accordance with relevant best practice guidance from the Institute of Geologists of Ireland (IGI), '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (IGI, 2013). The IGI guidance document is an updated version of the 2002 guidelines, '*Geology in Environmental Impact Statements, A Guide'* (IGI, 2002), which was revised to take account of legislative changes, and the operational experience developed by geoscientists in the production of relevant environmental assessments. This assessment has also been prepared with regard to the guidelines prepared by the Environmental Protection Agency (EPA) *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft'* published in August 2017 and European Commission Guidance '*Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report'* published in 2012

The desk-based study involved reviewing information from the following sources:

- GSI Datasets Public Viewer and Groundwater web-mapping (consulted 03/08/2021);
- Ordnance Survey web-mapping to assess the surface topography and landforms (consulted 03/08/2021);
- EPA Public Viewer and webmapping (consulted 03/08/2021);
- Google Maps Aerial photography (consulted 03/08/2021);
- Bing Maps Aerial photography (consulted 03/08/2021);
- Cork County Council Planning Maps (consulted 03/08/2021);
- Cork County Council County Development Plan 2014-2022 (CCC, 2014);
- Cork County Council County Development Plan 2022-2028 (CCC, 2021);
- Blarney/Macroom Municipal District Local Area Plan 2017
- Site specific soils and bedrock data obtained during the Ground Investigation carried out by Ocbgeo
- The ground investigation for the proposed development was carried out by Ocbgeo between August and September 2020.
- The following scope of work was completed:
- Trial Pits (14No.);
- Cable Percussion Boreholes (6No.);
- Soakaway Tests (to BRE Digest 365) (3No.);
- Surveying of Exploratory Hole Locations.

The boreholes (BH01, BH01A, BH02, BH03, BH04, BH05 and BH06) were drilled using a pilcon cable percussion rig to depths of between 3.3 and 10m below ground level

The trial pits (TP01 to TP14) were excavated using a Kobelco E1355R excavator to depths of between 1.7 and 3.3 metres below ground level (mbgl).

Exploratory locations are presented in Figure 7-1 and 7-2.

Information in relation to the findings from the ground investigation is included in sections 7.3.3 and 7.3.4.

Full details of the ground investigation are presented in the '*Cloghroe Ground Investigation Report – Interpretive'* prepared by Ocbgeo (2020) and presented in Appendix 7.1.

No significant difficulties were encountered during the preparation of the Soils and Geology Chapter for the EIAR.

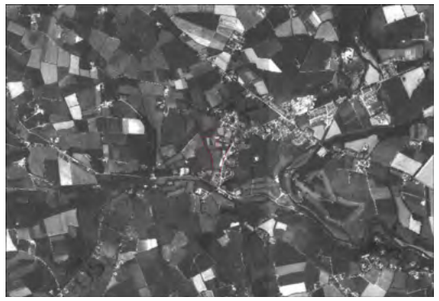
7.3 RECEIVING ENVIRONMENT

This section provides a description of the land, soils and geology in the general region of the proposed development and also takes account of the current and historic uses of the proposed development site ("the site").

7.3.1 Site Development

A review of historic maps (including available 6-inch historic maps (1829-41), 25-inch historic maps (1897-1913), Cassini 6-inch historic maps (1830-1930) and aerial photographs (1995 to 2012) from the Ordnance Survey of Ireland) (OSI, 2021) and current aerial photography (Bing Maps, 2021) confirms that land use at the site has generally been used as agricultural lands. The surrounding lands have developed considerably since the early nineteenth century. A detailed summary of land use both in relation to the Site and surrounding lands is presented in Table 7-1.

Table 7-1 – Historic Land Use Development - Summary

	**1837-1842 6 Inch Colour (OSI, 2021)** The site is used as agricultural lands. A road runs along the northern boundary of the site and along the south east boundary of the site. The surrounding area is also shown as agricultural lands. Tower Village is shown ca. 1.5 km to the north-east of the site.
	**1888-1913 Historic Map 25 Inch (OSI, 2021).** The site is still shown as agricultural lands. The road to the north of the site is no longer in place. There are a number of farmsteads and houses dotted around the general area. The Cork to Coachford railway line is shown ca. 100m south of the site.
	**6 Inch Cassini Maps 1830-1930 (OSI, 2021)** The site is still shown as agricultural lands. Part of the centre of the site is indicated to be a Fox Covert. A stream/ ditch is shown to run in a north to south direction along the western boundary of the site. A church is shown ca. 100m south of the site.
	**Aerial Photograph 1995 (OSI, 2021).** The 1995 aerial map shows the construction of a number of buildings on the site. An area of disturbed ground is shown along the eastern boundary of the site. There are a number of new housing estates to the east and south of the site. There are a number of houses constructed to the north of the site. Tower Village appears to be expanding to the north east.
	**Aerial Photograph 2000 (OSI, 2021).** More houses have been constructed to the north of the site. A number of new housing estates have been constructed around Tower Village.
	**Aerial Photograph 2005 (OSI, 2021).** A number of buildings have been constructed to the west of the site. An area of disturbed/ bare ground is indicated in the centre of the site.
	**Aerial Photograph 2012 (OSI, 2021).** No significant changes are apparent in the area of the site or the surrounding areas.
	**Current Aerial Photograph (Bing, 2021)** No significant changes are apparent in the area of the site or the surrounding areas.

7.3.2 Current Site Setting and Topography

A Site walkover survey was carried out on 25th August 2021 by an experienced Geo-Environmental Engineer.

The topography of the Site generally falls from north to south. The ground level in the north of the site is ca. 45m AOD falling to ca. 28m AOD at the location of a stone ditch in the centre of the site and further to ca. 25m AOD in the south of the site. A stream runs along the western boundary of the south and a drain runs along the southern boundary of the site

The site is mainly grassed as a result of its existing agricultural use, however there are indications of disturbed ground to the east and centre of the site. There are currently existing farm buildings on the site (See Figure 7-1 below). The ground was found to be quite soft to the south of the site (See Figure 7-2 below).

Figure 7.1 Farm Buildings

Figure 7.2 Soft Ground to the South of the Site

The site is bounded by green fields to the north, a local road with new houses to the north east, the R617 to the south east, the Senandale housing estate to the south and green fields to the west.

7.3.3 Ground Investigation

All exploratory locations completed during the Ground Investigations are presented in Figure 7-3 and Figure 7-4 below. Refer also to Appendix 7.1.

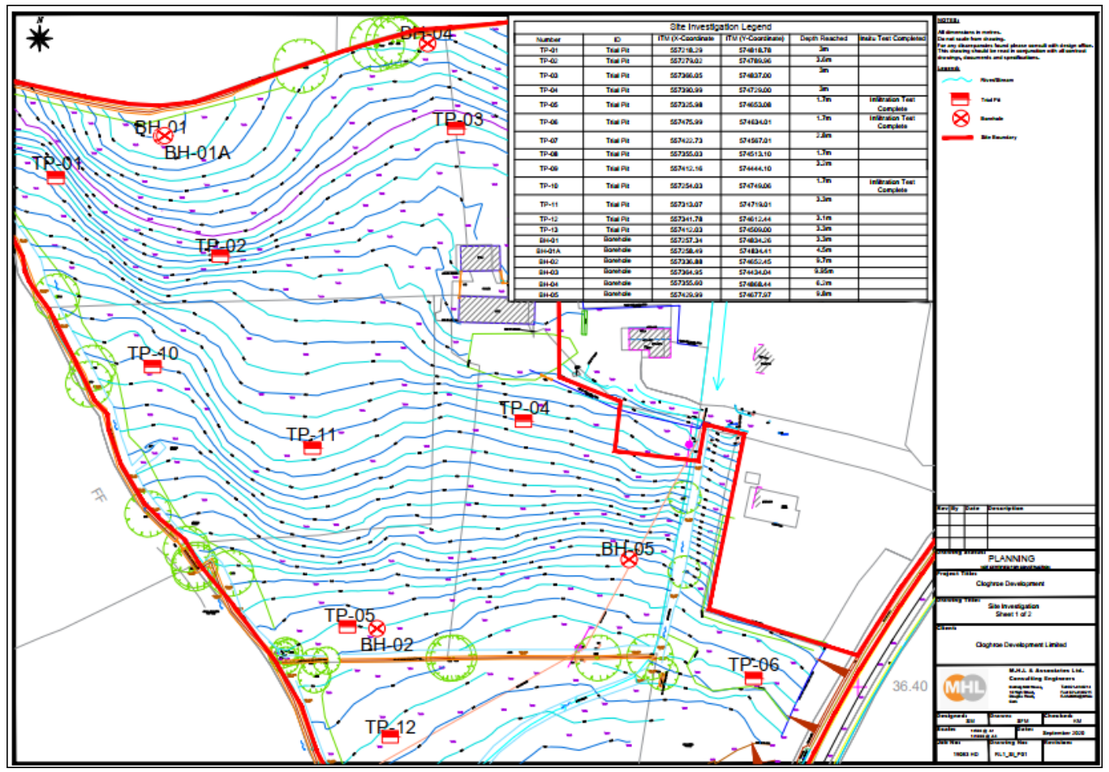


Figure 7.3 Ground Investigation Locations (including /Groundwater Monitoring Locations) Map 1 of 2 (MHL, 2021).

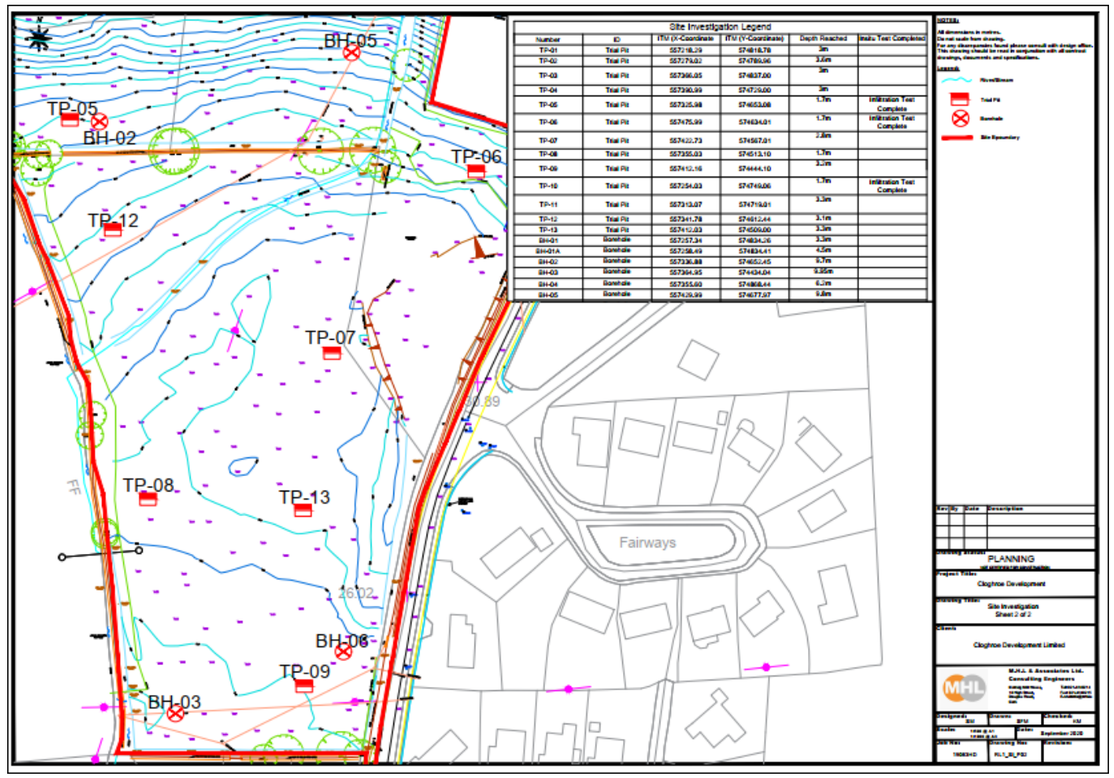


Figure 7.4 Ground Investigation Locations (including Groundwater Monitoring Locations) Map 2 of 2 (MHL, 2021).

7.3.4 Soils

Based on the Teagasc soils database available on the GSI public data viewer, the dominant soil type underlying the Site and surrounding area is well drained mineral soils. Refer to Figure 7-5.

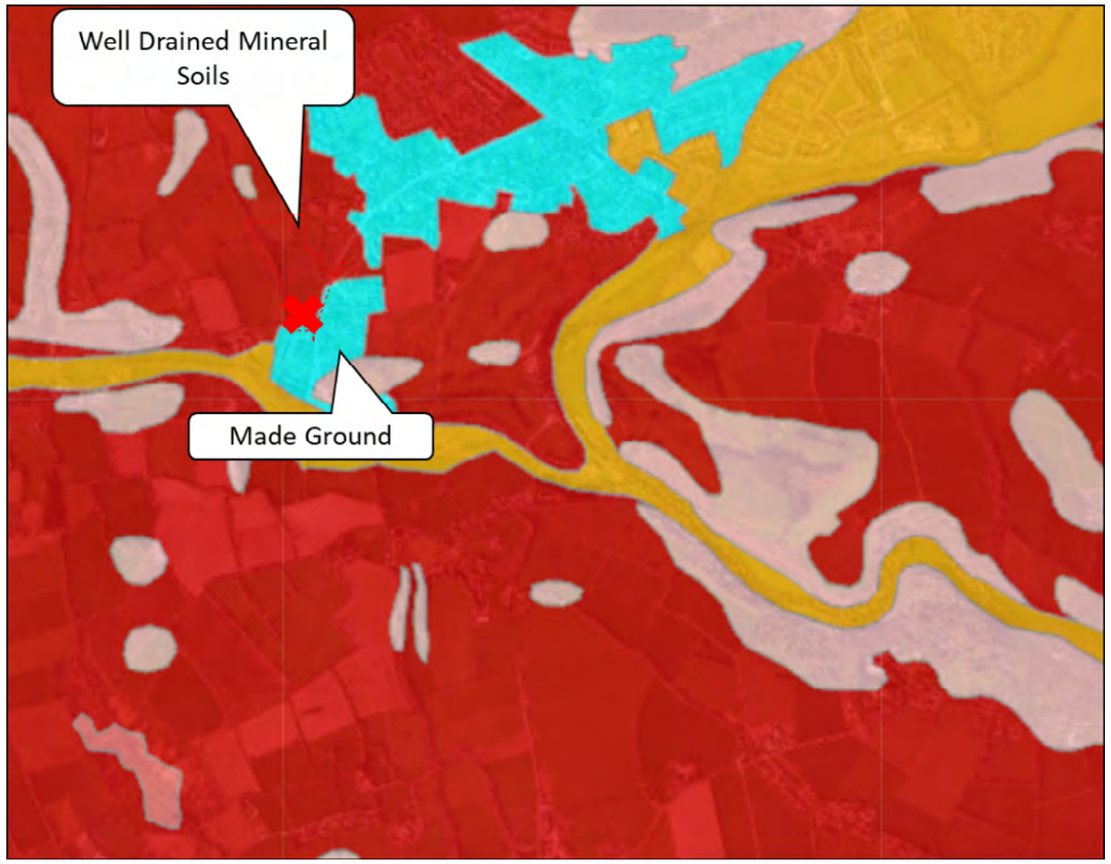


Figure 7.5- Teagasc Soil Maps (GSI, 2021)

According to the GSI public data viewer (GSI, 2021) and as presented in Figure 7-6 below the primary superficial / quaternary sediments underlying the site include tills derived from sandstones. The lands surrounding the south of the site appear to comprise urban soils or made ground.

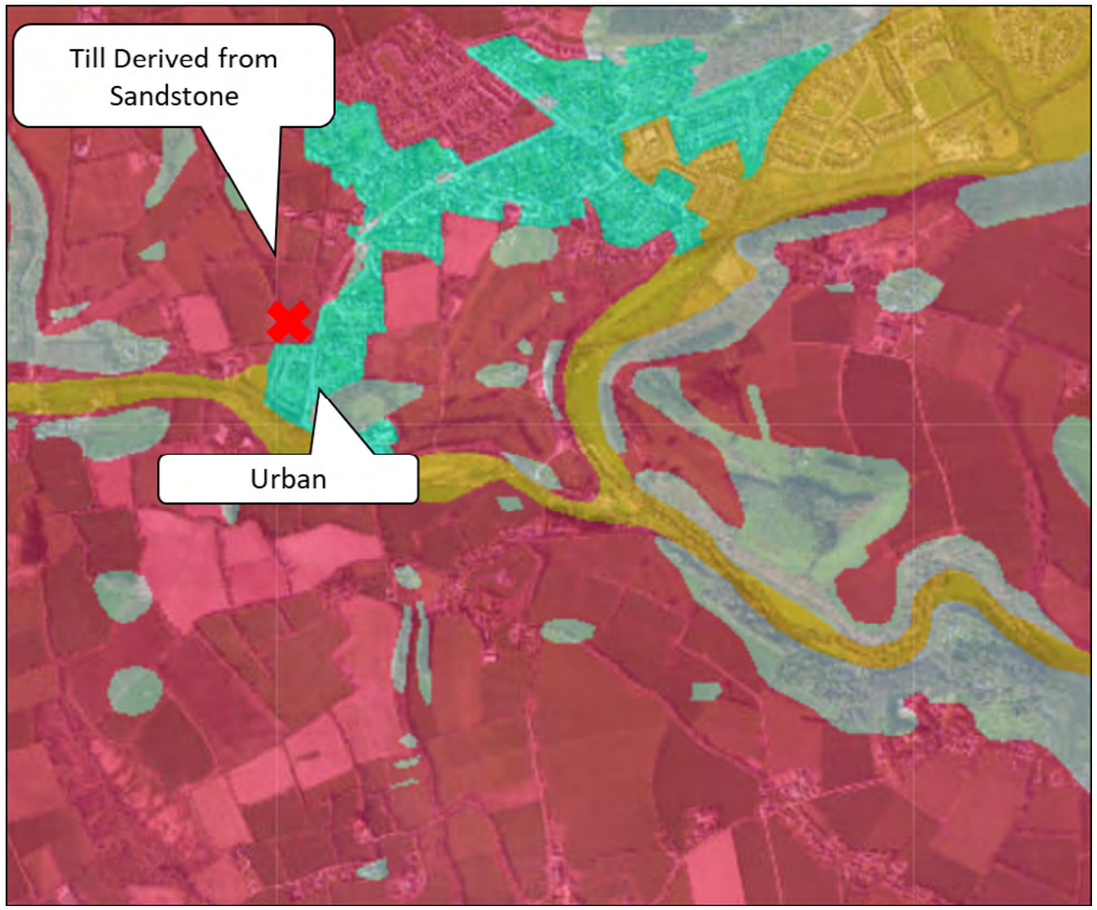


Figure 7.6 – Superficial / Quaternary Deposits (GSI, 2021)

The regional soil descriptions were verified by the ground investigation. Site specific soils records, as observed during the ground investigation (IGSL, 2021) are summarised as follows;

- Topsoil was encountered at most locations across the site and ranged from ca. 0.1 to 0.4mbgl.
- Made Ground was encountered in a localised area towards the south of the site (TP07, TP08 and TP13) to a maximum depth of 1.7m bgl. Made ground generally comprised reworked soft brown sandy gravelly very silty clay.
- Till encountered across the Site generally to depths of up to 4m bgl (locally up to 10m) has been described primarily as firm to very stiff, brown, sandy Silt / Clay with occasional cobbles.
- Till is generally underlain by dense to very dense grey sandy gravel / gravelly sand, to a maximum encountered depth of 10mbgl.
- Ground investigation records confirm that no visual or olfactory evidence of soil contamination was encountered at any of the exploratory locations across the site.

The site investigation carried out by Ocbgeo verified the results of the historic mapping review, namely that the site has been used historically for agricultural purposes. Refer to Figure 7-7 for schematic / conceptual cross sections (A-A)

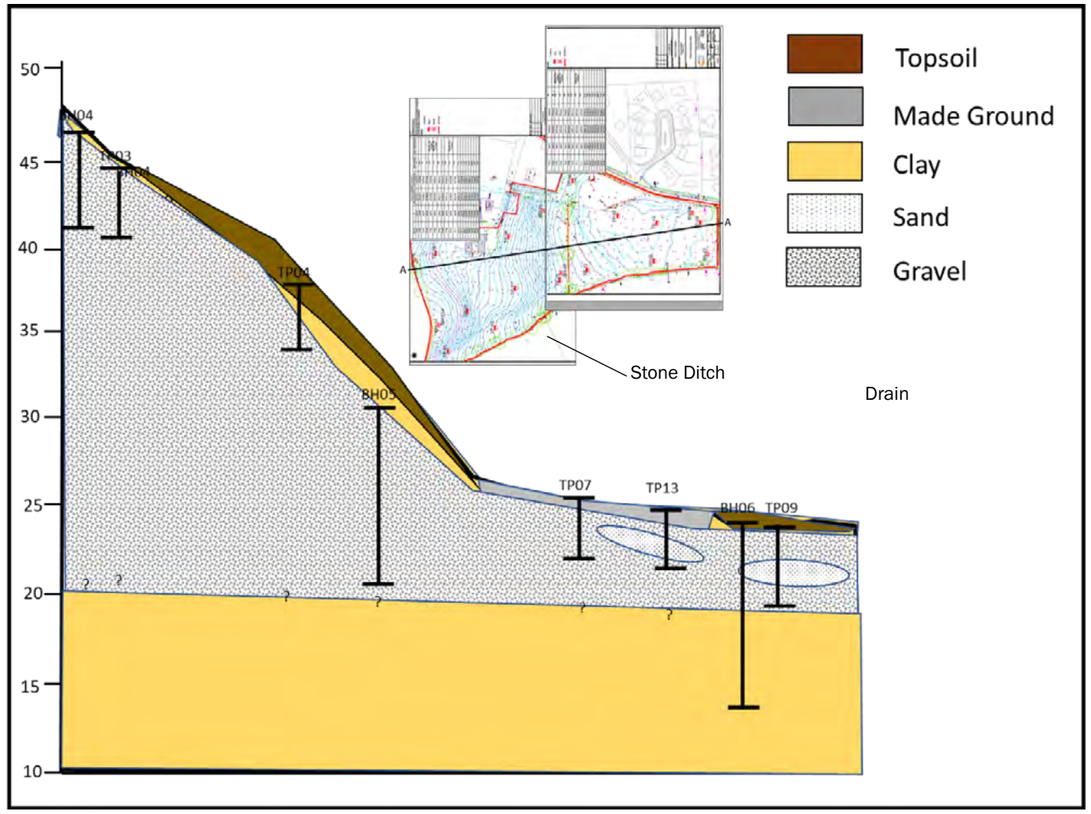


Figure 7.7 – Cross Section A-A

Soil Quality / Contaminated Land

On a regional scale there are no EPA licensed facilities within the vicinity of the site. The closest EPA licenced site is Garryhesta Pit, a soil and stone recycling facility near Ovens as identified on Figure 7-8 below.

Figure 7.8 - Potential Offsite Sources of Ground Contamination (EPA, 2021)

There are no significant industrial sites in close proximity to the proposed development.

During the desk-based review and site walkover survey, no potential sources of onsite contamination have been identified. The made ground encountered during the ground investigations generally comprised reworked soft brown sandy gravelly very silty clay with no evidence of contamination.

7.3.5 Bedrock Geology

The GSI bedrock geology 100k map identifies the underlying bedrock of the site as the Gyleen formation comprising sandstone with mudstone and siltstone in the northern section of the site and the Cuskinny Member formation comprising sandstone and siltstone towards the south of the site as presented on Figure 7-9 below.

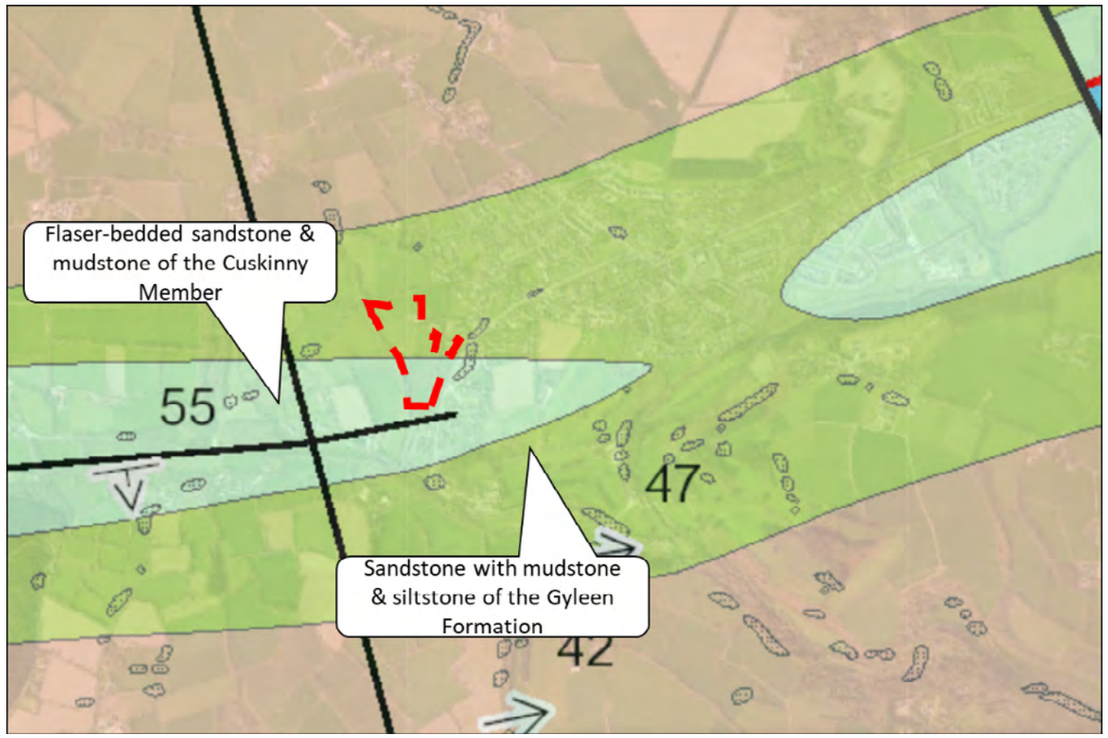


Figure 7.9 – Bedrock Geology (GSI, 2021)

There are no karst features mapped within the Site or its environs. The closest karst feature is a cave located at Blarney ca. 3.5km east of the site as shown on Figure 7-10 below. Based on the regional geology, karst features would not be expected to be encountered beneath the site or surrounding lands.

Figure 7.10 – Karst (GSI, 2021)

Ground investigation was carried out to a maximum depth of 10m bgl (24.5m AOD). Bedrock was not encountered during the ground investigation.

There are no geological heritage areas likely impacted by the site. The closest geological heritage area is identified as St. Josephs Section on the Lee Road located ca. 7km south east of the site as shown on Figure 7-11 below.

Figure 7.11 – Geological Heritage Areas (GSI, 2021

7.3.6 Geo-hazards

No landslide susceptibility issues are identified within the vicinity of the Site (GSI, 2021). The closest landslide susceptibility issue identified is a boggy depression at the top of a river gully identified ca. 16km south east of the site as shown on Figure 7-12 below.

Figure 7.12 – Landslide Susceptibility (GSI, 2021)

There are no mines or mineral occurrences within the vicinity of the Site.

Available EPA radon maps shows that between five and ten per cent of the homes within the 10km grid square where the site is located, have radon concentrations in excess of the national Reference Level of 200 becquerel per cubic metre (Bq/m3) as shown in Figure 7-13 (EPA, 2021).

Figure 7.13 – Regional Radon Levels (EPA, 2021)

7.4 IMPACT ASSESSMENT

7.4.1 Do Nothing

The site is currently greenfield agricultural land. Under the Do-Nothing scenario the lands will remain in agricultural use. The land would continue to be slightly negatively impacted by low intensity agricultural use and there will be no significant impact on land take or no impact on soils and geology over and above normal low intensive agricultural use.

7.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

7.5.1 Construction Phase

7.5.1.1 Land (Including Land Take)

The proposed development site comprises ca. 7.5ha of land which is currently in agricultural use and will also involve the demolition of 2no. farm buildings.

The Site is located within the Tower Village settlement zoning as per the Blarney Macroom Municipal District Local Area Plan (2017). Objective DB-01 of the local area plan states that it is an objective of the plan to increase residential units within the Tower Village development boundary by 182 units.

The impact on land take at the ca. 7.5ha site is likely to have a slight negative impact on the environment of the area. This will be a permanent impact. However, the proposed development is within the Tower Village settlement zone and there are existing housing and commercial land use within the immediate vicinity of the Site.

7.5.1.2 Soils and Geology

Activities during construction will primarily comprise stripping of topsoil across the site, excavation of subsoil and pouring of foundations for the residential and commercial units, installation of the storm water (including 6no. attenuation tanks) and foul water drainage works, watermains and laying of cable ducts, and piling as required.

Tracked excavators will likely be sufficient to excavate soils for subsequent relocation to facilitate construction works. The extent of the excavation for the housing and duplexes is likely to be a maximum depth of 3m bgl. Piling will be required in the southern portion of the site. Piles will be driven up to 9m bgl.

The extent of excavation for service / utility trenches will vary; however, the general depth will be in the region of 1.5m bgl, with a maximum depth of 2m bgl for the proposed stormwater attenuation tanks and flood storage tanks.

Some reprofiling works will be required on the Site. The maximum depth for reprofiling will be 4m bgl towards the centre of the Site.

The maximum anticipated depth of excavation across the Site is therefore anticipated to be 4m bgl. All excavations are anticipated to encounter sandy gravelly clay or sands and gravels, with localised areas of made ground towards the south and east. It is important to note that no rock breaking will be required.

Made ground has been encountered onsite and comprised reworked soft brown sandy gravelly very silty clay. No significant impacts from this made ground has been identified.

The total volume of soil requiring excavation for the proposed development is expected to be ca. 13,200m^3 with 34,300 m^3 of fill required. Topsoil will be reused onsite for landscaping purposes. Excavated subsoil where suitable will be reused onsite. 24,600 m^3 of fill will be required to be imported onto site.

Unsuitable soil cannot be discounted and may require disposal offsite. All such material will be tested prior to being removed and recovered or disposed of offsite to a suitably permitted / licenced waste recovery / disposal facility in accordance with relevant waste management legislation (including but not limited to the Waste Management Acts and regulations made thereunder).

During the construction phase of the development, the following potential impacts on soils and bedrock could occur and have been assessed accordingly;

- Stripping of topsoil may result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff;
- Soils beneath the proposed development may become unnecessarily compacted by machinery during construction;
- Topsoil and subsoil may become rutted and deterioration of the topsoil layer and any exposed subsoil layers may result in erosion and generation of sediment laden runoff;
- Soils may be at risk of becoming contaminated through construction activity; in particular the risk of spillages and leakage of any fuel, oils and paint.
- Temporary onsite groundwater and gas monitoring wells could provide a conduit for potential contamination of soils and bedrock through Site construction activity; in particular the risk of spillages and leakage of any fuel, oils, and paint; and,
- Unsuitable soils may require disposal offsite.

The potential impacts, in the absence of mitigation, are likely to result in moderate negative impacts on receiving soils; however, any impacts would be short-term and localised.

However, mitigation measures, including the mitigation measures set out in section 7.6 below, will be implemented during the Construction Phase to reduce and/or avoid these potential impacts, and to address any potential waste soil management issues.

7.5.1.3 Ground Stability

There is no evidence of significant historic landslides and there are no known karst features within the proposed development boundary. Industry standard health and safety practices will be implemented during the construction phase in the unlikely event that there are any potential ground stability issues associated with excavation, trenching and piling works. Therefore, no significant negative impact, associated with ground stability, is likely

7.5.2 Operational Stage

The development will have an imperceptible, permanent impact on soils and geology during the operational phase. The operational stage of the residential development consists of the typical activities in a residential area and will not involve further disturbance to the topsoil, subsoils, and geology of the area.

In the absence of mitigation measures there might be a negative moderate long term impact from radon.

7.5.3 Potential Cumulative impacts

All relevant proposed and permitted developments in the immediate environs of the proposed development have been reviewed as part of this assessment and key developments are summarised in Table 7-2 below:

Table 7-2 – Permitted Developments in the Vicinity of the Site

Application Reference	Applicant(s)	Date Received	Description	Current Status
Cork City Council Ref: 21/40620	Kevin McDonnell and Paul Coburn		The construction of 73 no. residential units, flood mitigation works which include works to the R579, culverting of existing streams, foul and storm drainage, public lighting, landscaping, amenity areas and all associated site works	Application currently being assessed by Cork City Council
Cork City Council Ref: 20/39202	Tower Residential Developments Limited	25/03/2020	Construction of a residential development of 37 no. dwelling houses and all ancillary site development works at Kerry Road, Coolflugh, Tower, Cork.	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Gleann Fia Homes Ltd	20/12/2019	The construction of 40 no. dwelling houses.	Final permission granted on 6th January 2021
Cork County Council Ref: 19/4718	Hydro Estates Ltd.	25/03/2019	The construction of 12 no. dwelling houses	Final permission granted on 8th August 2019.
Cork County Council Ref: 18/7111	Whitebon Developments Ltd.	29/11/2018	Construction of a nursing home, 29 no. detached houses and all ancillary site works on the site of the former St. Ann's Hydropathic Establishment.	Final permission granted on 13th August 2019.
Cork County Council Ref: 17/7253	Muskerry Homes Ltd	13/12/2017	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018.
Cork County Council Ref: 18/6802	The Board of Management of Cloghroe National School	22/10/2018	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final permission granted on 4th December 2019
Cork County Council Ref: 18/5562	Gleann Fia Homes Ltd	15/06/2018	The demolition and removal of partially completed 6 no. residential units and the construction of 60 no. dwelling houses	Final permission granted on 27th November 2018th August 2019.

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 4 as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

Protect the function and quality of the soil resource in County Cork

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 4.

EPO 4 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is to

Protect the function and quality of the soil resource in the Blarney Macroom Municipal District.

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 4.

There is no specific objective within the Blarney and Macroom Municipal District Local Area Plan 2017 with respect to soil and geology pertaining to Tower Village.

Objective I 9-1 : of the Cork County Development Plan 2014-2021 in relation to soils is as follows "*Protection of Soils-Ensure the protection and conservation of the soils in County Cork by encouraging sustainable management practices and the reuse of brownfield lands"*. However no significant areas of brownfield lands have been identified within the Tower Village area. Therefore there will be no significant cumulative impacts on soils and geology with regards to this objective of the Cork County Council Development Plan.

No significant cumulative impacts on the land, soils and geology environment are anticipated during the construction or operation phases from the proposed development.

Further, the implementation of the mitigation measures outlined in Section 7.8 below will ensure that there is no likely significant cumulative impact on land soils and geology with the permitted developments in the vicinity of the Site.

7.6 MITIGATION MEASURES

7.6.1 Construction Phase

Stripping of topsoil will be carried out in a controlled and carefully managed way. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Topsoil stockpiles will be protected for the duration of the works and will be located so as not to necessitate double handling. Topsoil will be retained for use on site.

The design of road levels and finished floor levels has been carried out in such a way as to minimise cut/fill type earthworks operations. The duration that subsoil layers are exposed to the effects of weather will be minimised. Disturbed subsoil layers will be stabilised as soon as practicable (e.g., backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil will be sealed using a grading bucket and graded to shed water and avoid waterlogging of subsoil material. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

The excavation of material will be minimised as much as possible to reduce the impact on soils and geology. Any surplus material, or materials which are deemed not suitable for onsite reuse will be classified in accordance with the EPA Guidance Document *'Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* (2015). All waste soils are classified correctly and managed, transported and disposed of offsite in accordance with the requirements of the Waste Management Acts.

Further mitigation measures for the prevention of soil / bedrock contamination during construction are proposed below. It should also be noted that additional mitigation measures outlined in Chapter 8 - Water are also applicable to the protection of soils and geology during the construction phase:

- In advance of commencement of the Construction Stage, all onsite monitoring wells will be fully decommissioned by an experienced borehole specialist in accordance with relevant guidelines, 'Good practice for decommissioning redundant boreholes and wells' (UK Environment Agency, 2012);
- Earthworks / piling plant and vehicles delivering construction materials to Site will be confined to predetermined haul routes around the Site for each phase of the proposed development;
- The need for vehicle wheel wash facilities will be assessed by the Contractor depending on the phasing of works and onsite activity and will be installed as needed, near any Site entrances and road sweeping implemented as necessary to maintain the road network in the immediate vicinity of the Site;
- Dust suppression measures (e.g., dampening down) will be implemented as necessary during dry periods;
- All excavated materials / piling arisings will be stored away from the excavations / immediate works area, in an appropriate manner at a safe and stable location. The maximum height of temporary stockpiles will be 3m;
- A comprehensive monitoring and supervisory regime, including monitoring of all excavations and stability assessments as required will be put in place to ensure that the proposed construction works do not constitute a risk to the stability of the Site;
- The employment of good construction management practices will serve to minimise the risk of pollution from construction activities at the proposed development, in line with the Construction Industry Research and Information Association (CIRIA) publication entitled, Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA - C532 (2001) which are also detailed in Chapter 8 – Water; and,
- Specifically, regarding pollution control measures, the following will be adhered to;

  - Fuels, lubricants and hydraulic fluids for equipment used on the construction Site, as well as any solvents, oils, and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice;
  - Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the proposed development for disposal or re-cycling;
  - Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the proposed development and properly disposed of;
  - All Site vehicles used will be refuelled in bunded and adequately sealed and covered areas in the construction compound area;
  - All plant and machinery will be serviced before being mobilised to Site;
  - No plant maintenance will be completed on Site, any broken-down plant will be removed from Site to be fixed;
  - Refuelling will be completed in a controlled manner using drip trays at all times;
  - Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;

- Fuel containers will be stored within a secondary containment system, e.g., bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on Site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills;
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment;
- 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. This will minimise the risk of soils and bedrock becoming contaminated through Site activity; and,
- The 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 agreed for the Site to ensure that they are operating safely and effectively.

The above mitigation measures have been incorporated in the a site-specific Construction Environmental Management Plan (CEMP), which is appended to this EIAR as Appendix 2-2 and shall be implemented during the Construction Stage (including initial Site preparatory / enabling works).

7.6.2 Operational Phase

In accordance with relevant building regulations, a radon barrier will be installed beneath all buildings to be constructed as part of the proposed development. Therefore, radon will not have any impact on the proposed development.

Spillage and leaks of oil from cars and trucks parked in the development during the operational phase is unavoidable. To reduce the potential impacts, oil interceptors will be incorporated into the site drainage design. The parking areas will also be paved,

Hardstanding and a suitably designed drainage system will minimise the influx of any contaminants into underlying soils and groundwater. Any accidental leaks from cars/ other vehicles within the car parking/ road areas will be directed through the surface drainage system via an appropriately sized interceptor.There will be ca. 37,300m2 of impermeable runoff area and 23,900m2 of green runoff area within the proposed development. The proposed surface water drainage system is in accordance with Sustainable Urban Drainage Systems(SUDS) principles and divides the site into six(6) drainage catchments: all of which are proposed for attenuation utilising Stormtech Underground Chamber systems. Each attenuation system is designed with a controlled flow rate of less than the greenfield run-off rate for the catchment area.

Impacts of soils and geology are unlikely.

7.7 RESIDUAL IMPACTS

7.7.1 Construction Phase

The impact on land take is likely to have a slight negative permanent impact on the environment of the area; however, this change is consistent with existing and emerging trends.

Implementation of the suite of effective mitigation measures outlined above will ensure that potential moderate impacts of the proposed development on soils and the geology environment do not occur during the construction phase, and that any residual impacts (with the exception of offsite soil removal) will be slight negative and short term in duration.

The primary residual impact is the potential removal of unsuitable subsoil (native soil and made ground) for offsite disposal. All waste soils shall be tested and classified correctly (as per relevant EPA (2015) Guidance) and managed, transported and disposed of offsite in accordance with the requirements of the Waste Management Acts. The residual impact with respect to offsite soil removal is therefore likely to be slight negative and permanent.

The majority of soil is likely to be suitable for disposal as inert material to an appropriate local authority permitted or registered / EPA licensed waste facility. The relevant local authority permitted or registered and /or EPA licensed waste facilities will be operated and managed according to the relevant conditions of their waste permits, certificates of registration or EPA waste licences.

7.7.2 Operational Phase

The impact on land take is likely to have a slight negative permanent impact on the environment of the area; however, this change is consistent with existing and emerging trends.

Accordingly, no predicted residual impacts with regards to soils or geology will arise during the operational phase.

7.8 REINSTATEMENT

All temporary construction compounds and Site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architecture plan. All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase. Oil, fuel etc. storage areas will be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriately permitted, registered or licenced waste facility.

7.8.1 Interactions with other Environmental Attributes

- Climate & Climate Change - Potential impacts on the receiving Land, Soils and Geology environment could also impact on climate, However, the mitigation measures described in this chapter, and those relevant in Chapter 12 – Air Quality & Climate will ensure that this will not occur.
- Water - Potential impacts on the receiving land, soils and geology environment could also impact on hydrology and hydrogeology conditions present. However, the mitigation measures described in Chapter 8 – Water (Hydrology and Hydrogeology), and those relevant in this chapter will ensure that this will not occur.

CHAPTER EIGHT

Water (Hydrology & Hydrogeology)

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CHAPTER EIGHT

8 Water (Hydrology & Hydrogeology)

8.1 INTRODUCTION

This chapter of the EIAR comprises of an assessment of the potential impact of the proposed development on the local water and hydrological regimes. It includes existing watercourses, surface water drainage, foul drainage, water supply and flood risk.

8.1.1 Proposed Development

The proposed strategic housing development comprises 198 no. residential units, a 42 child crèche, a retail food store, a cafe and associated green space. The site is to be accessed via the R617.

8.1.2 Study Area

The study area includes the site and lands adjacent and downstream that are hydrologically connected. The proposed development is located within the Lee River catchment on the Owennagearagh river tributary.

8.1.3 Difficulties encountered in Compiling Information

No particular difficulties were encountered during the preparation of this chapter of the EIAR.

8.2 METHODOLOGY

This assessment describes the existing water environment and assesses the potential for likely significant impacts of the proposed development on water or water dependent receptors. It also identifies appropriate mitigation measures. The proposed development's potential impact on the water environment is considered under the following three categories:

Hydrological regime

The assessment considers the likely significant effects of the proposed development and how relevant aspects have the potential to change the physical characteristics of the site area and thus the drainage and flood characteristics of the study area.

Water quality

The assessment considers the likely significant effects of the proposed development on surface watercourse and groundwater quality during construction and operation.

Flood risk

The assessment considers the potential flood-related issues in the locality. A site-specific flood risk assessment (SSFRA, IHD 2021) has been prepared as part of the SHD application documentation. The findings of the SSFRA are summarised in this report and the likely significant effects of the proposed development during construction and operation have been examined, analysed and evaluated.

8.2.1 Relevant Legislation and Guidelines

This EIAR has been prepared with due regard to the relevant legislation and guidelines on the preparation of environmental impact assessment reports, in particular those published by the European Commission and the EPA. These documents are listed below. Other relevant publications which were consulted are included in the bibliography at the end of this chapter.

- European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report;
- European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on Scoping;
- European Commission, 2013. Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment;
- Environmental Protection Agency, 2017. DRAFT Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Department of Housing, Planning & Local Government, 2018. Guidelines for Planning Authorities & Bord Pleanála on Carrying Out Environmental Impact Assessments.

8.2.2 Assessment Methodology

The potential impact, i.e. the significance of the effects of the proposed development, is generally understood to mean the importance of the effects and the consequences of the change. Significance is determined by a combination of scientific and subjective concerns. Effects are assessed on the following:

- Quality (i.e. positive, negative, or neutral);
- Significance (imperceptible, slight, moderate, significant, or profound);
- Duration (short term, medium term, long term, permanent or temporary);
- Extent and;
- Context.

- In the collation of information to describe effects, reference has been made to the criteria set out in 'Checklist for Information Required to Describe Effects' as listed in Table 3-4 of the EPA 2017 draft guidance document.
- The initial baseline site assessment as outlined in Section 8.3 describes the existing hydrological and hydrogeological receiving environment. The characteristics were determined through a desktop study using existing data and a field assessment.
- Section 8.4 describes the proposed development in terms of aspects relevant to water. Section 8.5 describes the potential impacts associated with the development of the site (in the absence of mitigation).
- Following the identification of potential impacts, specific mitigation measures have been developed to avoid, reduce and if possible, remedy any negative impacts on the local hydrology and hydrogeological regimes. These are described in section 8.6.
- Assessments of the residual impacts of the development are outlined in Section 8.7 and finally, cumulative impacts including those of neighbouring projects are assessed in Section 8.8.

8.2.3 Desktop Study

The desk top study involved an examination of the hydrological aspects and water quality aspects of the following sources of information:

- Engineering Design Report prepared by MHL Consulting Engineers;
- Site Specific Flood Risk Assessment Report prepared by Irish Hydrodata Ltd;
- Geotechnical Site Investigations Report prepared by OCB Geotechnical Ltd;
- Topographic Survey drawings of the site by Precise Control Ltd;
- OPW LeeCFRAM study reports and mapping;
- Information on Integrated Catchment Management (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodinfo.ie);
- Geological Survey of Ireland online data (www.gsi.ie);
- Water Framework Directive (WFD) online mapping and data (www.wfdireland.ie);
- EPA online mapping (www.epa.ie);
- History of flooding in the vicinity (www.floodinfo.ie/map/floodmaps/);
- Cork County Council Development Plan;
- Cork County Council Blarney Macroom Municipal District Local Area Plan.

8.2.4 Field Assessment

A site walkover survey was carried out to confirm the pattern of existing drainage and to record surface hydrology features relevant to the proposed development. No significant constraints were noted in terms of hydrology and water quality during the site visit.

8.3 DESCRIPTION OF THE EXISTING RECEIVING ENVIRONMENT

8.3.1 Site Location

The proposed development site is located on lands within the townland of Coolflugh, Blarney, Co. Cork. It occupies an area of about 7.5Ha and is currently used for agricultural purposes. It is bounded on the west by a small stream and to the east by the R617. The Senandale housing estate is located on the southern boundary. To the north and north-east are agricultural lands and some established individual housing (Figure 8.1).

The site is located within the development boundary of Tower as identified in the Blarney Macroom Local Area Plan 2017 (Figure 8.2).

8.3.2 Catchments and Protected Ecological Environment

The site is situated within the sub catchment Lee [Cork]_SC_060 as defined by the WFD and within the WFD River Sub Basins Shournagh_040 (EPA 2021).

The site itself is not situated within any environmentally designated areas; however surface water running off the site drains into the Shournagh Valley (000103) proposed Natural Heritage Area (pNHA), and the Lee Valley pNHA (000094). The closest SPA, Cork Harbour SPA (004030), is approximately 10km to the east-southeast of the site.

8.3.3 Site and Local Area Topography

A detailed topographical survey of the site has been undertaken by Precise Control Ltd (PC 2019). This data was supplemented with OSI Lidar data for the wider area. The terrain is presented in Figure 8.3 and shows the site lies on the eastern flank of a shallow valley feature that grades from north to south. The southern part of the site is relatively flat and low-lying.

8.3.4 Existing Surface Water Features

There is a small stream on the western boundary of the site (Figure 8.4). This rises to the north and drains a rural catchment of about 0.9km^2. The stream channel locally meanders across the property boundary line, particularly so adjacent to the southern part of the site. It is not regularly maintained and is locally silted up. It frequently overflows both banks to the east and west. It enters a culvert system close to the south western corner of the site. This culvert system runs along the rear of Senandale housing estate properties No. 5 to No.12. The culvert discharges to an open channel adjacent to No. 12 before passing through twin small-bore pipe culverts under the regional road R579. It then joins the Owennagearagh river which is located some 20m further to the south.

A shallow open drain is located on the southern boundary of the site adjacent to the Senandale housing estate. This conveys local land runoff including some from the R617. There are two other significant stream/drainage channels located within the centre of the site. These drains collect surface runoff and are also likely to receive inflow from groundwater.

Data from the geotechnical site investigations report (OCB 2020) indicates subsurface land drains in a number of locations and some instances of imported fill. Both of these features may locally alter drainage pathways.

Figure 8.1: Site Layout

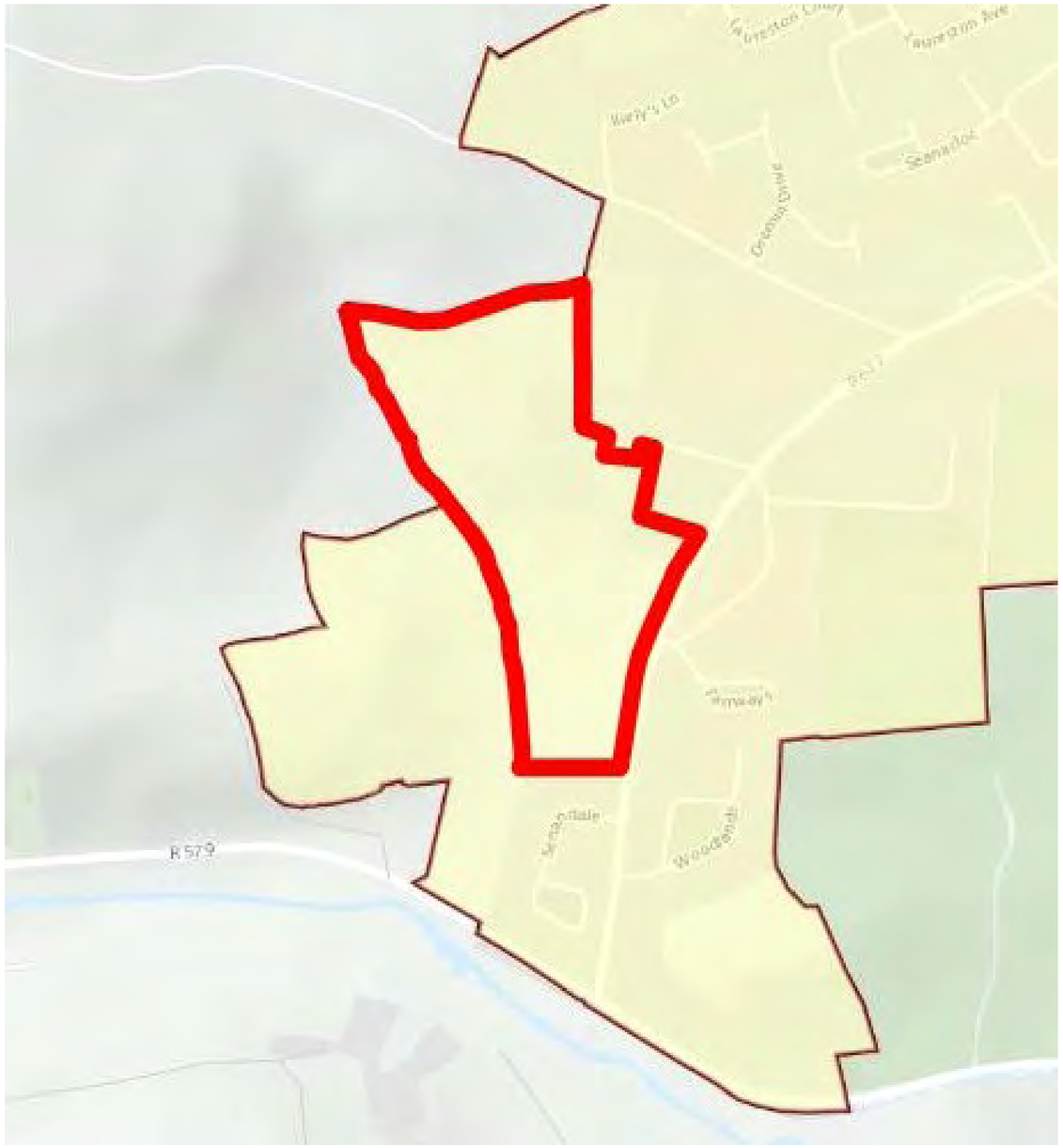

Figure 8.2: Development Boundary

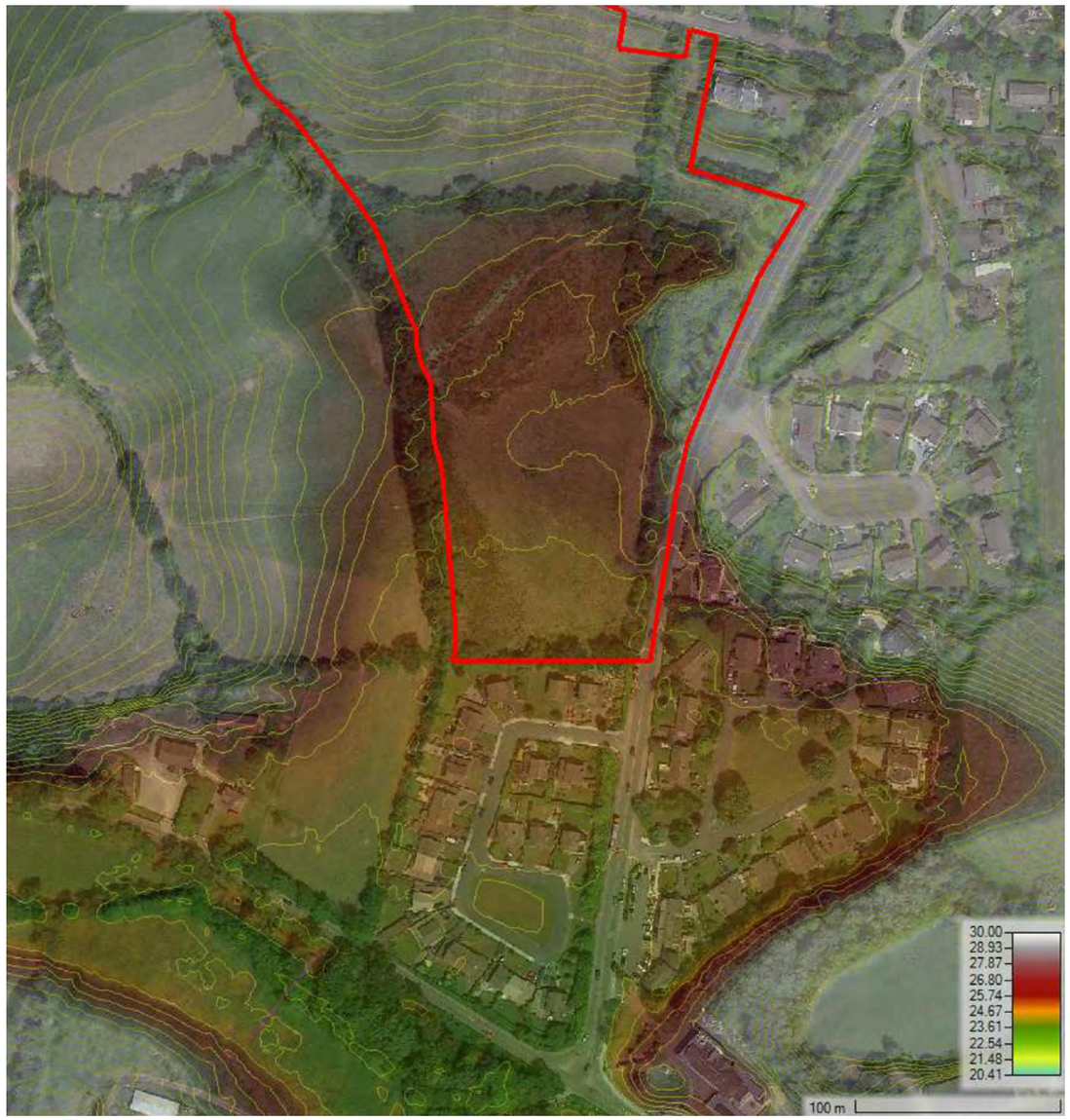

Figure 8.3: Site and Local Terrain

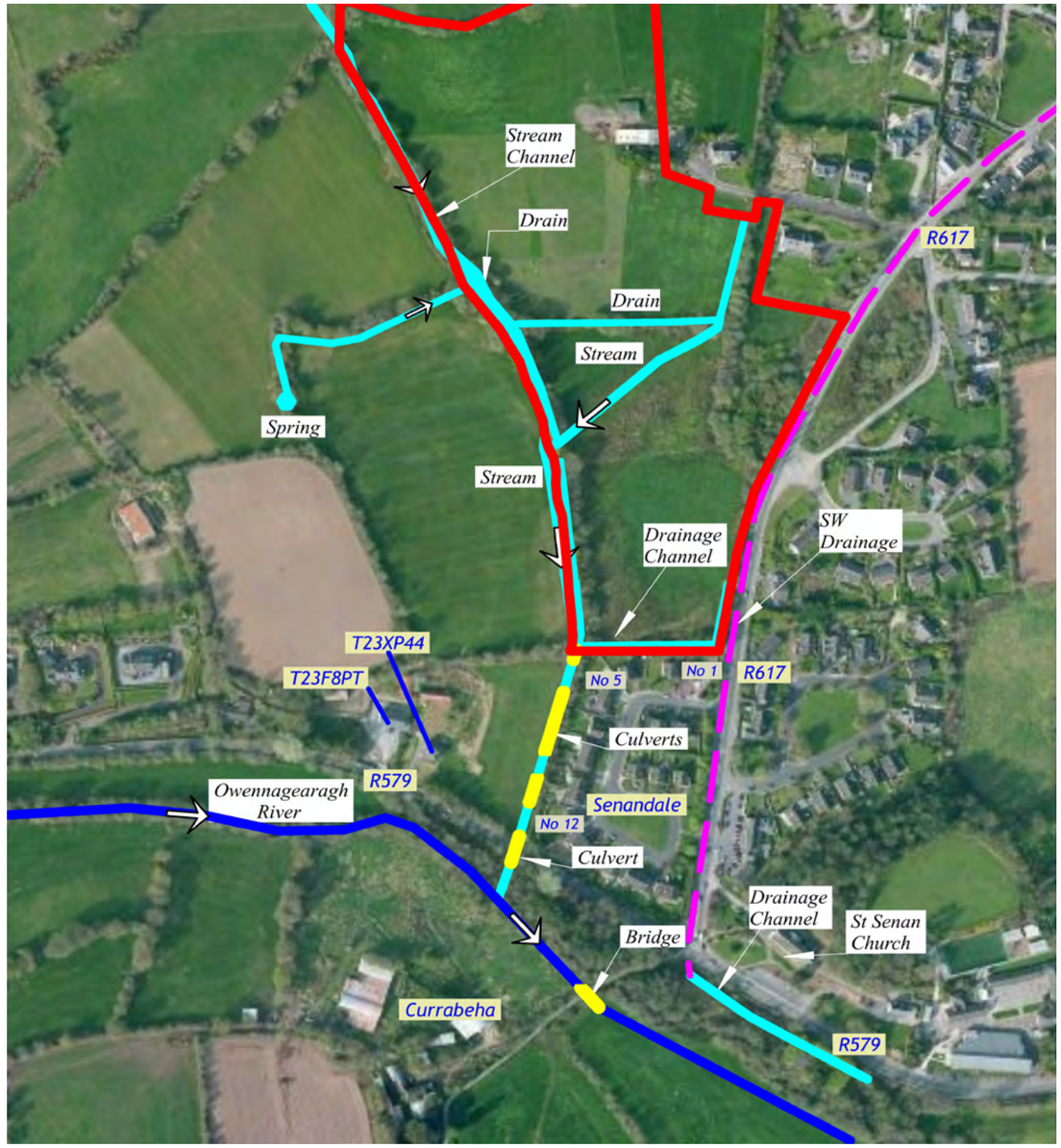

Figure 8.4: Local Water Features

8.3.5 Surface Water Quality

There is no surface water quality data available for the immediate site area. The nearest WFD sample points are located to the east on the Shournagh river. The WFD (2013-2018) water quality classification status is described as 'Moderate' and the river risk status as 'At Risk'.

8.3.6 Existing Municipal Services

A municipal storm water drainage pipe is located on the R617. This drains the built-up areas to the east and north of the site. It discharges to an open roadside drain located on the southern side of the R579. This drain in turn joins the Owennagearagh river downstream from the Currabeha access bridge.

A municipal foul sewer is located on the R617. This flows southwards and connects to the pumping station located off the R579. A municipal water supply is also located on the R617.

8.3.7 Site Hydrology and Groundwater

GSI's Groundwater Data Viewer (GSI 2021) indicates that the site is underlain predominantly by bedrock comprising Devonian/Lower Carboniferous mudstones and sandstones (Figure 8.5) with predominant west-southwest to east-northeast strike. It classifies the underlying aquifer as 'Locally Important Aquifer' that is generally only moderately productive in local zones.

The ground water is classed as 'Extremely Vulnerable' due to shallow rock and permeable sub-soils (Figure 8.6). The geotechnical site investigation report indicated topsoil over a glacial till comprising 'sandy gravelly Clay, frequently with low cobble content, typically firm or stiff' in turn overlying fluvio-glacial deposits comprising 'typically medium dense to very dense Sands and Gravels' (OCB 2020). The presence of the near surface clay layer, which is evident in almost all excavations (Figure 8.7) and is thicker in the southern part of the site, suggests that overall surface water infiltration to ground is likely to be limited.

There are no mapped karst features or historic springs in the vicinity of the site. There is one mapped historic well, located approximately 300m to the north east (Figure 8.8). Water supply in the locality is primarily served by the Irish Water network.

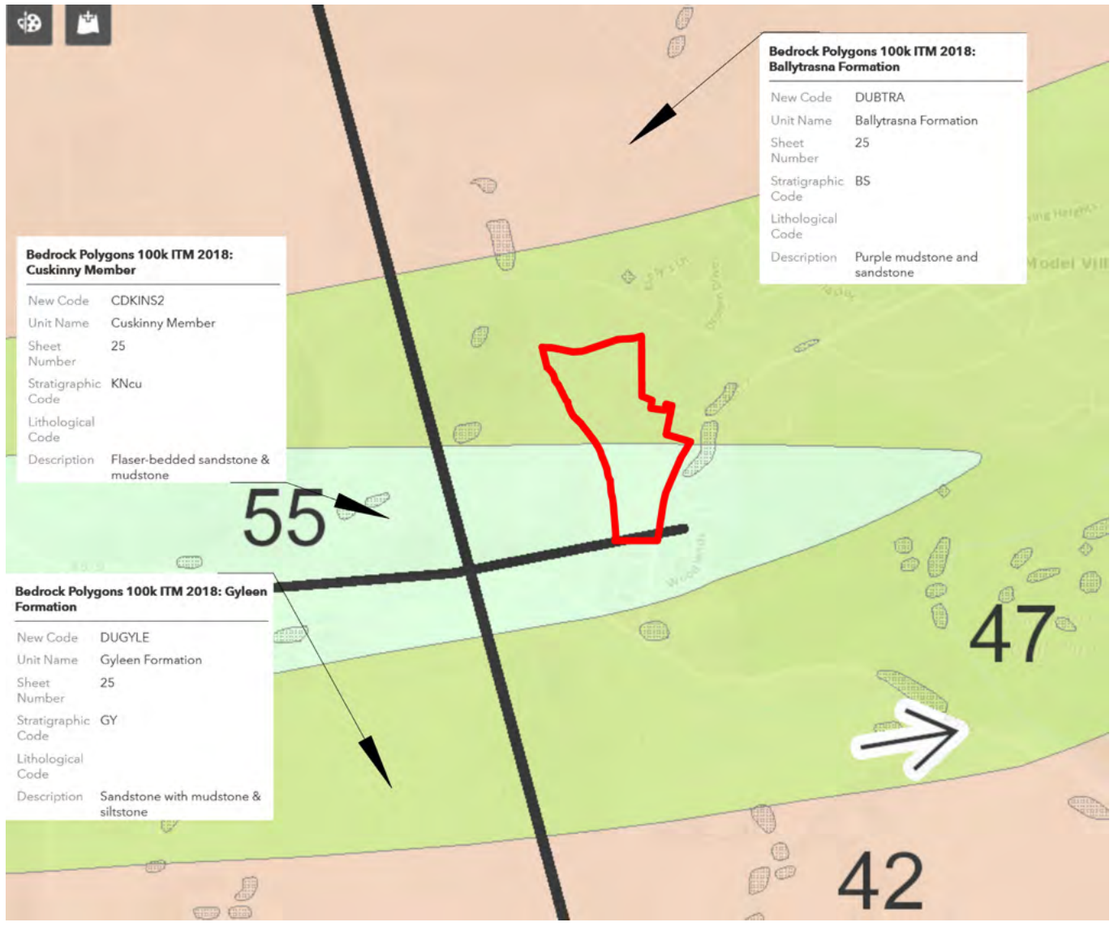

Figure 8.5: Bedrock Geology

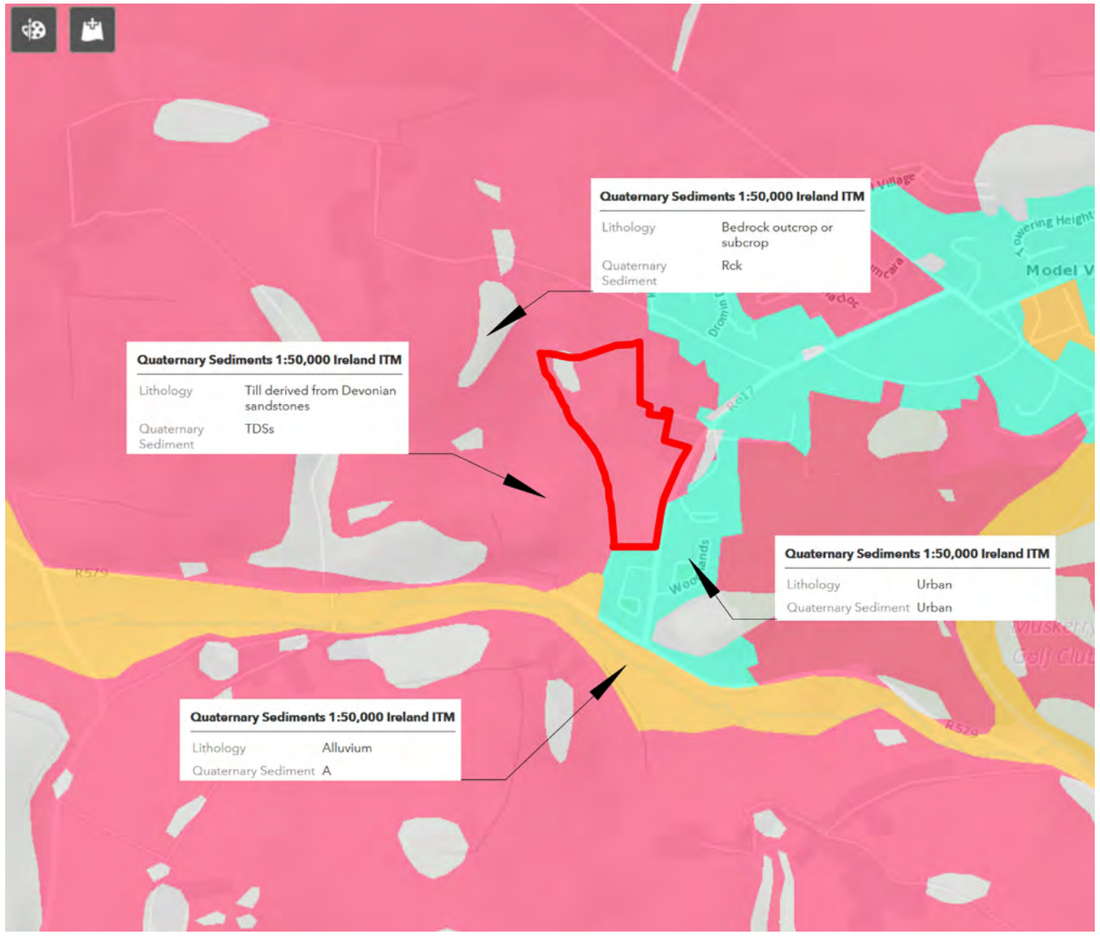

Figure 8.6: Near Surface Sediments

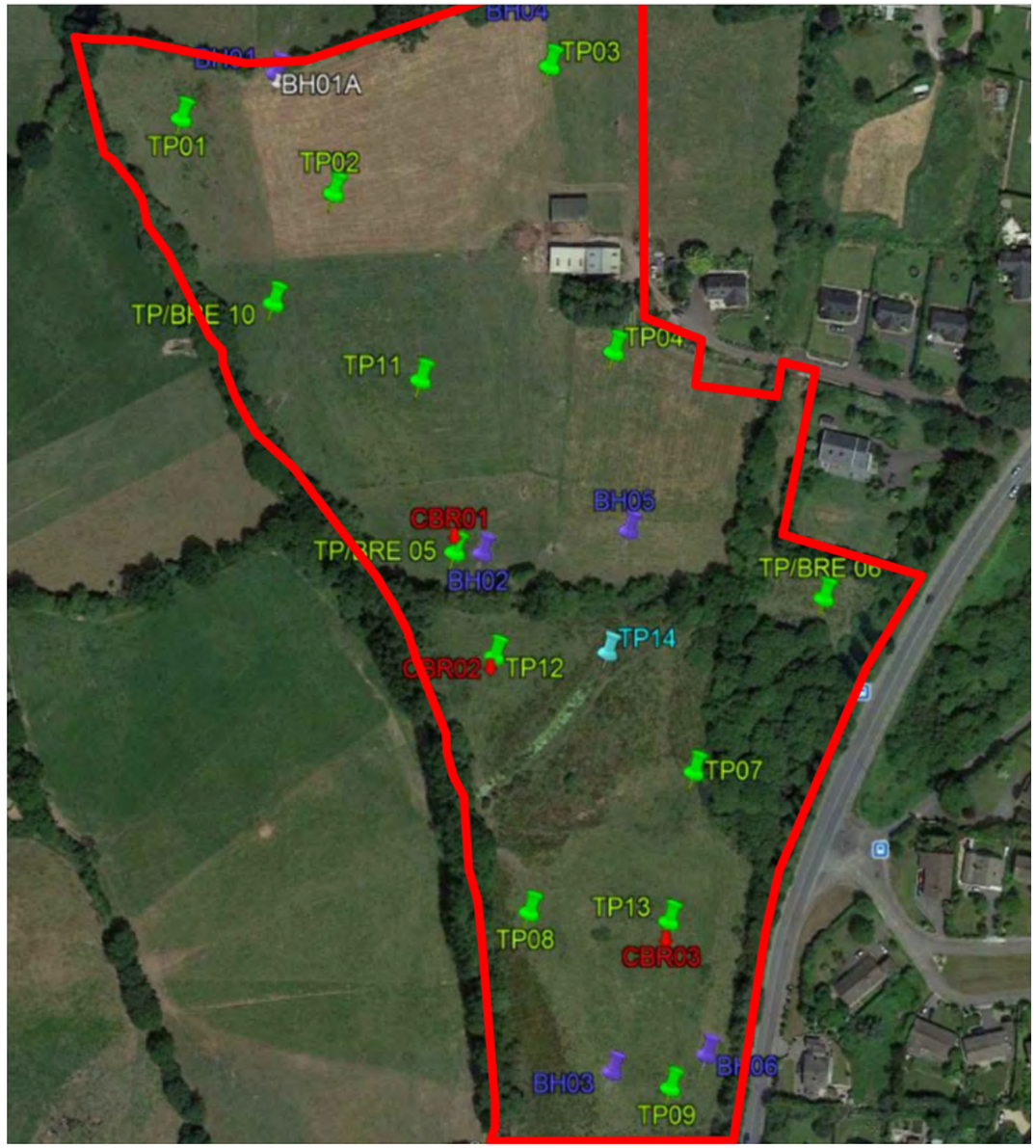

Figure 8.7: Site Investigation Points

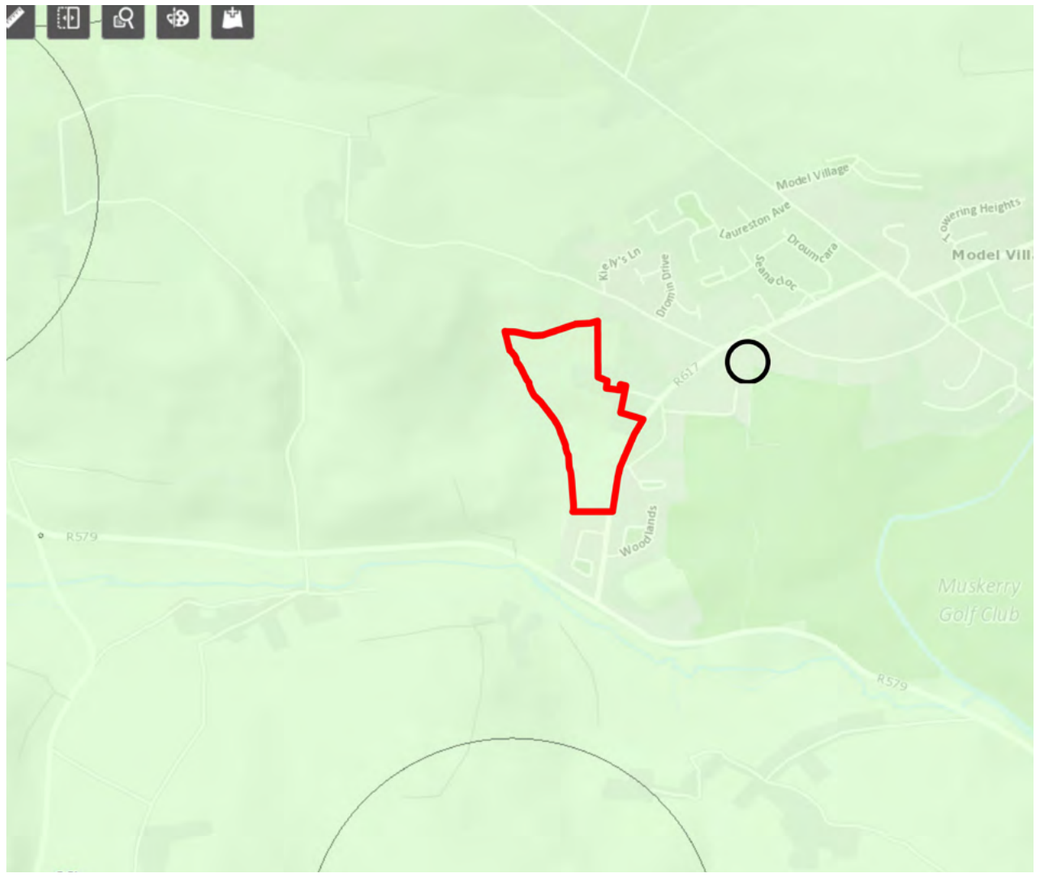

Figure 8.8: Local Wells

Figure 8.9: OPW PFRA Mapping

8.3.8 Groundwater Quality

The groundwater body was classified under WFD (2013-2018) as having an overall 'Good' status.

8.3.9 Flooding and Flood Risk

Indicative flood maps from the OPW PFRA (OPW 2012, Figure 8.9) show localised flooding on the western stream channel at the southern part of the site and along the Owennagearagh river channel. More detailed flood mapping produced for the OPW LeeCFRAM study (OPW 2012, Figure 8.10) and the Cork County Council MDLAP (CCC 2017, Figure 8.11) do not include the western stream and only indicate flooding along the Owennagearagh channel. Historic data indicates frequent flooding along the R579 and at the junction with the R617 (OPW 2021). There are no known records of flooding within the site itself.

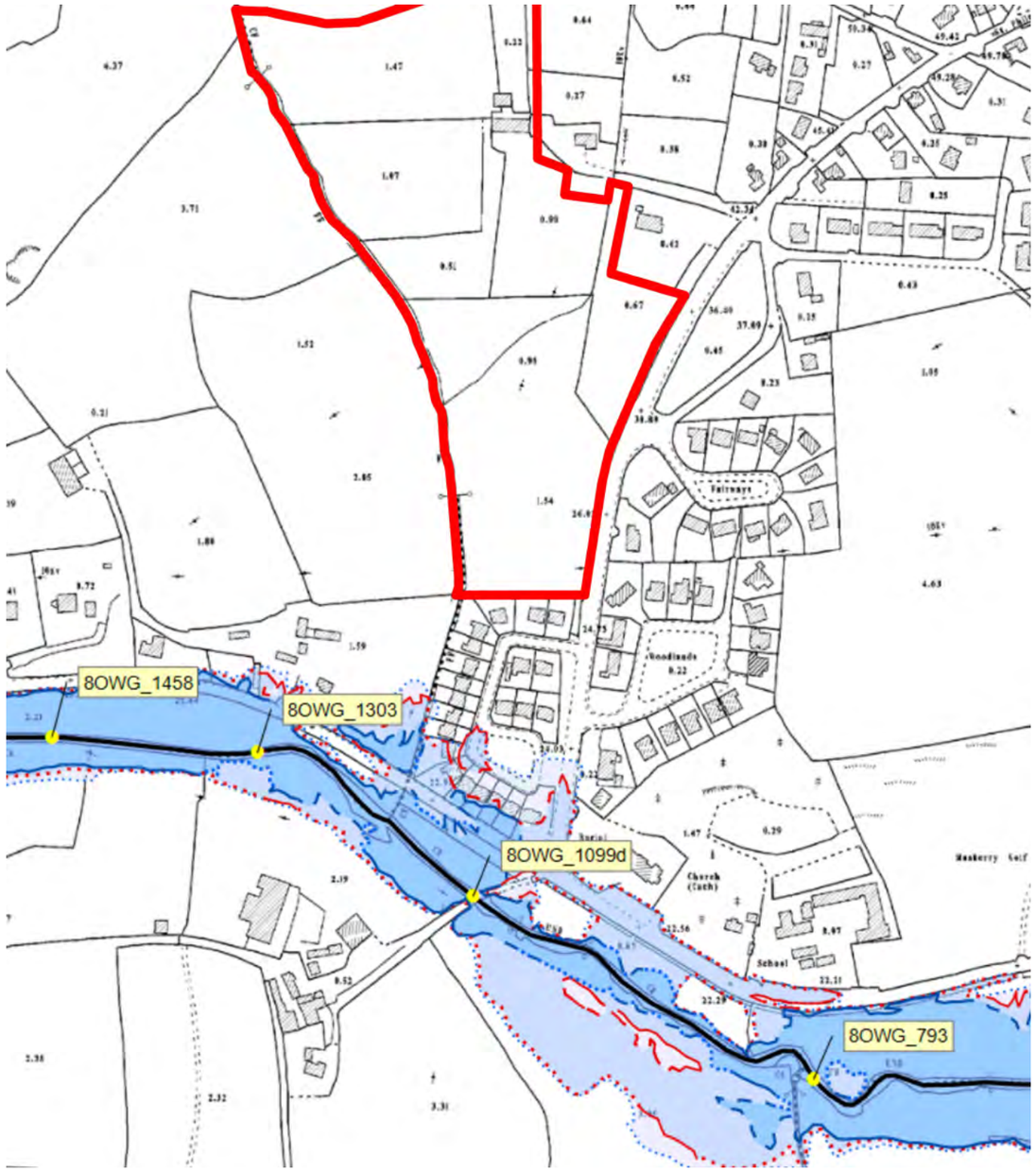

Figure 8.10: OPW LeeCFRAM Mapping

Figure 8.11: Cork County Council MDLAP Flood Zone Mapping

A site-specific flood risk assessment (SSFRA) (IHD 2021) has been completed in accordance with "The Planning System and Flood Risk Assessment Guidelines for Planning Authorities" (DEHLG 2009). (Attached as Appendix 8-1 of this EIAR), The current climate 1%AEP peak flow for the Owennagearagh river was calculated to be 36.7m^3/s while that for the western stream was 1.4m^3/s. Values for other return periods and climate change events (20% uplift) are included in Table 8.1.

Table 8.1: Peak Flood Estimates

Flood Event	Owennagearagh River Flow (m^3/s) to Currabeha access bridge		Western Stream Flow (m^3/s) to R579 culverts	
	Current Climate Scenario	Future Climate Change (CC) Scenario	Current Climate Scenario	Future Climate Change (CC) Scenario
1%AEP	36.74	44.09	1.40	1.68
0.1%AEP	55.81	66.97	1.86	2.23

Hydraulic modelling of peak floods in the Owennagearagh show inundation patterns (Figure 8.12) that are similar to those produced by the previously mentioned studies. The modelling has also shown that for the existing site terrain there is a local flood risk associated with high flows in the western stream. An extreme event in the western stream will not only inundate the lower, southern part of the site (Figure 8.13a-c) but will also pose a risk to dwellings in the Senandale housing estate and potentially result in flooding on the R617 to the junction with the R579. This flooding will be primarily overland conveyance rather than flood plain storage. There is no risk of flooding on the site associated with high flows in the Owennagearagh river as shown by Figure 8.12 though flood waters can back up into the drainage channel along the southern boundary. The levels in the Owennagearagh river together with the capacity limits of the culverts under the R579 impact the flood levels on the lands to the west of Senandale housing estate and adjacent to the southern part of the site.

Figure 8.12: Extent of inundation arising from 1%AEPCC (44m³/s) peak flow in the river and a nominal flow in the western stream (0.2m³/s)

Figure 8.13a: Flood mapping, existing site terrain, stream flow = 1%AEP (1.4m³/s), river flow = 10m³/s

Figure 8.13b: Flood mapping, existing site terrain, stream flow = 1%AEPCC (1.7m³/s), river flow = 10m³/s

Figure 8.13c: Flood mapping, existing site terrain, stream flow = 0.1%AEPCC (2.2m³/s), river flow = 10m³/s

8.4 THE PROPOSED DEVELOPMENT

The section below provides a summary of aspects of the proposed development that are relevant to this section of the EIAR. The water related features of relevance are:

- Surface and ground waters;
- Foul drainage;
- Water supply;
- Flood risk management.

8.4.1 Proposed Surface Water Drainage

Existing channels within the site area will be maintained to facilitate local drainage. These channels are indicated in Figure 8.14. Ponds (drainage basins) are included to improve biodiversity potential and to assist with flood water management (discussed later).

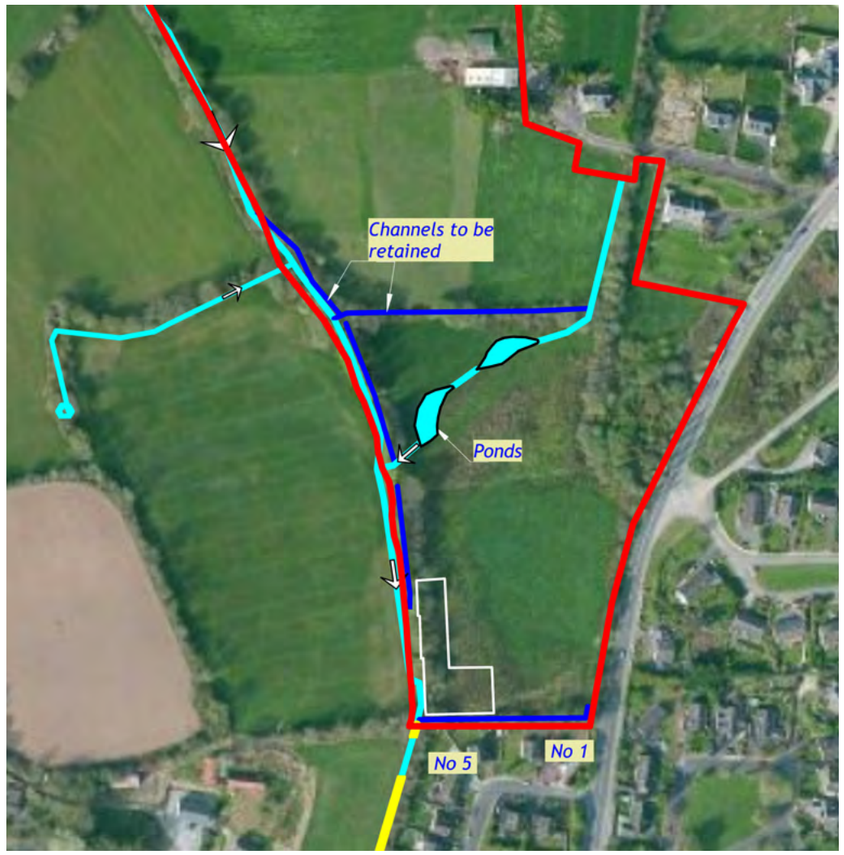

Figure 8.14: Open-channel Drainage within the Site

Runoff from the built-up areas and roads will be collected by the proposed surface storm water drainage network and discharged via attenuation into the municipal network on the R617. The SuDS design for the proposed development is based on dividing the site into six catchment areas in order to provide smaller local attenuation areas (Figure 8.15). The combined attenuated flows will then be discharged to the municipal network via a hydrocarbon interceptor. The various calculations are contained in the engineering design report (MHL 2021).

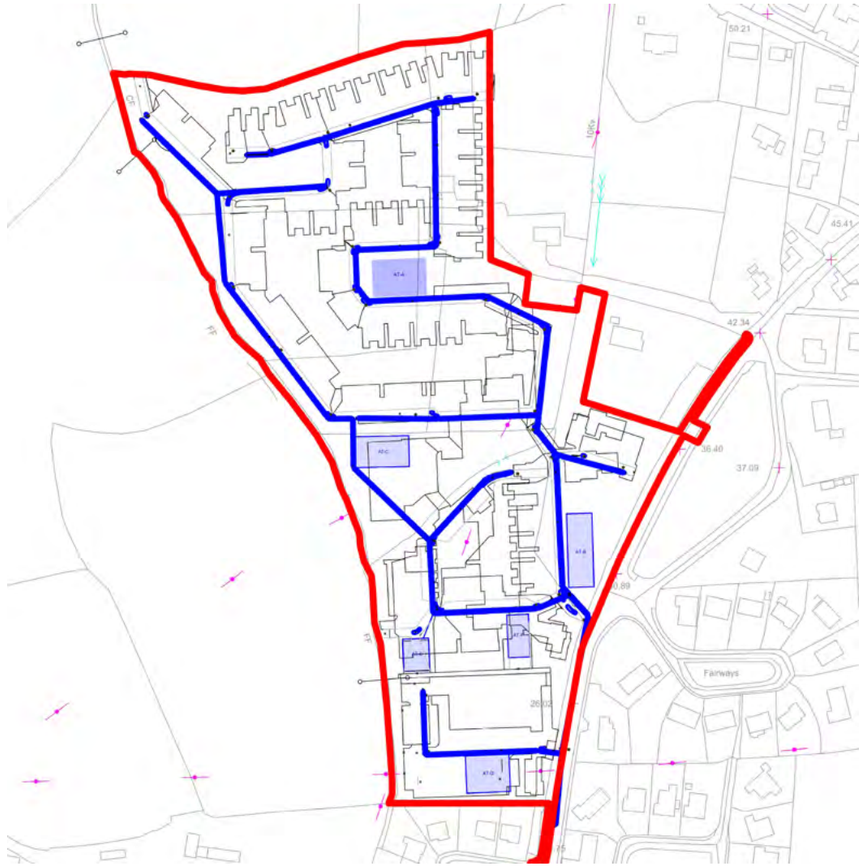

Figure 8.15: Surface Water Drainage and Attenuation within the Site

8.4.2 Proposed Foul Drainage

It is proposed that the foul drainage network will flow to the south eastern corner of the site, which is the lowest point of the development (Figure 8.16). At this location it will connect to the existing Irish Water (IW) sewer on the R617 from where it will flow to the IW pumping station located off the southern side of the R579, opposite St Senan's Church.

The proposed foul network within the site consists of 225mm diameter pipes. A pre-connection enquiry was submitted to IW. Confirmation of Feasibility was received on 16th October 2020 and Design Acceptance on 29th October 2020. All foul drainage will be constructed in accordance with the latest Irish Water Codes of Practice.

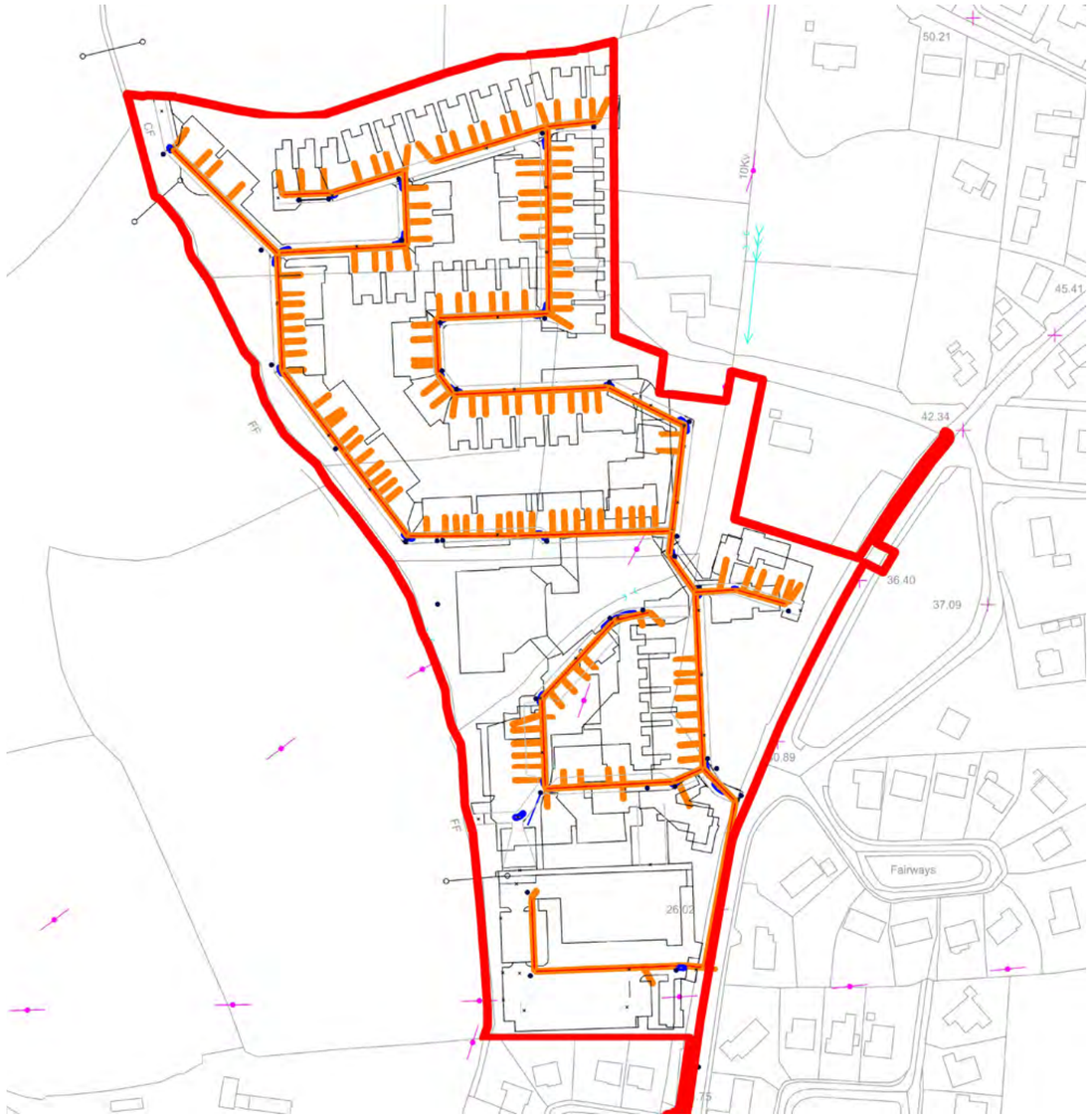

Figure 8.16: Foul Sewer Network within the Site

8.4.3 Proposed Water Supply

The site connection will be via a 150mm diameter link into the existing public watermain on the R617. Storage will be provided in each house via an attic tank to cater for possible shut downs in the system. A pre-connection enquiry was submitted to IW. Confirmation of Feasibility was received on 16th October 2020 and Design Acceptance on 29th October 2020. Hydrants will be provided on the ring main, subject to fire safety requirements.

8.4.4 Proposed Flood Water Management

Parts of the proposed development will occupy areas at risk of flooding as identified in the SSFRA. In order to compensate, manage and mitigate the flood risk on the southern part of the site and in the adjoining Senandale housing estate, it is proposed to provide flood water storage. This will be in the form of:

- Underground storage (1200m^3) at the south western corner of the site (Figure 8.17);
- Environmental biodiversity ponds that also act as open drainage basin storage (surface area = 600m^2, volume up to 300m^3) within the site (Figure 8.18).

The purpose of this storage is to limit peak flows in the western stream and allow retained waters to discharge at a reduced flow rate. The hydraulic modelling has shown (Figure 8.19a-c) that for the western stream extreme event, flood waters will be contained within the site storage and prevented from entering the Senandale housing estate and flowing onto the R617.

Figure 8.17: Underground Flood Water Storage Tank

Figure 8.18: Surface Pond/Drainage Basin Storage

Figure 8.19a: Flood mapping, developed terrain, stream flow = 1%AEP (1.4m³/s), river flow = 10m³/s

Figure 8.19b: Flood mapping, developed terrain, stream flow = 1%AEPCC (1.7m³/s), river flow = 10m³/s

Figure 8.19c: Flood mapping, developed terrain, stream flow = 0.1%AEPCC (2.2m³/s), river flow = 10m³/s

8.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

8.5.1 "Do-Nothing" Scenario

If the proposed development does not proceed, there will be no impacts to the existing surface water or groundwater hydrology of the site. Surface water run-off and stream flows would continue to discharge along their current pathways. Areas of the locality will be at risk of flooding during an extreme fluvial event. This is the 'current baseline' scenario. The terrain features are not expected to change significantly over time and at a future date the 'evolved baseline' is likely to include increased flood risk and locally larger inundation areas arising from higher rainfall intensity associated with climate change.

8.5.2 Assessment of Effects during Construction

The development has the potential to impact the local surface hydrology, groundwater and water quality during the construction period unless appropriate mitigation measures are effectively implemented. The construction works also have the potential to impact the water quality and WFD status of existing waterbodies which include the western stream, the Owennagearagh river and further downstream, the Shournagh river.

8.5.2.1 Hydrological Regime

Construction of the proposed development will require the removal of the topsoil and the softer underlying layers. The reshaping of the terrain may thus temporarily alter the hydrological regime. An increased runoff rate may be experienced once the underlying clay layers are exposed and the beneficial effects of the existing marshy surface layer are removed. Inappropriate site management could, in the absence of mitigation, potentially lead to the increased discharge of runoff to surface waters.

8.5.2.2 Water Quality

Surface water runoff from the construction phase may contain increased silt levels or pollution from the construction processes. The discharges of these contaminants, such as concrete and cement, have the potential to cause pollution. Accidental oil or fuel spillages or leaks from construction activities also have the potential to contaminate the surface and groundwaters, thereby reducing quality. Potential impacts that may arise during the construction phase, in the absence of mitigation, are:

- Surface water runoff during the construction phase may contain increased silt levels or become polluted by construction activities. This may potentially wash out into the western stream along the boundary or at the south western end of the site;
- Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling activities could result in spillages which could potentially contaminate surface and ground water;
- Concrete runoff, particularly discharge of wash water from concrete trucks, could lead to potential contamination of surface and groundwaters;
- Silt carried on the wheels of vehicles leaving the site could be carried onto the public road and into the existing municipal storm water drainage system.

8.5.2.3 Potential Impacts of Flooding

The site-specific flood risk assessment (IHD 2021) highlights how the low-lying part of the site and the adjoining Senandale housing estate could be protected from flood risk. The necessary works include the provision of surface and underground storage, local raising of the terrain and the construction of various flow control structures. The proposed surface water drainage infrastructure is also relevant.

Until such time as these individual items are in place a flood risk will be present for the southern part of the site, for some dwellings in the Senandale housing estate and for parts of the R617.

8.5.3 Potential Impacts During Operation

Once the development is completed the operational impacts on the water and hydrology aspects of the site will be minimal.

8.5.3.1 Hydrological Regime

Existing surface water drainage channels will be maintained in their current alignment/location and will convey local runoff and groundwater inflows. Two ponds (drainage basins) will be incorporated on one drainage channel and will assist with the management of flood waters. The increase in impermeable areas will result in higher runoff; however these will be collected by the surface water system, attenuated and returned to the Owennagearagh river system at the downstream side of the Currabeha access bridge.

8.5.3.2 Water Quality

The potential ongoing risks to surface and ground waters will be discharges from damaged foul waste pipes or accidental hydrocarbon leaks. The risks are considered to be low as all infrastructure will be installed to relevant specifications and pressure tested. All surface runoff from roofs and paved areas will be directed to the surface water system and will be routed through a hydrocarbon interceptor.

8.5.3.3 Flood Risk

The proposed works involve the raising of low-lying lands and the management of the western stream flood waters. Hydraulic modelling contained in the SSFRA shows that these works will remove the risk of extreme event flooding in the Senandale housing estate and on the R617 arising from the western stream (Figure 8.19a-c).

The site occupies about 8% of the existing western stream catchment area (0.9km^2) and surface water runoff will be attenuated and discharged into the existing municipal drainage system at greenfield rates. This will result in a small but beneficial reduction in peak flows reaching the Owennagearagh river and subsequently the downstream areas.

8.6 MITIGATION & MONITORING MEASURES

8.6.1 Construction Phase Mitigation

A project-specific Construction and Environmental Management Plan (CEMP) has been prepared by MHL Consulting Engineers (MHL 2021b) in line with relevant guidelines and is included as appendix 2-2 of this EIAR.

Caution will be exercised in the environmental management of the site to ensure that no potential contamination issues are experienced which may impact on the overall surface water or groundwater quality. General measures to be implemented will consist of:

- Surface water shall be directed to settlement ponds where topographically feasible. When this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated wastewater treatment plant if excessive build-up of surface water on site occurs;
- Bund structures (including/incorporating existing ditches) will be used on site to retain surface waters and to prevent runoff from the site. Bunds will be made up of adequately compacted material and visibly inspected during site audits to ensure they remain intact and functional;
- Daily checks of the surface water regime will be conducted and these will be logged and documented;
- Weather conditions and seasonal weather variations will be considered when planning the works. Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather;
- Drainage channels beside construction roadways to direct surface water to settlement areas and also allow for natural percolation to ground;
- Surface water gullies and drains shall be protected by silt fences;
- There will be minimal and short-term on site storage. Excess materials (soil, stones, and construction wastes) removed off site in an efficient manner;
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and construction plant re-fuelled via delivery trucks in specific bunded re-fuelling areas. Bunds will be made up of adequately compacted material with impermeable membrane and visibly inspected during site audits to ensure they remain intact and functional;
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a control and isolated manner, preventing the possibility of any pathway to a surface water source.

8.6.2 Operational Phase Mitigation

The development proposals include storm water attenuation, hydrocarbon interception and flood water management. Parking areas and driveways will be paved. All new pipe infrastructures are to be installed, pressure tested and CCTV inspected to the relevant codes of practice and guidelines. No likely significant impacts to sensitive water features have been identified. No additional mitigation measures are considered to be necessary for the operational phase.

The flood water storage and management system will be ensured as part of the overall maintenance program for the development. Inlet and outlet and flow structures will be designed and constructed to ensure that blockages do not occur, and waters can free flow at all times.

8.6.3 Monitoring

8.6.3.1 Construction phase monitoring

Proposed monitoring during the construction phase in relation to the water and hydrogeological environment are as follows:

- Adherence to the 'Construction and Environmental Management Plan';
- Monitoring of run-off from the site including pumping / dewatering activities;
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection, silt fences etc.);
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content);
- Implementation of a dust management programme during the construction phase of the development;
- Monitoring the cleanliness of adjacent road network and vehicle wheel wash facilities.

8.6.3.2 Operational phase monitoring

Once the development is complete the foul drainage system and potable water system will be vested to Irish Water who will then operate and maintain the network. Monitoring is not considered necessary.

The storm water drainage system will be taken in charge by the City Council. Ongoing monitoring is not considered necessary.

The flood water storage, control structures and adjacent stream channel will be maintained as part of the overall maintenance program for the development. Inspection of the stream channel for debris build-up or siltation will be conducted at regular intervals.

8.7 PREDICTED IMPACT FOLLOWING MITIGATION (RESIDUAL IMPACT)

8.7.1 Residual Effects During Construction

The site works are all of relatively short duration and temporary. The proposed excavations are shallow and not extensive and are unlikely to alter the site or local area groundwater regime. The flood risk is associated with relatively rare events. With the effective implementation of mitigation measures described previously, it is considered that any impacts on sensitive hydrological features in the study area arising from the works will be 'slight neutral effects' as per the EPA guidelines (EPA 2017).

8.7.2 Residual Effects During Operation

There are no potentially adverse impacts associated with the development. Infrastructure will be installed to relevant specifications and pressure tested. All surface runoff from paved areas will be collected and routed through a hydrocarbon interceptor before discharge. The increase in impermeable areas may result in a minor reduction in local groundwater infiltration. However, as the existing site is underlain by a shallow clay layer which already restricts infiltration the impact is not considered to be significant. It is anticipated that any long-term impact on surface/ground waters will be confined to 'slight neutral effects' as per the EPA guidelines (EPA 2017).

The development will raise the ground level in the low-lying parts of the site. The impacts on flood plain will be offset by the provision of flood water storage. The works provide an impermeable barrier and prevent western stream flood waters from reaching Senandale and the R617. It is anticipated that any long-term impact on flood risk arising from the development will be confined to 'moderate positive effects' as per the EPA guidelines (EPA 2017).

8.7.3 Climate Change

The proposed development is unlikely to have any appreciable impact on the climate. It provides low density residential accommodation in close proximity to existing municipal services and amenities.

The surface water drainage network has been designed to accommodate a 20% increase in rainfall intensity to allow for climate change. The flood risk assessment also allows for a 20% increase in peak flood values and additionally assesses the development proposals for the more extreme 0.1%AEPCC event.

8.8 CUMULATIVE IMPACTS

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 5, as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *Maintain and improve the quality of water resources and improve the management and sustainable use of these resources to comply with the requirements of the WFD.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a negative interaction with the status of EPO 5.

EPO 5 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *Maintain and improve the quality of water resources and improve the management and sustainable use of these resources to comply with the requirements of the WFD.*

EPO 11 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *Protect flood plains and areas at risk of flooding from inappropriate development.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 11 and does not define the interaction with EPO 5.

The cumulative impact assesses the overall implications the proposed development may have on the environment in cumulation with existing and potential development in the area.

The existing relevant development in the area comprise low density housing estates such as Senandale to the south, Fairways and Woodlands to the east and dispersed individual housing to the north. A larger built up area further north drains directly to the adjoining Shournagh river catchment. The increase in impervious areas arising from the SHD development is not considered to be significant when other existing local development is taken into consideration.

There are no recently permitted significant developments in the vicinity of the site. The adjoining lands to the west comprise some 6Ha and lie within the settlement Boundary of Tower as identified in the Blarney/Macroom Municipal District Local Area Plan (2017). Runoff from this site, if developed at some future date, will be attenuated to greenfield rates. There will be no additional hydraulic impact on the western stream channel. These lands lie on the opposing western flank of the stream valley and their development will have no impact on hydrology/hydrogeology within the SHD site. Equally development of the SHD site will not hydraulically impact these lands.

REFERENCE & BIBLIOGRAPHY

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PC 2019. Topographic Survey drawings by Precise Control Ltd (EIAR Appendix 8.2);

WFD 2021, WFD online mapping and data (www.wfdireland.ie);

CHAPTER NINE
Biodiversity

CHAPTER NINE
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CHAPTER NINE

9 Biodiversity

9.1 INTRODUCTION AND METHODOLOGY

The project is described in full in Chapter 2.0 of the EIAR. Information in relation to potential impacts on European sites is set out in detail in the Natura Impact Statement [NIS] submitted with the planning application. The existing biodiversity of the site and connectivity with the surroundings was assessed through a desktop study and site surveys including an ecological walkover, habitat survey, mammal survey and bat survey.

9.1.1 Desk Study

A desk study was carried out to collate ecological data collect from either the site at Cloghroe or in the immediate environs of the proposed project. These areas were viewed using Google Earth, Google maps[1] and Bing maps[2] (last accessed on 03/09/2021).

Whilst information in relation to potential impacts on European sites is set out in detail in the Natura Impact Statement [NIS] submitted with the planning application, for the sake of completeness, in terms of an overall ecological appraisal, the Environmental Protection Agency (EPA) mapping[3] system was used to identify any hydrological connection between the proposed development and European sites.

Locations and boundaries of all European sites within 15km of the proposed project were identified and reviewed using the NPWS online map viewer. Boundary shapefiles were also downloaded from this site to facilitate the preparation of project graphics.

Desktop information on relevant European sites were reviewed on the NPWS website, including the site synopsis for each SAC/SPA, the conservation objectives, the site boundaries as shown on the NPWS online map viewer, the standard Natura 2000 Data Form for the SAC/SPA which details conditions and threats of the sites, and published information and unpublished reports on the relevant European sites.

The National Biodiversity Data Centre (NBDC) was accessed for information on protected habitats and species known from the 2 km grid square W57S within which the site is located (last accessed 3rd September 2021). Bat records within 4km of the survey area were also reviewed using the NBDC website.

The conservation status of mammals within Ireland and Europe is evaluated using one or more of the following; Wildlife Acts, the Red List of Terrestrial Mammals (Marnell *et al*., 2009; 2019) and the EU Habitats Directive 92/43/EEC.

Birds of Conservation Concern in Ireland, No. 4 (BoCCI), published by BirdWatch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the island of Ireland (Gilbert *et al*., 2021) The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists; Red, Amber and Green; based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, Amber List are of medium conservation concern and Green List are not considered threatened (see Table 9.1).

1 https://www.google.ie/maps
2 http://www.bing.com/maps/
3 https://gis.epa.ie/EPAMaps/

The Ecological Appraisal submitted for planning approval in 2018 for the site to the east of the proposed site was reviewed to determine the state of the adjacent lands (Sexton, 2018).

The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects because of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).

It follows that, given the nature of the proposed Cloghroe SHD, the zone of influence will be limited to the development site and immediate environs as well as areas connected via hydrological pathways (ground or surface water) and landscape features such as hedgerows, treelines and watercourses.

Determining the potential for impacts and the zone of influence is based on the source-pathway receptor chain principle and involves assessing likely significant effects on ecological receptors within the zone of influence in relation to three pathways: -

- Surface water
- Groundwater
- Land & Air

9.1.2 Site Surveys

An ecological walkover survey of the site was conducted by an Atkins ecologist on the 23rd October 2020 and 25th August 2021. The purpose of the survey was to characterise and record the habitats and sensitive ecological receptors within and adjacent to the channels included in the study area. The site was visited on the 12th and 26th November 2020 to undertake terrestrial mammal survey work. Bat survey work was undertaken on site in May 2021 and September 2021. The river adjoining the site was also walked in September 2021 to check for signs of Otter (*Lutra lutra*).

A Phase 1 habitat survey was undertaken in line with published practice (Smith *et al*., 2011), with habitats classified in line with the Heritage Council Classification scheme (Fossitt, 2000). Dominant plant species in each habitat type were recorded. Plant nomenclature follows the Botanical Society of Britain and Ireland's List of Accepted Plant Names (Botanical Society of Britain and Ireland, 2007). Habitats were later mapped using MapInfo v16 GIS software.

Incidental sightings and signs of birds, mammals, invertebrates and amphibians were noted during the walkover survey to further evaluate the importance of the site to flora and fauna (in line with the approach set out in the *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2017) and *Guidelines for Ecological Impact Assessment* (CIEEM, 2018). The landscape value for bats was also considered (after e.g. Entwhistle *et al*., 2001; etc.). Trees or structures suitable for bat roosts within the development site and potential suitable bat foraging habitat were also noted during the daytime walkover of the Site.

Aerial photos and site maps assisted the ecological walkover survey. The location of the proposed project and the surrounding areas were viewed using Google Earth, Google maps and Bing maps. The EPA online mapviewer OSI Discovery series maps were used to locate watercourse networks and identify hydrological connectivity to larger rivers such as the River Shournagh or the River Lee.

Trail camera surveys to examine the possibility that a number of burrows might be used by badger was undertaken in between the 12th and 26th November 2021.

Bat Survey was undertaken by Greenleaf Ecology on behalf of Atkins. Walkover surveys of areas identified as potential roosting, foraging and commuting habitats during the desk top study were undertaken in May 2021. Potential bat habitat was assessed using the criteria outlined in Table 2.1 of the Bat Report (refer to Appendix 9.1). A detailed inspection of potential bat roosting sites (both trees and structures) was also undertaken on the 17th May 2021 and 27th September 2021. An assessment of bat activity was undertaken in May 2021 and September 2021. A total of 3 dusk activity surveys were completed and were undertaken on 10th May, 17th May and 27th September 2021. Each survey was conducted in appropriate weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (10°C).

In order to supplement the information gathered from the manual activity surveys, a passive monitoring system of bat detection was also deployed for this survey scheme (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for later analysis). Passive monitoring was completed from the 10th to 14th May 2021, inclusive and from the 22nd to 26th September 2021, inclusive, using the Anabat Express and Anabat Swift bat monitors. Weather conditions were mixed during the monitoring, with spells of heavy rain and low temperatures at night. One Anabat Express monitor and two Anabat Swift monitors were deployed for the survey and were positioned in hedgerows at three different locations. The detectors were set to record from approximately 30 minutes before sunset until sunrise and recorded for 7 nights at each location.

9.1.3 Evaluation of Ecological Receptors

The evaluation and impact assessment within this report has been undertaken with reference to relevant parts of the 2018 *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine* - developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). Consideration was also given to *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* published by the European Union in 2013.

The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known / published accounts of distribution and rarity where available, and professional experience: -

- International (European).
- National (Ireland).
- Regional (Munster).
- County (Cork)
- Townland (Cloghroe).
- Local (intermediate between the Site and Townland).

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and / or species rarity; the extent to which such habitats and / or species are threatened throughout their range, or to their rate of decline.

9.2 EXISTING ENVIRONMENT – DESKTOP STUDY

The site of the proposed development is located to the west of the R617 outside Tower, northwest of Cork City. The landscape consists of rural land on the outskirts of suburban development. The site is 7.3ha in area and comprises two large agricultural fields, associated land drains and an area of woodland along the R617.

9.2.1 Statutory Conservation Sites

9.2.1.1 European Designated Sites

The developer has also submitted a Natura Impact Statement (Atkins, 2021) to the Board in respect of the proposed development, which should be read in relation to potential impacts to European sites.

European designated sites comprise Special Areas of Conservation (SAC) and Special Areas of Protection (SPAs). This network of European designated sites is referred to as the Natura 2000 network. SACs are designated for their biodiversity value based on the presence of Annex I habitats and Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC).

The proposed site is not located within any European sites. The proposed site is hydrologically connected via the Dromin Stream, Currabeha River, River Shournagh and River Lee to the Cork Harbour SPA (004030). Cork Harbour SPA is located 17.65km downstream of the proposed site. Figure 3.1 displays the location of the SPA in relation to the proposed site.

Cork Harbour SPA is designated for the following species, in addition to the wetlands that support them:

- Little Grebe (*Tachybaptus ruficollis*)
- Great Crested Grebe (*Podiceps cristatus*)
- Cormorant (*Phalacrocorax carbo*)
- Grey Heron (*Ardea cinerea*)
- Shelduck (*Tadorna tadorna*)
- Wigeon (*Anas penelope*)
- Teal (*Anas crecca*)
- Pintail (*Anas acuta*)
- Shoveler (*Anas clypeata*)
- Red-breasted Merganser (*Mergus serrator*)
- Oystercatcher (*Haematopus ostralegus*)
- Golden Plover (*Pluvialis apricaria*)
- Grey Plover (*Pluvialis squatarola*)
- Lapwing (*Vanellus vanellus*)
- Dunlin (*Calidris alpina*)
- Black-tailed Godwit (*Limosa limosa*)
- Bar-tailed Godwit (*Limosa lapponica*)
- Curlew (*Numenius arquata*)
- Redshank (*Tringa totanus*)
- Black-headed Gull (Chroicocephalus ridibundus)

- Common Gull (Larus canus)
- Lesser Black-backed Gull (Larus fuscus)
- Common Tern (Sterna hirundo)

There are no Special Areas of Conservation (SACs) within 15km of the proposed project. However, Great Island Channel SAC (001058), which is over 19km from the Site, is connected via the River Lee and Cork Harbour. Great Island Channel SAC is designated for the following habitats: -

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]

The potential for impacts to European (Natura 2000) sites is fully considered in the accompanying Natura Impact Statement.

9.2.1.2 Natural Heritage Areas

Natural Heritage Areas (NHAs) are nationally designated sites, which are considered important for the habitat, species or geological heritage. NHAs are legally protected under the Wildlife Amendment Act 2000. Proposed Natural Heritage Areas (pNHAs) are sites that are of significance for wildlife and habitats, but which have not as yet been statutorily designated.

The Shournagh Valley pNHA (000103), is located approximately 2km downstream of the site via the Dromin Stream and the Currabeha River. The pNHA is designated for a corridor of riparian woodland. The area of woodland located closest to the proposed site is of an open structure with Beech and Ash (*Fraxinus excelsior*) being the dominant species, and a ground flora of Bracken, Bluebell and Greater Stitchwort (*Stellaria holostea*). Both Holly and Spindle (*Euonymus europaeus*) are spreading through this woodland. Wetter areas are dominated by Alder (*Alnus glutinosa*), willow, Ash and some tall oak.

Other nationally designated sites located within 5km of the proposed site include the following:

- Lee Valley pNHA (000094) – 2.5km straight-line distance;
- Blarney Castle Woods pNHA (001039) – 2.4km straight-line distance;
- Blarney Lake pNHA (001798) – 2.7km straight-line distance;
- Ardamadane Wood pNHA (001799) – 4.1km straight-line distance; and
- Blarney Bog pNHA (001857) – 4.6km straight-line distance.

These pNHAs are not hydrologically linked to the proposed site and are, therefore, outside the potential zone of influence of the proposed development, given the distance between the development site and those pNHAs, the absence of hydrological pathways, the absence of landscape connectivity, and the localised nature of the proposed development.

9.2.1.3 Nature Reserves

No nature reserves are located within the 5km of the proposed project.

9.2.1.4 Other non-statutory designated sites of ecological value

No other sites of ecological value are located within the 5km of the proposed project.

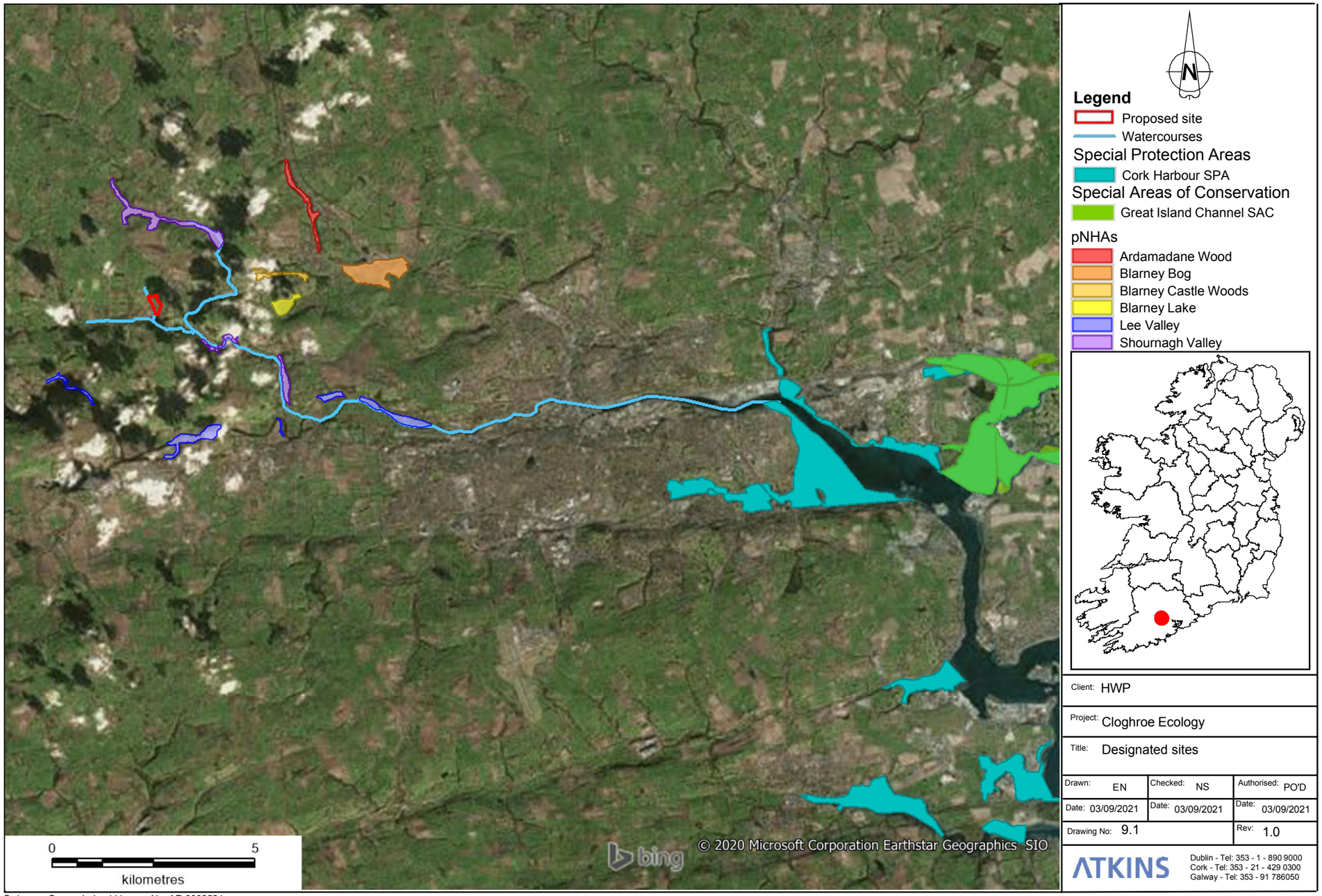


Figure 9.1: Designated Sites.

9.2.2 Rare and Protected Flora and Fauna

The NBDC database was searched for records within the 2 km grid square W57S within which the Site is located. The records returned are presented in Table 9.1 below. None of these records occurred within the proposed site.

Table 9.1 NBDC Rare and Protected Flora and Fauna.

Species	Date of record	Protected Status	Source
Harlequin Ladybird (*Harmonia axyridis*)	14/07/2021	Invasive Species	Ladybirds of Irleand
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*)	11/04/2021	Threatened Species: Near threatened	Bees of Ireland
Eurasian Badger (*Meles meles*)	31/12/2013	Protected Species: Wildlife Acts	Protected Species: Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	31/12/2007	Protected Species: Wildlife Acts	Protected Species: Wildlife Acts
European Otter (*Lutra lutra*)	03/01/2016	EU Habitats Directive Annex II & Annex IV	Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	19/09/2008	EU Habitats Directive Annex IV	Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	16/06/2007	Protected Species: Wildlife Acts	Protected Species: Wildlife Acts

The Large Red Tailed Bumble Bee record was from ca. 1km northwest of the site (W569750).

A data request was also submitted to NPWS for information on rare and protected plant and animal species within the 10km grid square within which the site is located (W57); a response was received in November 2020. Records included badger (*Meles meles*), otter (*Lutra lutra*), Irish hare (*Lepus timidus hibernicus*), Irish Stoat (*Mustela erminea* subsp. *hibernica*), Eurasian Pygmy Shrew (*Sorex minutus*) and Common frog (*Rana temporaria*), though none of the records are from within the proposed development site.

A number of rare plants were noted: - Small Cudweed (*Filago minima*; 1893), Lesser Snapdragon (*Misopates orontium*; 1990), Sharp-leaved Fluellen (*Kickxia elatine*; 2014) and Mudwort (*Limosella aquatica*; 2013) (with the year of the most recent observation indicated). None of the records are from within the proposed development site or its immediate environs.

The proposed site is located in an area with high suitability for bats (Lundy *et al*., 2011)[4], particularly Brown long-eared bat (*Plecotus auratus*), Soprano pipistrelle (Pipistrellus pygmaeus), and Whiskered bat (*Myotis mystacinus*) which utlise the wooded tracts along the Currabeha and Shournagh Rivers. The western margin of the site, with the dense treeline and the Dromin Stream along with the wet nature of the southern field, provides attractive foraging grounds for these species and good connectivity to the wooded tracts of the River Shournagh.

9.2.3 Other Ecology Studies

Based on the 2018 Ecological Assessment of the neighbouring site (Sexton, 2018), located on the western bank of the Dromin Stream, the lands in this site are dominated by GA1 improved agricultural grassland lined by treelines (WL2) and earth banks (BL2). There are two small areas of scrub (WS1) comprising holly, as, sycamore, brambles and gorse. Other habitats recorded included a stone wall (BL1), drainage ditch (FW4) and lowland depositing stream (FW2). The treelines and stream were evaluated as being of Local ecological value, with all other habitats were assessed as important at a Site level. No rare plant species or invasive plant species were recorded on site. Mixed broadleaved (WD1) woodland is located south of the R579.

Signs of mammals were noted along the field boundaries which it was noted could be either badger, fox (*Vulpes vulpes*) or rabbit (*Oryctolagus cuniculus*); but no badger setts or burrows were located. The drainage ditches on site were noted as potentially providing suitable habitat for Common frog. Bird species noted on site are discussed below. The study did recommend completion of a bat survey and a mammal survey.

The site was resurveyed in 2021 (Greenleaf Ecology, 2021). This included a phase 1 habitat survey and survey of invasive species (19th July 2021); survey for terrestrial mammals such as badger; and bats surveys (19th to 24th July 2021). A survey of trees potential to be bat roosts was undertaken on the 19th July 2021. Two of the passive monitors erected were along the western boundary of the site which is the subject of this application.

No rare plant species or invasive plant species were recorded on site in 2021. No trees within the site were categorised as potential bat roosts; two trees were identified as having moderate suitability; one tree as having low suitability. These are not on the boundary of the site which is the subject of this application. Activity surveys recorded Soprano pipistrelle, Common pipistrelle and Leisler's bat on site in July 2021; with Common pipistrelle being the most commonly recorded.

The passive monitors recorded five species of bat; namely, Soprano pipistrelle, Common pipistrelle, Leisler's bat, Daubenton's bat and Natterer's bat. Common pipistrelle was again the most recorded on two of the monitors; with Soprano pipistrelle being the most common on the third passive monitor. Daubenton's bat was noted close to the Dromin Stream; while there was only a single record of Natterer's bat.

No signs of badger were recorded. No evidence of otter was recorded on the site or Dromin Stream (Greenleaf Ecology, 2021).

9.2.4 Invasive Species

While non-native invasive species are not an ecological feature of value, they do need to be considered as a potential ecological constraint. The European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 detail the legal context regarding the introduction and dispersal of certain non-native invasive plants and animals. Section 49 and 50 of the Regulations specify that it is an offence to disperse or spread any plant species or associated vector material listed on the 3rd Schedule of the Regulations.

There are no records for invasive plant species such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) or Giant Hogweed (*Heracleum mantegazzianum*) within the site, or in the vicinity. As noted, no invasive plant species were recorded on the neighbouring site (Greenleaf Ecology, 2021).

9.2.5 Existing Bat Data

The review of existing records of bat species in the area of the site indicates that six of the ten known Irish species of bat have been recorded within a 4km radius of the proposed site (last checked September 2021). These bats include pipistrelle species (*Pipistrellus pipistrellus sensu lato*) and soprano pipistrelle (*P. pygmaeus*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*) and Natterer's bat (*M. nattereri*) as shown in Table 9.2 below. Of these species, Daubenton's bat has been recorded roosting in a building located c.3.7km to the east of the site.

[4] http://maps.biodiversityireland.ie/metadata/Landscape_Conservation_for_Irish_Bats_metadata(v.3).pdf

Table 9.2 NBDC bat records from within a 4km radius of the proposed site.

Common Name	Scientific Name	Present	Known Roost	Date of Last Record
Pipistrelle sp.	*Pipistrellus pipistrellus sensu lato*	√		25/07/2014
Soprano Pipistrelle	*Pipistrellus pygmaeus*	√		25/07/2014
Nathusius's Pipistrelle	*Pipistrellus nathusii*			
Leisler's Bat	*Nyctalus leisleri*	√		29/07/2013
Brown Long-eared Bat	*Plecotus auratus*	√		01/08/2006
Daubenton's Bat	*Myotis daubentoniid*	√	√	07/08/2014
Whiskered Bat	*Myotis mystacinus*			
Natterer's Bat	*Myotis nattereri*	√		01/08/2006
Lesser Horseshoe Bat	*Rhinolophus hipposideros*			
Brandt's Bat	*Myotis brandtii*			

The bat landscape association model (Lundy *et al*., 2011) suggests that the proposed site is part of a landscape that is of high suitability for bats including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle, brown long-eared, Leisler's, Daubenton's, natterer's and whiskered bat. The proposed site and its environs are of low suitability for Nathusius' pipistrelle and is outside of the core distribution range for lesser horseshoe bat (*Rhinolophus hipposideros*) (Roche *et al*., 2014).

A bat assessment was undertaken for a proposed residential development at St. Ann's Hydro Hill at Tower (Abbott, I., 2017), located c.1.4km to the north-east of the proposed site at Cloghroe. Eight species of bat were recorded during the course of the site surveys; common pipistrelle, soprano pipistrelle, Leisler's, brown long-eared, whiskered, natterer's, Daubenton's and a single occurrence of lesser horseshoe bat. Evidence of minor bat roosts of brown long-eared bat and whiskered bat in stone ruins on site was found, indicating use as small day-time roost and as a 'night roost'. These species may also roost adjacent to the site. Summer roosts of common pipistrelle, soprano pipistrelle and Leisler's bat also occur just off-site to the west, within close vicinity, with the exact roost locations remaining unknown. Natterer's bat social calls associated with roost behaviour were recorded at a veteran Monterey Pine on site.

As noted above, bat surveys undertaken on the neighbouring site in July 2021 recorded evidence of Soprano pipistrelle, Common pipistrelle, Leisler's bat, Daubenton's bat and Natterer's bat. No trees within the site were categorised as potential bat roosts; two trees were identified as having moderate suitability; one tree as having low suitability.

9.2.6 Aquatic Ecology

The first order Dromin Stream (EPA code: IE_SW_19S010500) flows from north to south along the western side of the site. The stream rises approximately 250m north of the site, flows along the entire western boundary and enters the Currabeha River approximately 180m downstream of the site. The Currabeha River enters the River Shournagh a further 1.2km downstream, to the east of the site. The site is located in the Lee [Cork] subcatchment (Lee[Cork]_SC_060; Subcatchment Id 19_8). The closest hydrologically connected record of water quality is Q-value records of the Shournagh upstream and downstream of the confluence with the Currabeha River. These records date from 2017 and 2019, respectively, and assign a Q-value of 4-5 (High) to both sites. Meanwhile, the Dromin Stream, Currabeha River and River Shournagh have been assigned Moderate Status under the Water Framework Directive. A number of drains flow through the site to join the Dromin Stream to the west.

9.3 FIELD SURVEY RESULTS

9.3.1 Habitats

Semi-natural habitats are illustrated on Figure 9.2 (Habitat Map). This should be read in association with the following drawings and assessment from the landscape assessment of the site which identifies all trees groups / vegetation for removal and retention. As set out below, 4 no. potential bat roosts have been identified on the site, however, it should be noted that none of these four potential bat roosts will be removed. A series of photographs of the site are also included in the Landscape chapter of the EIAR. Photographs of potential bat roosts are included in Section 9.3.6.

- Drawing L102 – Existing Vegetation
- Drawing L103 – Tree Retentions and Removals
- Drawing L104 – Arboricultural Impact Assessment. Tree Cluster Removal
- Drawing L105 – Green Infrastructure

L104 in particular illustrates the potential impacts associated with the removal of clusters of trees as shown on Drawing L103. In addition, the approach to Green Infrastructure, which is informed by the identification of semi-natural habitats on site, is set out in Drawing L105. This includes illustration of vegetative corridors, central wetland (including its role in amenity and drainage) as well as area of proposals for retention and enhancement of damp and dry woodland habitat. Areas of woodland can be summarised as follows: -

- Cluster 1 - comprises non-native Sitka Spruce (Picea sitchensis) and fir (Abies sp.) on the southeastern corner of the site.
- Cluster 2 - comprises willow which appear to have colonised a disturbed piece of ground at one distinct point (likely associated with historic R617 road improvements) (Salix sp.) on the eastern side of the site.
- Cluster 3 – an area of mixed woodland including Sycamore (Acer pseudoplatanus), Poplar (Populus nigra) and willow (Salix caprea) which is to be removed to facilitate construction of the storm water tank on the eastern side of the site.
- Cluster 4 – wet willow woodland, a small section to the west of which is to be removed.
- Cluster 5 – Non-native Monterrey cypress (Hesperocyparis macrocarpa) to be removed.

This illustrates the location of hedgerows, treelines, woodland and notable trees. Trees which will be retained are illustrated on Drawing No. L103.

9.3.1.1 Improved agricultural grassland (GA1)

This habitat was recorded widely across the proposed development site and consisted of a number of large fields on the northern side of the proposed development site. These paddocks were separated by post and wire fencing. On the southern side of the proposed development site, the habitat was recorded on the higher, more free draining areas near the wet grassland habitat.

Species present included abundant perennial rye grass (*Lolium perenne*) along with frequent meadow grass (*Poa* sp.) and occasional white clover (*Trifolium repens*). Broad-leaved dock (*Rumex obtusifolius*), nettle (*Urtica dioica*), dandelion

(*Taraxacum officinale* agg.), common ragwort (*Senecio jacobaea*), soft rush (*Juncus effusus*), creeping bent grass (*Agrostis stolonifera*) and creeping buttercup (*Ranunculus repens*) were recorded rarely. One paddock on site contained grazing cattle and another was undergoing active manure application. Sward height in the habitat varied between 5 and 10 cm. This habitat is of negligible ecological value.

Plate 9.1 Improved Agricultural Grassland within proposed site.

9.3.1.2 Wet grassland (GS4)

This habitat was recorded in the lower lying areas on the southern side of the proposed development site. Soft rush was abundant along with creeping buttercup (*Ranunculus repens*). Creeping bent grass (Agrostis stolonifera) and perennial rye grass (*Lolium perenne*) were recorded frequently. Nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), common ragwort (*Senecio jacobaea*), Yorkshire fog (*Holcus lanatus*), greater birds foot trefoil (*Lotus pedunculatus*) and wavy bittercress (*Cardamine flexuosa*) were recorded rarely. The very wet areas adjacent to the drainage ditch and stream along the southern boundary also contained common sorrel (*Rumex acetosa*), marsh thistle (*Cirsium palustre*) and bog stitchwort (*Stellaria alsine*), all of which were recorded rarely.

The habitat showed evidence of poaching and grazing by cattle with standing water in the poached areas. The ground conditions were wet. Rushy tussocks were c. 0.5 - 0.75 m high with the grassy areas between having a sward height of c. 5 - 10 cm. This habitat would be of local importance for invertebrate communities (2 no. common darter dragonflies (*Sympetrum striolatum*) were observed). A adult Common frog (*Rana temporaria*) was recorded in wet grassland at the southern end of the site. A number of Snipe were also flushed during survey work. Wet grassland is considered as being of local importance (higher value).

Plate 9.2 Wet grassland within the proposed site.

9.3.1.3 Dry meadows and grassy verges (GS2)

This habitat was recorded along the eastern site boundary under the treeline adjacent to the public road (i.e. outside the site). The species present included frequent cocksfoot (*Dactylis glomerata*), ox-eye daisy (Leucanthemum vulgare), ribwort plantain (*Plantago lanceolata*) and winter heliotrope (*Petasites fragrans*). Dandelion (*Taraxacum officinale* agg.), red fescue (*Festuca rubra* agg.) were recorded occasionally. Creeping buttercup (*Ranunculus repens*) and common hogweed (*Heracleum sphondylium* ssp. *sphondylium*) were recorded rarely. The grass bank had been recently strimmed, and the sward height was c. 5 - 10 cm.

This habitat can provide important linear habitat for pollinators, if managed correctly[5]. While the habitat is frequently available in rural settings, it is becoming less common in suburban areas. Therefore, given the continued development in the Cloghroe area, this habitat is considered as being of local importance (higher value).

Plate 9.3 Dry meadows and grassy verges along roadside adjoining the site.

9.3.1.4 Eroding/Upland Stream (FW1)

A stream recorded running downhill from north to south along the western boundary of the proposed development site. This watercourse is a first order stream called the Dromin Stream on the EPA mapping website[6]. This stream flows to the third order Currabeha River south of the proposed development site and is eventually connected to the River Lee via the Shournagh River.

The stream consists of both a single and often double channel which flows on either side of a boundary bank on the western side of the proposed development site. The stream has c. 1m wetted width, is fast flowing and the bed consists primarily of cobble and gravel sized clasts along with a minor fraction of fine sediments. The depth varied from 5-15 cm. The stream is shaded by the mature treeline growing overhead.

A range of species were recorded along the banks of the stream including frequent ivy (*Hedera hibernica*) and bramble (*Rubus fruticosus* agg.) along with occasional wild angelica (*Angelica sylvestris*), meadowsweet (*Filipendula ulmaria*) and opposite leaved golden saxifrage (*Chrysosplenium oppositifolium*). Wood avens (*Geum urbanum*) were rarely recorded.

Given the hydrological linkage and linear corridor provided by the stream within the local area, this habitat is considered as being of local importance (higher value).

Plate 9.4 Dromin Stream (FW1) which runs along the western boundary of the site.

9.3.1.5 Drainage Ditch (FW4)

This habitat was most frequently recorded on the low-lying southern portion of the proposed development site with drains recorded along the southern boundary, along the internal hedgerows/treelines and within the wet grassland field, running from east to west, eventually apparently draining to the Dromin stream on the western boundary.

The drains were c. 0.75 - 1 m wetted width and c. 5-10 cm deep with a muddy bed. The water was near stagnant or slow flowing. In-stream and marginal vegetation consisted of occasional floating sweet-grass, brooklime, common duckweed

5 Pollinator-friendly management of: Transport Corridors. All-Ireland Pollinator Plan, Guidelines 9. National Biodiversity Data Centre Series No. 20, Waterford. September 2019. https://pollinators.ie/wp-content/uploads/2019/10/Transport-Corridors_actions-to-help-pollinators-2019-WEB.pdf

6 https://gis.epa.ie/EPAMaps/ (accessed 29/10/2020).

(*Lemna minor*), bog stitchwort (*Stellaria alsine*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effusus*), creeping bent grass (*Agrostis stolonifera*), wild angelica (*Angelica sylvestris*) and starwort (*Callitriche* sp.).

This habitat contributes to the overall hydrology of the site – providing conditions required for the wet grassland habitat present. It also provides important habitat for invertebrates and potentially amphibians. Therefore, this habitat is considered as being of local importance (higher value). Common darter (*Sympetrum striolatum*) was recorded on site during the August 2021 site visit.

Plate 9.5 Drain (FW4) within the proposed site (left – October 2020; right - August 2021).

9.3.1.6 Hedgerow (WL1)

This habitat was recorded within the proposed development site, often in association with treeline habitat, along the northern boundary of the site and the internal field boundary in the centre of the site.

The hedgerow habitat of the internal field boundary consisted of low earth and stone bank vegetated by frequent willow (*Salix* sp.) and bramble (*Rubus fruticosus* agg.). Gorse (*Ulex europaeus*) was recorded occasionally. Hawthorn (*Crataegus monogyna*) and dog rose (*Rosa canina* agg.) were recorded rarely. Bramble was frequently recorded. Pedunculate oak (*Quercus robur*) and birch (*Betula* sp.) trees were recorded occasionally.

The hedgerow along the northern boundary of the proposed development site consisted of stone and earth bank c. 1 m high with frequent hawthorn and bramble along with occasional nettle (*Urtica doica*), gorse and soft shield fern (*Polystichum setiferum*). Blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*), crab apple (*Malus sylvestris*), foxglove (*Digitalis purpurea*) and dog rose were rarely recorded. This hedgerow showed no evidence of recent management with most thorny shrubs growing as trees interspersed with gaps, which were less frequently recorded in the western end. The thorny species grew to c. 6-10 m high. Mature ash and oak trees were recorded on the eastern and western sides of this hedgerow feature and grew to c. 20m high.

This habitat provides an important linear habitat within the local area. Given the diversity of flowering and fruiting species, these hedgerows are important food sources for bird and pollinator species. While the habitat is frequently available in rural settings, it is becoming less common in suburban areas. Therefore, given the continued development in the Cloghroe area, this habitat is considered as being of local importance (higher value).

Plate 9.6 Hedgerow (WL1) within proposed site.

9.3.1.7 Treeline (WL2)

The treeline habitat was recorded at several locations within the proposed development site boundary.

A Sitka spruce dominated treeline formed part of the southern side of the eastern boundary. Willow (*Salix* sp.) grew abundantly on the western side of this treeline along with frequent bramble (*Rubus fruticosus* agg.) and ivy (*Hedera hibernica*). This treeline grew to 8-10 m high. The central and northern portions of this treeline was composed of frequent poplar and occasional oak (*Quercus* sp.) and sycamore (*Acer pseudoplatanus*) which was recorded rarely. The poplar trees grew to c. 10-15 m high with the other semi mature trees reaching 6-10m.

The western boundary of the proposed development site was also treeline habitat which contained occasional mature pedunculate oak (*Quercus robur*) as well as frequent grey willow (*Salix cinerea*). Holly (*Ilex aquifolium*), gorse (*Ulex europaeus*) and hawthorn (*Crataegus monogyna*) were recorded occasionally below the mature trees. A mature poplar (*Populus* sp.) treeline was located west of this treeline forming a double treeline but was located outside the proposed development site boundary.

A mature/semi mature treeline was recorded south of an existing dwelling on the eastern side of the proposed development site and consisted of frequent birch along with occasional ash (*Fraxinus excelsior*), sycamore and poplar. This treeline grew to c. 10-15 m high.

Part of the southern boundary of the site consisted of several mature pedunculate oak trees forming a short treeline. These trees grew to c. 20m high. The feature continued to the west in the form of a bushy willow dominated treeline which grew to c. 8-10m high.

A short section of mature poplar and cypress treeline acting as a shelter belt was recorded on the south side of the farm yard on the proposed development site boundary.

This habitat provides an important linear habitat within the local area. While the habitat is frequently available in rural settings, it is becoming less common in suburban areas. Therefore, given the continued development in the Cloghroe area, this habitat is considered as being of local importance (higher value).

Refer to the accompanying landscape package, including the Existing Vegetation figure which highlights desirable trees for protection and retention along the field boundaries.

Plate 9.7 Treeline (WL2) within proposed site.

9.3.1.8 Mixed broadleaved woodland (WD1)

This habitat was recorded on the eastern side of the proposed development site. The habitat consisted of willow (*Salix* sp.) dominated woodland growing on the top and side slopes of a raised area of land adjacent to the public road. The separate wet willow woodland habitat was located on the lower level adjacent which was c. 2-3m below the level of the road.

The drier slopes and upper level of the woodland contained willow (*Salix* sp.) which was dominant, with mature and semi-mature single and multi-stemmed willow trees. Sycamore (*Acer pseudoplatanus*) and alder (*Alnus glutinosa*) were recorded rarely (single trees). The field layer was scrubby in nature and consisted of abundant bramble (*Rubus fruticosus* agg.) along with frequent gorse (*Ulex europaeus*), nettle (*Urtica doica*) and ivy (*Hedera hibernica*). Creeping buttercup (*Ranunculus repens*), wood avens (*Geum urbanum*), herb-robert (*Geranium robertianum*), harts-tongue fern (*Phyllitis scolopendrium*), soft shield fern (*Polystichum setiferum*), winter heliotrope (*Petasites fragrans*) and creeping bent grass (*Agrostis stolonifera*) was recorded occasionally. Broad-leaved dock (*Rumex obtusifolius*) was recorded rarely. The was evidence of recent access by grazing cattle.

Historic aerial photography indicates that this area of woodland has developed from an area of disturbed ground in 1995 which appears to have undergone successional change from scrub to willow woodland over the past 25 years according to the aerial photographic evidence. It is understood to have developed after works on the regional road.

This habitat provides an important ecological feature for mammals within the local environment. With continued development in the area, this habitat will provide an important ecological corridor. Therefore, this habitat is considered as being of local importance (higher value).

Woodland clusters are also described in detail in the Landscape chapter of the EIAR and accompanying drawings.

Plate 9.8 Mixed (broadleaved) woodland (WD1) within the proposed site.

9.3.1.9 Wet willow-alder-ash woodland (WN6)

The lower level of the willow dominated woodland close to the eastern side of the proposed development site was wetter with saturated, water-logged ground conditions and standing water recorded around the edge of the woodland. Creeping bent grass (*Agrostis stolonifera*), creeping buttercup (*Ranunculus repens*), marsh bedstraw (*Galium palustre*) and fool's water cress (Apium nodiflorum) were recorded frequently. Common chickweed (Stellaria media), watercress (*Nasturtium officinale*) and marsh thistle (*Cirsium palustre*) were recorded occasionally. Wild angelica (*Angelica sylvestris*) was recorded rarely. Starwort (*Callitriche* sp.) were recorded occasionally on the muddy edges of standing water. The trees were c. 4-6 m high and generally multi-stemmed with access to livestock and some evidence of poached ground as a result. Small areas of standing water were recorded around the base of the raised area and these contained locally dominant common reed (*Phragmites australis*).

Historic aerial photography indicates that this area of woodland has developed from an area of disturbed ground in 1995 which appears to have undergone successional change from scrub. It is understood to have developed after works on the regional road.

Correspondence with Annex I 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) has been considered. Given the structure, origin of this woodland, and that it is not located on alluvial deposits, it is not considered to be representative of the annexed habitat type, rather an area of wet woodland on lands with impounded drainage. The Annex I habitat is generally well drained and infrequently inundated, while the wet woodland present at the proposed site, shows signs of permanent inundation. However, this habitat is an important component of the overall hydrological regime of the site and provides a rare resource of its kind in the surrounding area and is therefore considered as being of local importance (higher value). [see also photographs included in the Landscape chapter of the EIAR].

Plate 9.9 Wet willow woodland (WN6) within the proposed site.

9.3.1.10 Scrub (WS1)

This habitat was recorded in the form of a bramble (*Rubus fruticosus* agg.) dominated scrub growing on the slope leading from ground level within the proposed development site up to the road level. A small linear section of gorse (*Ulex europaeus*) dominated scrub was recorded within the wet grassland habitat on the low-lying southern side of the site.

This habitat provides good food and shelter resources to birds, invertebrates and local mammal communities. Therefore, this habitat is considered as being of local importance (higher value).

9.3.2 Invasive Plants

Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) or Giant Hogweed (*Heracleum mantegazzianum*) were not recorded within the site.

Winter heliotrope and cherry laurel were recorded within the proposed site as outlined in Figure 9.3.

9.3.3 Mammals

Figure 9.3 also displays the mammal signs encountered on site. These comprise rabbit burrows and one unidentified burrow adjacent to the site, potentially either badger or fox. A trail camera survey was undertaken between the 12th and 26th November 2020 to investigate further the mammal activity and usage of burrows encountered throughout the proposed site. It was concluded that the burrows were not being utilised by badger and therefore further surveys were not required (following NRA, 2009 Guidance *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*).

Mammal species recorded using the site included fox (*Vulpes vulpes*), rabbit (*Oryctolagus cuniculus*), brown rat (*Rattus norvegicus*) and wood mouse (*Apodemus sylvaticus*); as well as a domestic cat. All burrows noted on site were found to be actively used by rabbits. No badger setts were recorded. The terrestrial mammal community is of local importance (lower value).

9.3.4 Birds

A list of winter birds encountered is included in Table 9.3. Of particular interest, 6 Snipe were encountered within the wet grassland in November 2020, in addition to the Red-listed Grey wagtail also recorded within the site. This highlights the importance of this habitat within the wider locality to local biodiversity. The bird community is of local importance (higher value).

Table 9.3 Bird List - Cloghroe (23/10/2020).

Species	Scientific Name	BoCCI Status	Notes
Grey wagtail	*Motacilla cinereal*	Red	Nesting habitat occurs along the river valley on the western boundary of the site.
Redwing	*Turdus iliacus*	Red	Redwing occur in Ireland as a winter visitor, feeding in particular on berries. Commonly occur in both rural and urban areas when weather is cold or in years when large numbers irrupt from northern breeding grounds.
Snipe	*Gallinago gallinago*	Amber	3 flushed from wet grassland in southern side of site in AM, 1 flushed in PM (23/10/21). 6 Snipe were flushed on 12/11/21 and 4 on the 26/11/21 when undertaking mammal work. Snipe roost by day in such wet areas and fly out to feed in surrounding fields by night. Inclusion on the red list is, however, as a breeding bird. The site does not support suitable nesting habitat.
Goldcrest	*Regulus regulus*	Amber	
Starling	*Sturnus vulgaris*	Amber	
Robin	*Erithacus rubecula*	Green	
Song thrush	*Turdus philomelos*	Green	
Blackbird	*Turdus merula*	Green	
Woodpigeon	*Columba palumbus*	Green	
Wren	*Troglodytes troglodytes*	Green	
Coal tit	*Periparus ater*	Green	
Magpie	*Pica pica*	Green	
Blue tit	*Cyanistes caeruleus*	Green	
Great tit	*Parus major*	Green	
Chaffinch	*Fringilla coelebs*	Green	
Jackdaw	*Corvus monedula*	Green	
Buzzard	*Buteo buteo*	Green	Soaring over site.
Hooded crow	*Corvus cornix*	Green	
Goldfinch	*Carduelis carduelis*	Green	
Jay	*Garrulus glandarius*	Green	
Pied wagtail	*Motacilla alba*	Green	

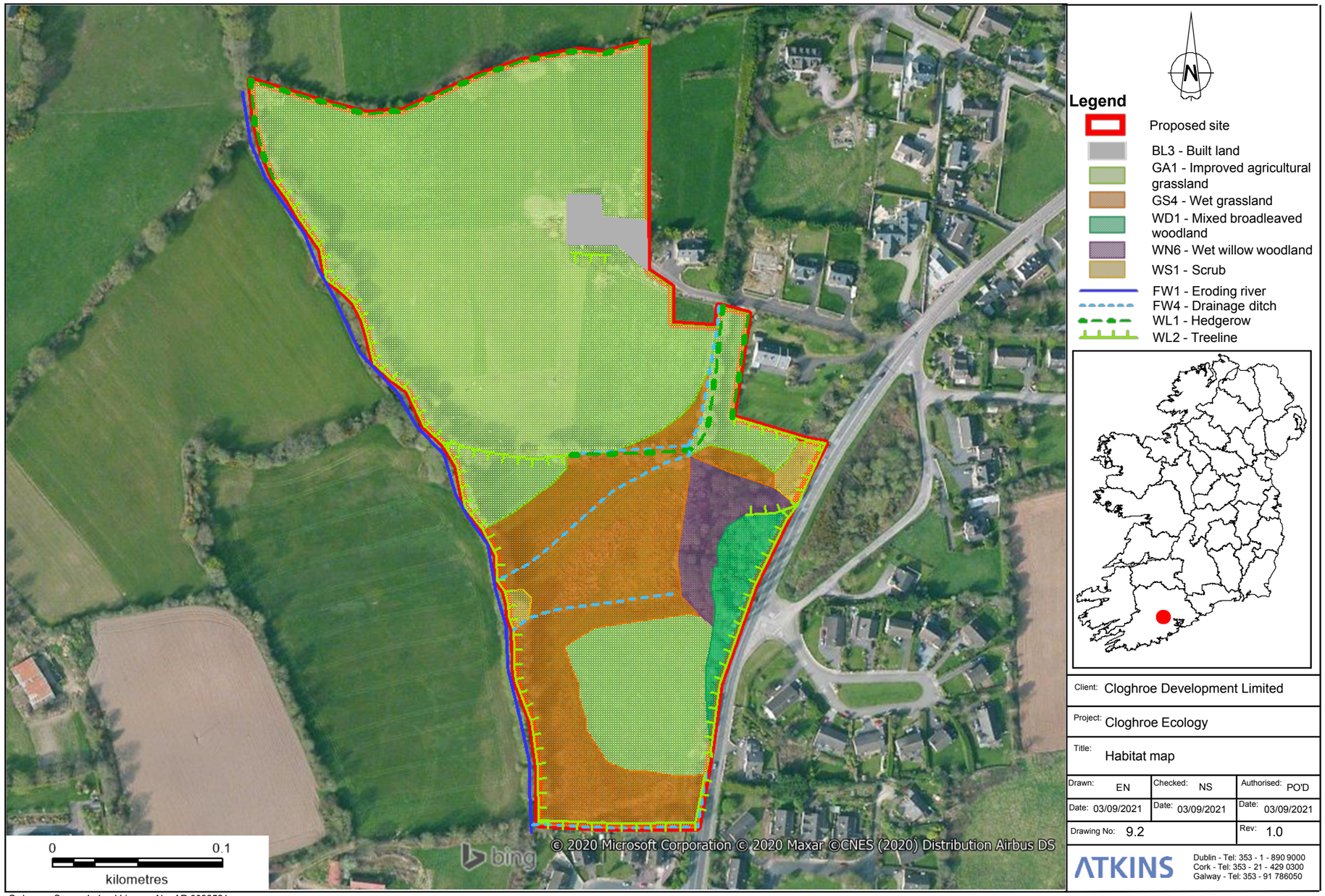


Figure 9.2: Habitat Map.

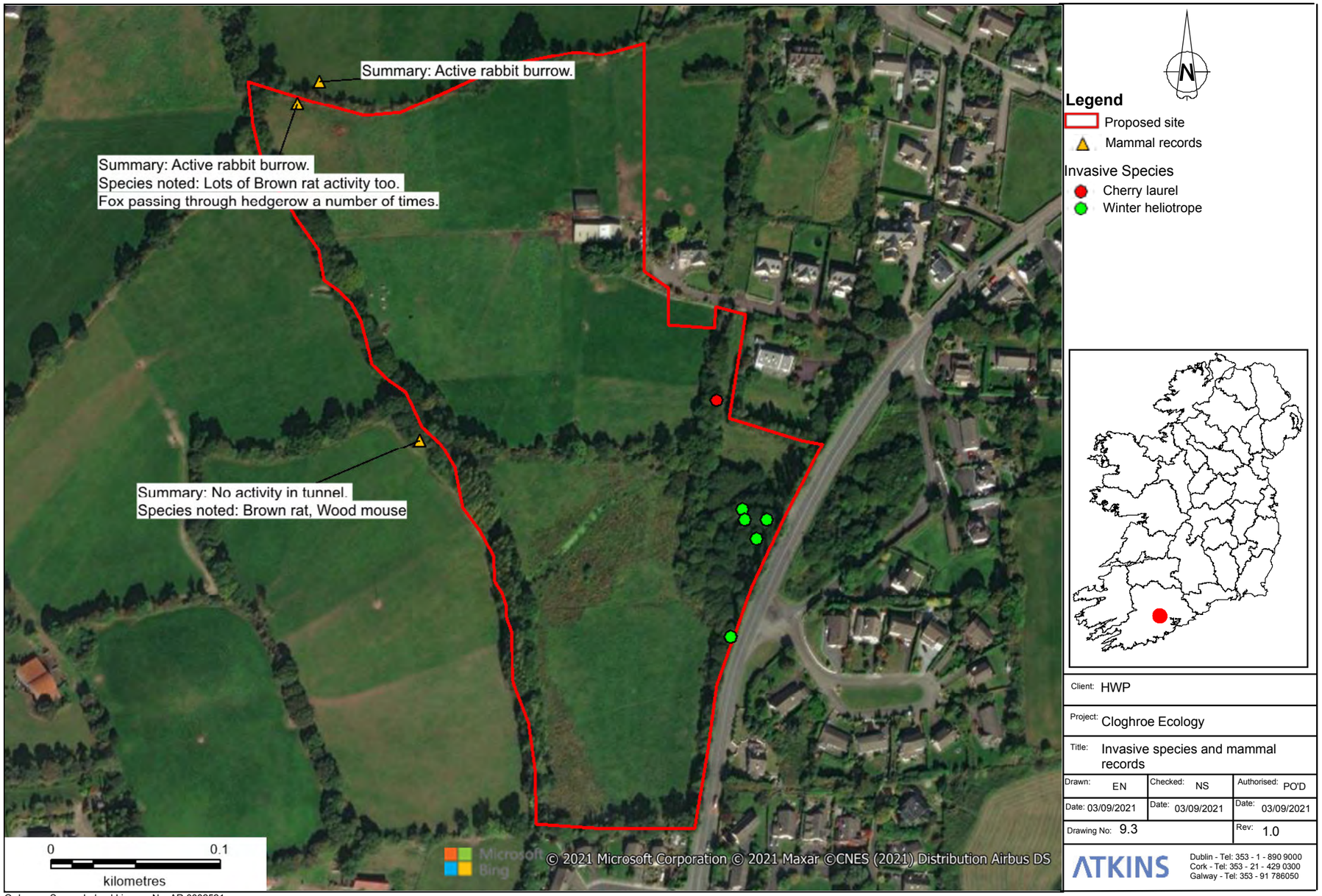


Figure 9.3: Invasive Species & Mammals.

Bird species which were picked up by the trail cameras in November 2020 included Robin, Blackbird, Wren, Chaffinch (*Fringilla coelebs*), Song thrush and Goldcrest. A Water rail (*Rallus aquaticus*) was heard in the central drain during the August 2021 site visit this species is Green listed by Gilbert *et al*., 2021.

During surveys on the neighbouring site include blackbird, Jay, Hooded crow, Pheasant (*Phasianus colchicus*), Wren and Goldcrest (Sexton, 2018); Robin, Rook (*Corvus frugilegus*), Blackbird, Woodpigeon (*Columba palumbus*) and Swallow (*Hirundo rustica*) (Greenleaf, 2021).

9.3.5 Other Observations

Common darter dragonflies (*Sympetrum striolatum*) were recorded within the wet grassland and on the drain crossing the centre of the site. A peacock butterfly (*Inachis io*) was recorded basking in hedgerow on northern boundary of site. Large numbers of Large white butterfly (*Pieris brassicae*) were noted on site in August 2021; along with single Tortoiseshell (*Aglais urticae*) and Red Admiral (*Vanessa atalanta*). A Hawthorn shieldbug (*Acanthosoma haemorrhoidale*) was also recorded.

9.3.6 Bats

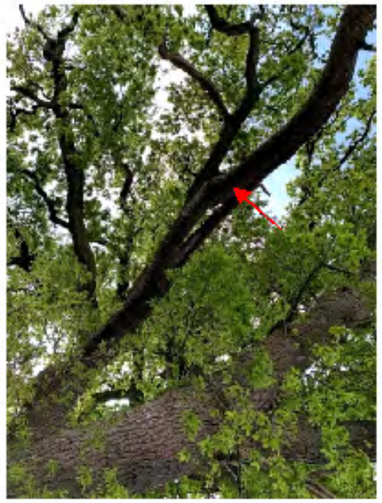
9.3.6.1 Tree Roosts

No trees within the study area were confirmed as roost sites. A total of four trees within the proposed site were categorised as being of moderate suitability for roosting bats as they contained one or more potential roost features, but none were obviously suitable for use by larger numbers of bats on a regular basis. Potential tree roosts are illustrated in the photographs in Figure 9.4, below. The location of the trees with suitability for roosting bats is illustrated in Figure 9.4 and detailed in Table 9.4.

Table 9.4 Cloghroe SHD: potential tree roosts

PTR Number	Tree Species	BCT Category	PRFs
1	Willow	Moderate	Crack in main stem
2	Oak	Moderate	Crack in limb and rot hole
3	Ash	Moderate	Crack in limb and butt rot
4	Ash	Moderate	Tear out in main stem

1. Crack in main stem of Willow in the hedge running east to west at the centre of the site.



2. Crack in limb of Oak on the northern site boundary.

3. Butt rot in Ash on the northern site boundary

4. Large crevice in tear out in Ash on the northern site boundary

Figure 9.4: Cloghroe SHD: illustrations of potential tree roosts.

Figure 9.5: Cloghroe SHD: locations of potential tree roosts.

Buildings

Buildings within the proposed site are limited to two agricultural sheds located at the north-east of the proposed site (see Plate 3.1 of the accompanying Bat Report; Appendix 9.1). The sheds are constructed of corrugated metal with a steel frame. The buildings are open and draughty and are of negligible suitability for roosting bats (these were checked on the 17th May and checked 27th September 2021).

9.3.6.2 Bat Activity Survey

Seven bat species were recorded during passive monitoring undertaken over 5 nights in May 2021 and 5 nights in September 2021. Bat activity was generally high at the site; however, low levels of activity were recorded during extended periods of heavy rain (heavy rain was recorded on the passive monitors). The most frequently recorded species was common pipistrelle, followed by soprano pipistrelle then Leisler's bat. These species were all recorded foraging across the site. Leisler's bat was recorded early in the evening (13 minutes before sunset) on PM 3 to the north of the site and soprano and common pipistrelle were recorded c.16 minutes after sunset on all three passive monitors in May 2021. Soprano and common pipistrelle social calls were also recorded on the passive monitors in May and September 2021. Natterer's, Daubenton's and Myotis species of bat (unidentifiable to species level) were recorded commuting and foraging across the site. Whiskered bat was not recorded at the site in May; however, this species was recorded across the site in September. One brown long-eared bat call was recorded alongside the Dromin Stream in May and a small number of calls that were not of sufficient quality to enable call identification were also recorded on all three monitors (Table 9-5).

The calls recorded on the passive monitors are summarised in Table 9-5. The location of the passive detectors is illustrated in Figure 9-6).

Table 9.5 Cloghroe SHD- summary table of total bat passes recorded on the passive monitors, May 2021 and September 2021.

Species	PM1		PM2		PM3		Total
	May 2021	Sept 2021	May 2021	Sept 2021	May 2021	Sept 2021	
Common Pipistrelle	782 (86%)	974 (57%)	952 (56%)	792 (73%)	713 (48%)	689 (71%)	4,902
Soprano Pipistrelle	67 (7%)	580 (34%)	306 (18%)	231 (21%)	469 (32%)	137 (14%)	1,790
Pipistrelle species[7]	30 (3%)	20 (1%)	7 (0%)	3 (0%)	21 (1%)	8 (1%)	89
Leisler's	18 (2%)	127 (7%)	436 (25%)	36 (3%)	283 (19%)	87 (9%)	987
Brown Long-eared	0	0	0	0	1 (0%)	0	1
Natterer's	2 (0%)	1 (0%)	4 (0%)	4 (0%)	0	1 (0%)	12
Daubenton's	0	1 (0%)	2 (0%)	0	0	9 (1%)	12
Whiskered	0	4 (0%)	0	2 (0%)	0	1 (0%)	7
Myotis Species	1 (0%)	3 (0%)	4 (0%)	11 (1%)	0	28 (3%)	47
No ID	7 (1%)	1 (0%)	1 (0%)	0	1 (0%)	5 (1%)	15
Total	907 (100%)	1711 (100%)	1712 (100%)	1079 (100%)	1488 (100%)	965 (100%)	7,862

The bat activity transect surveys undertaken in May and September 2021 recorded three species of bat within the proposed site. These species were common pipistrelle, soprano pipistrelle and Leisler's bat.

Leisler's bat was recorded early in the evening (c.7 minutes before sunset) flying into the site from a north-easterly direction during the May transect survey. No bat roost was recorded within the proposed site; it is likely that a Leisler's bat roost is present within one of the houses to the north-east of the site, however the exact location was not recorded. Leisler's foraged extensively over the site for the duration of the activity surveys undertaken in May but were present in lower numbers in September.

Common pipistrelle was recorded foraging along the hedgerows across the site, with the highest level of activity along the western boundary and along the hedgerows in sheltered areas to the centre and south of the site. Soprano pipistrelle was recorded in lower numbers foraging along the hedgerows across the site in May and September.

A lower level of bat activity was recorded alongside the R617 to the east of the site.

[7] *Pipistrellus* spp. which have frequency of maximum energy, FMAXE, of c. 50kHz which cannot reliably be assigned to Common Pipistrelle (typical FMAXE of c. 45kHz) or Soprano Pipistrelle (FMAXE c. 55kHz)

Figure 9.6: Location of passive bat survey monitors.

9.3.6.3 Evaluation of Bat Survey Results

A review of existing bat records from within a 4km radius of the proposed site indicates that six of the ten known Irish bat species had been observed. These include pipistrelle species, soprano pipistrelle, Leisler's, brown long-eared, Daubenton's and Natterer's bat. Of these species, Daubenton's bat has been recorded roosting within 4km of the site. In addition to these species, whiskered bat and lesser horseshoe bat have been recorded foraging at St. Ann's Hydro Hill at Tower (Abbott, 2017), located c.1.4km to the north-east of the proposed site at Cloghroe. Evidence indicating minor bat roosts of brown long-eared bat and whiskered bat was also recorded St. Ann's Hydro Hill, and summer roosts of common pipistrelle, soprano pipistrelle and Leisler's bat also occurred just off-site to the west.

Habitats within the proposed site that are of potential use by foraging and commuting bats include linear features such as the Dromin Stream, hedgerows, treelines and their associated wet ditches, which provide connectivity between the site and other foraging areas in the wider landscape. Overall, the study area is considered to be of high suitability for foraging and commuting bats due to the presence of connectivity to other suitable habitats in the wider landscape. However, roosting opportunities at the site are limited to 4 trees in the field boundaries that support potential roosting features such as cracks in limbs.

Results from the bat surveys undertaken in May and September 2021 indicate that five species of bat, namely soprano pipistrelle, common pipistrelle, Leisler's bat, natterer's and Daubenton's bat regularly commute to the site to forage. Whiskered bat was recorded at the site in the autumn season; and brown long-eared bat was recorded on one occasion on the passive monitors in May, however this species echolocates quietly and, as such, may be under recorded at the site. The level of activity and diversity of species recorded within the proposed site was high. Leisler's bat was recorded early in the evening in May and it is considered likely that a summer Leisler's bat roost is present within one of the houses to the north-east of the site, outside of the site boundary. Soprano and common pipistrelle were recorded relatively close to sunset in May and it is likely that these species also roost nearby in summer.

In relation to the foraging and commuting bat species recorded at the site, the bat populations are considered to be of Local Interest (Higher Value) (in accordance with NRA, 2009).

The status of Irish bat species (Marnell *et al*., 2019) is summarised in Table 9.6. The bat species recorded at the site are all of Least Concern.

The conservation status of all the bats recorded at the site is Favourable (NPWS, 2019).

Table 9.6 Status of Irish Bat Fauna (Marnell et al., 2019).

Species: Common Name	Irish Status	European Status	Global Status
Resident Bat Species			
Daubenton's bat (*Myotis daubentonii*)	Least Concern	Least Concern	Least Concern
Whiskered bat (*Myotis mystacinus*)	Least Concern	Least Concern	Least Concern
Natterer's bat (*Myotis nattereri*)	Least Concern	Least Concern	Least Concern
Leisler's bat (*Nyctalus leisleri*)	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle (*Pipistrellus nathusii*)	Least Concern	Least Concern	Least Concern
Common pipistrelle (*Pipistrellus pipistrellus*)	Least Concern	Least Concern	Least Concern
Soprano pipistrelle (*Pipistrellus pygmaeus*)	Least Concern	Least Concern	Least Concern
Brown long-eared bat (*Plecotus auritus*)	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat (*Rhinolophus hipposideros*)	Least Concern	Near threatened	Least Concern
Possible Vagrants			
Brandt's bat (*Myotis brandtii*)	Not Assessed	Least Concern	Least Concern
Greater horseshoe bat (*Rhinolophus ferrumequinum*)	Not Assessed	Near threatened	Least Concern

9.4 POTENTIAL IMPACTS

The potential impacts arising from the construction and operation of the proposed development at Cloghroe are discussed in the following sections.

9.4.1 Potential impacts assessed

In the absence of mitigation measures, the project could have a range of potential impacts on the ecological receptors within the zone of influence of the proposed project during the construction and operation phases. The categories below describe the possible impacts which may occur through development onsite. These impacts are further assessed considering desktop and field survey data.

9.4.1.1 Physical Damage/ Habitat Loss

Physical damage includes the degradation to, modification, fragmentation or loss of habitats. Direct physical damage of habitats could occur within working areas of the proposed project and along access routes where construction works are undertaken. Physical damage of habitats can also be an indirect impact and could occur, for example, through the introduction of fine sediments into an aquatic system, causing changes to the particle composition of the benthic habitats. Physical damage may be temporary or permanent in nature.

9.4.1.2 Disturbance

Disturbance can cause sensitive species to deviate from their normal and preferred behaviour, resulting in stress and increased energy expenditure. Disturbance can result in species being displaced from suitable habitat areas that provide areas for feeding and foraging, commuting routes, and resting and breeding sites. Physical disturbance of species can also result in direct mortalities of species and thus, disturbance impacts can be both direct and indirect and may be temporary or permanent in nature. Examples of direct disturbance includes activities such as damage to a breeding or resting site of a protected species, e.g. a bat roost, badger sett or otter holt. Indirect disturbance may result from the presence of works crews and personnel on site during construction, noise emanating from a construction site or artificial lighting of a bat foraging area, causing bats to avoid the area.

9.4.1.3 Changes in Water Quality

The release of pollutants to water can impact upon the relevant waterbodies and the species they support. This can result in impacts such as increased turbidity of the water column, a reduction in photosynthesis, contribution to eutrophication and changes to the species composition of the system as a result. The degree of impact depends on the type of pollutant released and the nature of the receiving receptor. For example, the release of fine sediments to a stream or river is likely to cause siltation of the river bed and interrupt the functioning of species, from aquatic plants to macroinvertebrates to fish, and larger predators that depend on these biotic groups as a food supply, e.g. otter and kingfisher. Impacts to water quality could be temporary in the form of surface water runoff during construction, or permanent in the form of a continued discharge impacting negatively on the receiving environment during the operation of the project.

9.4.1.4 Dispersal of Invasive Species

Non-native invasive species can have negative impacts on biodiversity. Negative impacts of non-native invasive species on native biota occur through competition, predation, herbivory, habitat alteration, disease and genetic effects such as hybridisation. In the cases of non-native invasive species, the main impacts are a reduction in species diversity due to dense plant growth, heavy shading and disruption of trophic levels. These species can potentially be spread via plant fragments and soil containing plant material, and by vectors such as machinery and personnel.

9.4.2 Do Nothing Scenario

The new EIAR provisions require consideration of the 'do-nothing' scenario (as set out in EIAR Guidance published by the EU in 2017 (EU, 2017). This should consider how the conditions on the site might evolve in the absence of the proposed development being progressed. In the short-term it is assumed that the development site would continue to be maintained as agricultural grassland which is currently used to graze a small number of beef cattle. As grazing intensity is low at present, some level of scrub expansion is likely around the boundaries of the site. Rushes are likely to continue to dominate the wetter lower part of the site; while poaching of the wet ground by heavy cattle would continue. Under such a scenario biodiversity on site is likely to remain broadly the same. The potential value of the footprint of the proposed project to species such as nesting birds, foraging mammals and commuting bats would continue, provided that the linear landscape features (hedgerows/woodland) are not lost due to other forms of development.

If grazing were to cease, the wet ground conditions would favour the development of wet woodland in the short to medium term, most likely to be dominated by willow in the short term.

Due to the site's proximity to Blarney and Tower, as well as it being proposed for zoning as *ZO 02 New Res Neighbourhoods* in the Draft City Development Plan 2022-2028 the site is likely to be considered for development again the future.

9.4.3 Project Design

The following design principles and "designed-in" mitigation have informed the assessment of impacts.

Within the scheme design and operation, good practice environmental and pollution control measures will be employed with regard to current best practice guidance such as Environmental Good Practice On-Site Guide (CIRIA, 2015).

Landscaping: - There will be loss of some improved agricultural grassland, wet grassland, 25% of the wet woodland, 75% of the broadleaved woodland habitat and a hedgerow along the R617 within the Site during the construction phase. A landscape masterplan has been prepared by Forest Bird Design. The retention of the existing hedgerows and woodlands and supplementary incorporation of wetland meadows and wildflower meadows has been proposed as part of this development.

Taking the above into account, the principal potential impacts of the residential development of the site at Cloghroe are outlined in the following sections.

9.4.4 Construction Phase

The potential impacts likely to arise during construction of the proposed development are discussed in the following paragraphs.

9.4.4.1 Potential Impact on Sites Designated for Nature Conservation

Potential negative impacts on European sites are discussed in the accompanying Natura Impact Statement (Atkins, 2021). As noted, the proposed development is not located within the boundaries of any European site. There will be no direct impacts to European sites; i.e. no land take or the permeant removal of habitat supporting qualifying interest and ecological features of the designated sites.

There is one Natura 2000 site within 15km of the study site - the Cork Harbour SPA (004030). The Dromin Stream located along the western boundary of the site is hydrologically connected to Cork Harbour, within which these designated sites are located. Great Island Channel lies >19km east of the Cloghroe site.

Discharges to the drainage network will ultimately reach Cork Harbour via the Dromin Stream, the Currabeha River, River Shournagh and River Lee. The Natura Impact Statement considers the potential for impacts to surface water and groundwater water; this was informed by the design of the surface water management systems (such as SuDS; storage tanks, silt and petrol interceptors etc.); as the type and scale of development and the distance to Cork Harbour.

In summary, for the reasons set out in detail in the NIS, having regard to the location, nature, extent and duration of the proposed development, the Cloghroe SHD will not have adverse effects on any European site, including Great Island Channel SAC or Cork Harbour SPA.

9.4.4.2 Potential Impacts on Habitats

Direct habitat loss/damage during construction

There will be loss of some improved agricultural grassland GA1, wet grassland (GS4), 25% of the wet woodland (WN6), 75% of the broadleaved woodland (WD1) habitat and a hedgerow along the R617 within the Site during the construction phase. These habitats range in value from negligible ecological value (e.g. agricultural grassland) to local importance (higher value) (e.g. wet grassland (GS4)). 75% of the sycamore dominated mixed (broadleaved) woodland will be removed to accommodate the underground storage tanks; while 25% of the will be removed to facilitate internal road construction.

There are no habitats on site of greater than local value. No ecological features of regional, national or European importance will be directly impacted by the proposed development.

Negative impacts to semi-natural habitats will be restricted to within the development site. The habitats are therefore assessed overall as important at a Site level and the effect of the habitat loss during the construction phase of the development will be significant at Site level only.

Indirect habitat loss/damage via proximity of construction works

Due to works close to biodiversity features adjoining the site, such as the woodland to be retained to the east, the Dromin Stream to the west and bounding hedgerows and treelines, there is potential for a slight negative impact to these features along the site's boundaries during the course of works.

Indirect habitat/species loss/damage via spread of invasive species

There are no third schedule invasive species recorded on the site. Winter heliotrope, though not listed on the 3rd schedule of the Natural Habitats Regulations, 2011 is still invasive and can pose a threat to semi-natural habitats if allow to spread as it can do on areas of bare ground. This species is located in the woodland on the eastern side of the site (refer to Mitigation measure below).

9.4.4.3 Potential Impacts on water quality

Indirect impacts to via surface-water run-off

During the construction phase of the project, a construction site compound will be established on the eastern side of the site as identified in Figure 3.1 and Figure 3.2 of the CEMP that accompanies this application. The site compound would not be located in proximity to any drains or surface water features through which pollutants such as hydrocarbons could be discharged to the Dromin Stream.

During wet conditions, sediment can mobilise in over-ground run-off during excavation and movement of heavy machinery through the Site. Sediment is of particular concern for aquatic species within receiving water bodies. The northern section of the site falls gradually in a south-easterly direction; thus, surface water in this location will drain to the existing surface water drainage and, in the absence of mitigation measures, this would be collected by settlement features of the existing sites Drainage System along the road, or the wet grassland and drainage ditch which flows through the southern part of the site and will act in filtering some of the sedimentation from the run-off prior to entering the stream. However, when construction works are occurring adjacent to the stream, unmitigated run-off could enter the Dromin Stream and potentially cause sedimentation. Therefore, the greatest the risk of sedimentation of the Dromin Stream is through an unmitigated over-ground run-off.

Indirect Impacts during construction phase via groundwater (hydrogeological pathway)

There is limited potential for contaminants from the construction process to reach the Cork Harbour SPA, as well as the more distant habitats of the Great Island Channel SAC, via a hydrogeological pathway. This pathway is dependent on magnitude of overburden removal from the site, as well as onsite practices. From assessment of patterns of water seepage onsite, the potential for groundwater contamination at the site is low. Excavation, pilling and ground water abstraction can interact with groundwater and has the potential to expose groundwater to contamination from concrete, hydrocarbons and other chemicals used in construction. Furthermore, given the type, location and scale of the development the distance from the proposed works and assimilation capacity of Cork Harbour is such that any mobilised contaminated groundwater leaving the site will pose an imperceptible impact to the harbour; this is discussed in the accompanying Natura Impact Statement which is included in Appendix 9.3 of the EIAR. The proposed design and operation of the surface water drainage network will also provide for effective protection of surface water quality.

9.4.4.4 Potential Disturbance and/or displacement of faunal species

The proposed clearance works will result in the removal of wet grassland, a portion of mixed (broadleaved) woodland and wet willow woodland and a hedgerow along the R617. These habitats provide commuting potential for bats and nesting habitat for birds. As noted, none of the identified potential bat roosts will be removed. Key hedges / trees such as mature oak along the western boundary of the site are to be retained as part of the design and landscaping of the site. The alteration and removal of semi-natural habitats will have a significant negative impact to local bat and bird species (at a local level). Combined with the abundance of similar habitat beyond of the proposed site; therefore, this project will have a slight temporary negative impact to local bat and bird species due to local habitat loss on site. Proposed measures to mitigate these impacts are set out below.

As outlined above, no physical signs of breeding badger (i.e. badger sett) or fox (i.e. fox den) were recorded on site; nor were they found on the adjoining site (Sexton, 2018). On site trail camera surveys showed no sign of badger, fox or species such as hedgehog using the site; though the possibility of such species foraging on the site cannot be discounted. Therefore, impacts from the construction phase of the works will cause a moderate temporary impact to rabbit and foraging badger and fox due temporary displacement from the site. There will be a temporary loss of foraging areas for fox and badger due to the removal of agricultural fields, woodland and hedgerow. No direct impacts to badger or fox populations will occur as a result of the works due to the provision of mammal fencing around works site and day time working hours.

No signs of otter were recorded on site or on the Dromin Stream. It is unlikely that the Dromin Stream would be utilised by otter given its small size and the presence of a number of small culverts downstream of the site. No impact to this species is predicted as a result of the Cloghroe development.

No signs of Red squirrel was noted during the course of site visits or during the trail camera work. As noted boundary hedges and trees such as those along the western boundary of the site are to be retained. No impact to this species is predicted as a result of the Cloghroe development.

9.4.4.5 Bats

This section details the principal potential impacts of the proposed residential and retail development on bats during the construction phase, in the absence of mitigation.

Roosting Habitat

Roosting opportunities at the site are limited to 4 trees in the field boundaries that support potential roosting features such as cracks in limbs. No works are proposed to these potential tree roosts, therefore, there will be no loss of roosting habitat within the site. Agricultural buildings currently on site were also checked; no bat roosts were recorded and it was noted that these buildings have a low potential to act as bats roosts.

While it is likely that a Leisler's bat roost is present within one of the houses to the north-east of the site, this structure will not be impacted by the proposed works.

Foraging and Commuting Habitat

The results of the bat activity survey undertaken for the proposed development indicate that the site supports seven species of foraging and commuting bat (soprano pipistrelle, common pipistrelle, Leisler's, natterer's, whiskered, Daubenton's and brown long-eared bat).

The proposed clearance works will result in the removal of wet grassland, a portion of mixed (broadleaved) woodland and wet willow woodland and a hedgerow along the R617. These habitats provide foraging and commuting habitat for bats. In the absence of mitigation, the alteration and removal of this habitat would have a significant adverse impact to

bat species (at a local geographic scale). However, it should be noted that similar habitats are abundant in the wider landscape. Measures proposed to mitigate such impacts through proposed landscaping design are set out below.

Lighting

Studies have found that Leisler's bat and pipistrelle bats can congregate around white mercury street lights and white metal halide lamps feeding on the insects attracted to the light. However, lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for some species, including Myotis species[8]. Further, even bat species that have been shown to opportunistically forage in lit conditions have subsequently been recorded being impacted by artificial lighting. In cities, for example, common pipistrelles have been recorded avoiding gaps that are well lit, thereby creating a barrier effect[9]. Temporary lighting required during the construction phase may cause disturbance to bats commuting through or feeding at the proposed site. In the absence of mitigation, disturbance of bats due to construction phase lighting would have a temporary to short-term significant adverse impact at the local geographic scale.

9.4.5 Operational Phase

9.4.5.1 Impact on Sites Designated for Nature Conservation

During the operational phase, surface waters will discharge to the existing sewer system along the R617 to the southeast of the scheme. The proposed surface water drainage system for the development has been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Sewers (GDSDS). The details of the drainage system (as well as matter such as the use of Sustainable Drainage Systems (SuDS) and surface water attenuation) are set out in the Engineering Report submitted with the planning application.

Surface water runoff from the development will be attenuated to below greenfield rates . Surface Water flow exceeding allowable outflow rates will be stored in underground 'Stormtech' units (for rainfall events up to 1 in 100-year return period, with a 20% allowance for climate change). Adoption of a SuDS design also allows for treatment of surface water flow as close to source as possible. This is described in detail in the accompanying Engineering Report (which is appended to the EIAR as Appendix 2.1); with details provided as to how water from different sources and with different risk profiles are to be addressed. The principal conclusion are set out below, for ease of reference:

While there are no records of historic flooding within the proposed development site on national flood maps[10]; there is knowledge of localised flooding in the southern part of the site (refer to Engineering Report appended to the EIAR). There are records of historic flooding south of the site. The appropriate management of surface water is therefore a primary focus of the proposed scheme. SuDS measures are to be implemented on-site to limit the discharge of stormwater and associated surface water runoff arising on-site to greenfield discharge rates (refer to the accompanying Flood Risk Assessment). The internal foul network has been designed in accordance with Irish Water's *Code of Practice for Wastewater Infrastructure* and will be separate from the surface water drainage system. The site will be connected to an existing foul network at the existing road entrance to the site.

The operational foul sewer amenities of the proposed development will connect to the existing operational Cloghroe Wastewater Pumping Station. Irish Water has confirmed that the plant has capacity to adequality process the additional input from the operational demand the proposed development (Appendix B of the Engineering Report), though the pump at the neighbouring pump station is to be upgraded. Therefore, construction and operational discharge of foul to the existing network will not result in any negative effect.

In the circumstances set out in this report and other application documentation, including the NIS, the operational phase of the proposed development will not negatively impact on water quality within Cork Harbour SPA; nor will it impact, directly or indirectly, on any of the habitats or species listed as features of interest for Great Island Channel SAC/Cork Harbour SPA or any NHAs and pNHAs.

9.4.5.2 Potential Impacts on Habitats

No further impacts on habitats are predicted during operation of the proposed scheme. Landscaping proposals are discussed under Mitigation, below.

9.4.5.3 Potential Impacts on water quality

Indirect damage to the aquatic environment via surface-water run-off

During the operational phase, surface-water run-off associated with the site will be collected by a new water drainage system for the development, which has been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Sewers (GDSDS) and as noted above this surface water will be treated appropriately.

Indirect damage to environment via discharge of treated foul effluent

Waste-water/Foul Effluent from the operational stage, will be collected via new sewer infrastructure at site that will connect to an existing foul sewer. The foul sewer will discharge wastewater into existing/new public waste-water sewer network. This will ultimately be connected to the Cloghroe Wastewater Pumping Station. Consultation was undertaken with Irish Water and is outlined in the accompanying Engineering Report. While the pump at the neighbouring pump station is to be upgraded, the current waste treatment infrastructure otherwise has the capacity to deal with effluent arising from the proposed development; as such, following upgrades to the pump, there will be not be any negative impacts to water quality in the Cork Harbour or any other water body.

Disturbance and/or displacement of faunal species

The development is sufficiently distant from Cork Harbour that disturbance of birds using the Cork Harbour SPA will not occur. Both badger, fox and rabbit are known to use manmade landscapes to forage. The provisions of green spaces linking the sections of woodland on the east side of the site with the riparian corridor on the west of the site will provide a corridor and foraging ground for both species. Operational impacts to mammal onsite will be imperceptible.

As noted above, bird populations will move off site during the construction stage. Once works have finalised and landscaping becomes established common bird species will use the area again. Therefore, there will be a neutral impact to local bird species during the operational phase.

9.4.5.4 Bats

This section details the principal potential impacts of the proposed residential and retail development during the operational phase, in the absence of mitigation.

Lighting

The street and domestic lighting proposed for the development will increase light levels within the proposed development area. As noted above, increased lighting may reduce the availability of feeding sites for bats and would be a long-term significant adverse impact at the local geographic scale. A lighting report was prepared for this proposal and accompanies this application (Lighting Reality, 2021,). This sets out the proposed lighting layout, design of luminaires and summarises horizontal illuminance (lux levels).

8 Stone E.L. (2013). Bats and Lighting: Overview of current evidence and mitigation.
9 Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby
10 From the National Flood Hazard Mapping website: www.floodmaps.ie (refer to the accompanying Flood Risk Assessment).

9.4.5.5 Risk of Major Accidents and Disasters

The risk of a major accident onsite is extremely low (e.g. there will be no oil storage tanks on site, removing the risk of oil spills associated with the finished development) and, in any event, is confined to the construction phase of the development. Events such as a large hydrocarbon spill or release or high volumes of contaminants during the construction phase could potentially have a negative impact on high value sensitive sites such as the Great Island Channel SAC and Cork Harbour SPA. However, given the location of the site relative to conduits, such as watercourses, and given the control measures proposed, there will not be any accident of sufficient scale that would negatively impact on Great Island Channel SAC and Cork Harbour SPA. While impacts to local soil and groundwater could conceivably occur, details of preventative measures and emergency response measures have been included in the accompanying CEMP (Appendix 2.2 to the EIAR), and will be implemented, in order to effectively limit the potential scale of this impact. Thus, the magnitude of a major accident on site is likely to be significant only at a site level only and is imperceptible in relation to Internationally important features such as European sites, in excess of 15km distant from the development site.

9.5 MITIGATION MEASURES

9.5.1 Construction Phase Mitigation

9.5.1.1 Protection of Sites Designated for Nature Conservation

A detailed Construction and Environmental Management Plan (MHL, 2021) has been appended to the EIAR. For ease of reference, the general pollution prevention measures which will be implemented during the construction phase are outlined below.

9.5.1.2 Mitigation of habitat loss/damage during construction

The accompanying Landscape documentation illustrates which hedgerows and wooded areas are to be retained on-site; these will be protected from any accidental damage during construction through use of measures such as fencing (see Chapter 4.0 - Landscape). Measures will be implemented to ensure that trees and hedges being retained are incorporated into the development without being impacted upon. Protective fencing will be provided around trees and hedge vegetation being retained and this will enclose their Root Protection Areas (RPAs). The fencing will be at least 2.3m. Similarly, a buffer is to be maintained between site and neighbouring stream and riparian margin. (Refer in particular to the Landscape Masterplan; Drawing L108 which accompanies this application).

To mitigate against for the loss of hedgerow and partial removal of woodland, substantial native tree and hedgerow planting will be occur on the site. Large areas of open space will be maintained on the site, along with areas of wet and wildflower meadow. This will reduce the impact of the proposed development upon habitats in the area and there will be no significant operational impact upon habitats due to the provision of substantial native and pollinator friendly habitats proposed for the site.

9.5.1.3 Landscape Protection Measures

- Trees to be retained will be fenced off at the commencement of construction to avoid inadvertent felling or use of the ground under canopies for construction purposes.
- A vegetated buffer will be retained or constructed at the northern part of the R617 to ensure a green transition between Cloghroe and Tower is clearly evident.
- Proposed development will be designed to protect the existing oak trees at the southeast corner, to ensure their continued visual and habitat value.
- The existing poplar trees and lone oak along the northeast boundary of the R617 will be retained for their visual contribution to the streetscape.
- The mixed broadleaf woodland adjacent to the R617 will only be felled when the stormwater tank is to be installed, to stagger the visual and environmental impact of felling (the tree lines south of the woodland will be felled first).
- The urban frontage to the R617 will include large canopy tree planting at offsets no greater than 12m, to visually soften and filter proposed buildings.
- All trees within 5m of the stream will be retained, for habitat benefit and visual framework.
- The central east/west hedgerow and associated sod and stone ditch will be retained, in particular protecting the oak and hawthorn trees. This is to ensure the long term character of traditional field parcelling is maintained and for the habitat benefit of the hedgerow as a commuting corridor.
- The central attenuation basin will be constructed during the first phase of construction and planted minimum 6 months prior to its use as stormwater attenuation, to ensure soil settlement and vegetation establishment.
- Proposed development will be offset from the southern boundary to enable an additional layer of tree planting between the existing hedgerow and edge of development, for the visual benefit of neighbouring houses.
- Salvaged topsoil will not be stored more than 6 months if kept in piles more than 1m high. Rotate stockpiling to fit this time period, to ensure healthy aerated soil for use in the completed development.
- Planting within 10m of the stream will consist solely of native plant species, for the benefit of natural systems.

9.5.1.4 Bats

Loss of Foraging and Commuting Habitat

Loss of commuting and foraging habitat at the site will be mitigated by the landscaping proposals, which include retention of hedgerows and wooded areas on-site; these will be protected from any accidental damage during construction through use of measures such as fencing. Measures will be implemented to ensure that trees and hedges being retained are incorporated into the development without being impacted upon. Protective fencing will be provided around trees and hedge vegetation being retained and this will enclose their Root Protection Areas (RPAs). The fencing will be at least 2.3m. Similarly, a buffer is to be maintained between site and neighbouring stream and riparian margin.

To compensate for the loss of hedgerow and partial removal of woodland, substantial native tree and hedgerow planting will be established on the site. Large areas of open space will be maintained on the site, along with areas of wet and wildflower meadow.

The planting schemes shall ensure connectivity to linear/ woodland habitats in the wider landscape. Trees that are being retained at the site shall be protected during clearance and construction works in line with current guidelines e.g. British Standard 5837:2012 and National Roads Authority 2006a.

Lighting

To minimise disturbance to bats and other fauna that are roosting/resting or active at night, construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from all hedgerow / treeline habitats to be retained. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside)

to prevent overspill. This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.

Lighting within the proposed development site shall be installed with sensitivity for local wildlife while still providing the necessary lighting for human usage. This is particularly important for bat foraging/commuting habitat at the edge of the Dromin Stream and retained hedgerows, treelines and woodland habitats at the site (refer to accompanying Lighting Report).

9.5.1.5 Amphibians

The primary potential breeding habitat that could be used by amphibians such as Common frog on site is the central drain. This is to be protected as part of site works and as noted in the Landscape Design, a wetland complex is to be created in the centre of the site (refer to Landscape Drawing - Central Amenity, L110)). This includes for a large area of semi-natural habitat through the centre of the site which will compensate for loss of wet grassland elsewhere on site.

9.5.1.6 Construction and Environmental Management Plan

Chapter 5.0 of the CEMP (MHL, 2021b) summarises the requirements of the Construction and Environmental Management Plan. While these can be reviewed in full in the CEMP, for ease of reference, the principal measures relating to the protection of receiving waters are set out below. The CEMP also sets out the Phasing of the proposed development, which will be as follows (refer to Figure 3.1 – Phasing Diagram of the accompanying CEMP): -

- Phase 1: Bulk excavation across the entire site extents.
- Phase 2: 82 Units including the proposed creche, retail food store and café in the South of the site.
- Phase 3: 109 Units in the North of the site.

The location of the site compound is also illustrated in Figure 3.1 and 3.2 of the accompanying CEMP.

EMP1 - Fuel & Oil Management Procedure

Refuelling

Refuelling will take place in the proposed site compound (as set out in Figure 3.1 and 3.2 of the accompanying CEMP).

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Plant nappies or absorbent mats will be placed under refuelling points during all refuelling to absorb drips.
- Mobile bowsers, tanks and drums shall be stored in secure, impermeable storage area, away from drains and open water.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor.
- Potential leaks from delivery vehicles will be reduced by visually inspecting all vehicles for major leaks.
- In the unlikely event of an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. The Environmental Manager will inspect nearby drains for the presence of oil and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound, and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the extremely unlikely event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

Oil storage

Oil storage will take place in the proposed site compound (as set out in Figure 3.1 and 3.2 of the accompanying CEMP).

- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements.
- Leakages of oil from oil stores will be prevented by storing these oils in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system.
- The volume of leakages will be prevented through monitoring oil storage tanks/drums for leaks and signs of damage. This will be carried out daily by the Environmental Manager.
- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re- cycling by an approved service provider. >

Environmental Controls

Environmental control measures will be stored in the proposed site compound (as set out in Figure 3.1 and 3.2 of the accompanying CEMP).

- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water.
- Fuel containers will be stored within a Secondary Containment System, e.g. bund for static tanks or a drip tray for mobile stores.
- Ancillary equipment such as hoses, pipes shall be contained within the bund.
- Taps, nozzles or valves must be fitted with a Lock System.
- Fuel and Oil Stores including tanks and drums shall be regularly inspected for leaks and signs of damage.
- Only designated Trained Operators who are authorized to refuel plant on site and emergency spill kits will be present at equipment for all refuelling events.
- Procedures and contingency plans will be set up to deal with emergency accidents or spills.
- Suitable spill response materials and emergency instruction shall be available on site and staff shall have been adequately trained.

Other measures such as Waste, Noise and Dust management are presented in the CEMP.

EMP6 - Site Environmental Training & Awareness

- Environmental awareness and training shall be achieved by: -
  - Site induction, including relevant environmental issues.
  - Environmental posters and site notices.
  - Method statement and risk assessment briefings.
  - Toolbox talks, including instruction on incident response procedures.
  - Key project specific environmental issues briefings.
- All managers and supervisors will be briefed on the content and effective implementation of the measures identified in the CEMP.
- Method Statements will be prepared for specific activities prior to the works commencing and will include all environmental protection and mitigation measures identified in the planning application documentation and emergency preparedness appropriate to the activity covered. The Construction Environmental Manager will review key Method Statements prior to their issue.
- Method Statement briefings will be given before personnel carry out key activities for the first time.
- Environmental Training Records are to be retained in the Site Office.

Environmental Controls: Site staff shall be competent to perform tasks that have the potential to cause a significant environmental impact. Competence is defined in terms of appropriate education, training and experience.

EMP7 sets out the Environmental Emergency Response Plan; EMP8 sets out the Monitoring and Auditing Procedure while EMP9 sets out the Environmental Accidents, Incidents & Corrective Action Procedures and EMP10 sets out the Environmental Complaints Procedure (see CEMP; MHL, 2021b). EMP12 sets out the Lighting Pollution Control measures.

EMP13 - Surface Water Management and runoff control measures

Where applicable the following measures will be implemented: -

- Implement erosion control to prevent runoff flowing across exposed ground and become polluted by sediments.
- Intercept and divert clean water runoff away from construction site runoff to avoid cross-contamination of clean water with soiled water.
- Implement the erosion and sediment controls before starting site clearance/construction works.
- Minimise area of exposed ground by maintaining existing vegetation that would otherwise be subject to erosion in the vicinity of the development and keeping excavated areas to a minimum.
- Install a series of silt fences or other appropriate silt retention measure where there is a risk of erosion runoff to watercourses from construction related activity particularly if working during prolonged wet weather period or if working during intense rainfall event.
- Implement sediment control measures that includes for the prevention of runoff from adjacent intact ground that is for the separation of clean and 'dirty' water.
- Install appropriate silt control measures such as silt-traps, check dams and sedimentation ponds.
- Washout from concrete trucks and plant will not be permitted on site.
- Provide recommendations for public road cleaning where needed particularly in the vicinity of drains.
- Controls need to be regularly inspected and maintained otherwise a failure may result, such as a build-up of silt or tear in a fence, which will lead to water pollution so controls must work well until the vegetation has re-established; inspection and maintenance is critical after prolonged or intense rainfall.
- Develop checklists for weekly Site Audits, which must be finalised by the Appointed Contractor and the relevant Personnel informed of their duties.

9.5.1.7 Biosecurity protocols

Biosecurity protocols shall be implemented during the proposed project to prevent the introduction of invasive species, in particular those listed on the third schedule of the 2011 Regulations, to site and the further spread of diseases. The following measures will be adopted:

- All equipment intended to be used at the site shall be: -
  - power steam washed at a suitably high temperature or at least 65 degrees, or
  - disinfected with an approved disinfectant, e.g. Virkon or an iodine-based product. The manufacturer's instructions shall be followed and if required, the correct contact times allowed for during the disinfection process. Items that are difficult to soak shall be sprayed or wiped down with disinfectant.
- During the duration of the proposed development, if equipment is removed off-site to be used elsewhere, the said equipment shall be cleaned and disinfected prior to being brought back to the works area.
- Appropriate facilities shall be used for the containment, collection and disposal of material and/or water resulting from washing facilities of vehicles, equipment and personnel.
- Importation of materials shall comply with Regulation 49 of the EC (Birds and Natural Habitats) Regulations 2011.

9.5.1.8 Potential Disturbance of faunal species mitigation Birds

Birds

Removal of vegetation such as grassland, woodland and hedgerow will be carried out outside the breeding bird season from 1st March to 31st August inclusive.

Mammals

No mitigation is necessary for terrestrial mammals using the site.

9.5.2 Operational Phase Mitigation

Bats

The following general principles will be followed in relation to the overall lighting plan for the proposed development site: -

- Lighting design has considered the presence of protected species. Appropriate lighting will be used within the proposed development and adjacent areas with sensitive lighting regimes deployed in wildlife sensitive areas. Stanchion height will be 6m. Refer to the Lighting Report which accompanies this Application; this also sets out details of horizontal illuminance (in lux) for each lamp post.
- Dark buffer zones will be used to separate habitats or features from lighting by forming a dark perimeter around them. This shall be used for habitat features noted as foraging areas for bats.
- Buffer zones will be used to protect dark buffer zones and shall ensure that light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. For key bat habitat, such as watercourses and treelines, there shall be an absence of artificial illumination. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected, as further outlined below.

Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).

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

9.5.2.1 Monitoring

Monitoring will be carried out in accordance with the methodologies set out in the CEMP (MHL, 2021b). During construction, the application of pollution prevention measures as set out within the CEMP will be checked regularly. The mitigation measures to protect hedgerows during construction shall be monitored to ensure its effectiveness.

Once operational, the implementation of the landscape plan and additional habitat (such as wild flower meadows and additional planting) shall be inspected to ensure effective implementation.

9.5.2.2 Enhancement

In line with Cork County Biodiversity action plan and All Ireland National Pollinator Plan, and in order to create a biodiversity net gain at the site, the landscaping proposals include areas of ecological enhancement such as wild flower areas and native tree planting linking with the proposed development. These measures are presented in full in the Landscape Masterplan (L108), which accompanies this planning application, as well as in the Landscape chapter of the EIAR.

These proposal are presented in more detail in Drawings L109 (R617 Public Realm); L110 (Central Amenity, including the wetland basins); L111 (Quadrangle Amenity); L112 (South Boundary) and L113 (Southwest Boundary).

The landscaping proposals seek to protect and enhance features (see Section 9.5.13, Landscape Protection Measures), as appropriate with a scheme which includes both native and non-native planting as appropriate to the location within the scheme ,with non-native species also chose based upon their value to pollinators.

With respect to habitat enhancement this includes in particular – the 'Basins/ wetland meadows' running through the centre of the site. Along the stream, existing streamside trees, ditch and understorey is to be retained. Stream enhancement woodland planting will include native species such as alder, willow, oak, and birch. Adjoining this an area of native semi-shade wildflower meadow will be created.

As noted above, there is also an area of wet willow woodland on the eastern side of the site. The landscape assessment noted that the willow cluster would likely live for decades, as they are good at regenerating. However, given the current growth form, the production of future specimens of merit is unlikely and will ostensibly perform as a cluster of plants. Their removal results in immediate habitat loss, but their value is to be replaced with clusters closer to the stream and therefore part of the ecological corridor along the streamline. In the area to be removed (to accommodate an attenuation tank), new mixed deciduous native woodland including oak, birch, hazel, alder and a flowering understorey will be created.

Tree planting serves to enhance the urban realm and provide commuting links to the various habitats. The aim is to improve visual screening while enhancing biodiversity. 85% of the planting will be deciduous, with 15% evergreen. There are pockets with clusters of 100% native species and urbanised zones where all of the trees are non-native, for performance in urban conditions. On balance, 75% of the trees and shrubs will be native. With the embargo on the movement and planting of Ash trees due to Ash Dieback disease (*Chalara fraxinea*), none are specified. It is noted that some of the non-native species could be replaced by Ash if the embargo is lifted. Proposed tree species to be used are as follows: -

- Field Maple (*Acer campestre*) 6%
- Norway Maple (*Acer platanoides*) 8%
- Birch (*Betula* spp.) 14%
- Hornbeam (*Carpinus betulus*) 4%
- Beech (*Fagus sylvatica*) 2%
- Apple / Crab apple (*Malus* spp.) 8%
- Scots Pine (*Pinus sylvestris*) 1%
- Wild Cherry (*Prunus avium*) 7%
- Oak (*Quercus* spp.) 9%
- Willow (*Salix aurita / caprea*) 20%
- Rowan (Sorbus aucuparia) 5%
- Lime (Tilia cordata) 10%
- Other Mixed Trees 6% >
- Woodland planting would be as follows: -
- Alder (Alnus glutinosa) 6%
- Downy Birch (Betula pubescens) 4%
- Hazel (Corylus avellana) 5%
- Hawthorn (Crataegus monogyna) 4%
- Spindle (Euonymus europaeus) 8%
- Holly (Ilex aquifolium) 10%
- Crab apple (Malus sylvestris) 2%
- Quaking Poplar (Populus tremula) 1%
- Wild Cherry (Prunus avium) 3%
- Prunus spinosa (Blackthorn) 8%
- Willow (Salix aurita / caprea) 28%
- Elder (Sambucus nigra) 8%
- Guelder Rose (Viburnum opulus) 8%

The following recommendations for enhancement for bats are adapted from Landscape and Urban Design for Bats and Biodiversity (BCT, 2012). To attract nocturnal flying insects, plant: -

- Mixtures of flowering plants, trees (including fruit trees) and shrubs to encourage a diversity of insects to sustain bats and other wildlife throughout the year. New planting shall include pollinator friendly tree species including locally appropriate species listed in the Pollinator Friendly Planting Code[11]. Hedgerows shall include a range of different species to provide food throughout the year, for example willows and blackthorn for early season nectar; hawthorn, bramble and rose for summer flowers and autumn berries; ivy for autumn nectar and later winter berries;
- Flowers that vary in colour, fragrance, shape, amount of nectar and time of flowering;
- Pale flowers that are more easily seen in poor light, so attracting insects at dusk;
- Single flowers, which tend to produce more nectar than double varieties; and
- Flowers with insect-friendly landing platforms and short florets, like those in the daisy or carrot families.

Other enhancement options include: -

- Integrated bat boxes built into the structure of buildings (with the majority located on southern orientations). The advice of the bat specialist would be sought to finalise the location of bat boxes on site.

SUDs features

Within the landscape plan shrubs and trees which have the potential to support foraging populations of birds are proposed in the landscape plan and: -

- Hawthorn (*Crataegus monogyna*)
- Holly (*Ilex aquifolium*)
- Rowan/Mountain Ash (*Sorbus aucuparia*).

9.6 RESIDUAL IMPACTS

The proposed development will result in the loss of grassland, woodland and hedgerow. Overall, the impacts of the proposed development in the absence of mitigation would be assessed as significant at the site level. Mitigation by avoidance is proposed for breeding birds, bats, trees, hedgerows; while strict adherence to on-site biosecurity measures would be implemented to prevent the spread of invasive species onto the site. A number of potential bat roosts in trees on site are also to be retained. Detailed measures to protect vegetation to be retained are set out in Section 9.5.13. Measures to reduce the effects of loss of habitats are also proposed in the form of detailed landscaping proposals. Details of trees to be planted are presented in Section 9.5.2.3. The protection of a wetland corridor along the central large drain will serve to retain and enhance the biodiversity value of this feature. Details are set out in Landscape Drawing L100 – Central Amenity. Planting of native woody species and wildflower meadows in public spaces is also proposed as mitigation in the Landscape Masterplan.

Enhancement proposals incorporated into the site landscape masterplan will improve the site potential for foraging bats and birds and will increase the potential for nesting and roosting opportunities for both. The value of the site for bats is to be retained through the careful design of lighting to account for bats foraging on site; protection of trees / hedges on the site boundary; planting of further trees throughout the site and in particular by protecting and enhancing the wetland corridor through the site, which links to the Dromin Stream to the west. Furthermore, bat boxes are to be provided on site in order to enhance bat roosting opportunities locally. With the effective implementation of the mitigation measures outlined in Section 6, such as landscaping and the minimisation of artificial light spill on to valuable habitats, no significant negative residual impacts on the conservation status of bat species will occur.

When considered in the context to the type and ecological value of semi-natural habitats to be lost on site, these measures will also benefit other groups using the site, such as birds, amphibians and invertebrates, and enhance the overall value of the site at a local level.

Overall, the residual impacts of the proposed development on ecology are likely to be slight negative impact at a site level and of short-term duration (i.e. Effects lasting one to seven years as per EPA, 2017). In the short to medium term (i.e. Medium term – seven to fifteen years) as vegetation on site mature the residual impact would increase to slight positive impact at a local level.

9.7 CUMULATIVE EFFECTS

The proposed development is located within the Settlement Boundary of Tower as identified in the Blarney/Macroom Municipal District Local Area Plan adopted in 2017. Tower is identified within this LAP as a Key Village. As per the Cork City Council Boundary Extension 2019, the site location is now included within the new Cork City Boundary.

The Cork County Development Plan, 2014 sets out policies and objectives for the development of the County during the period of the Plan. The Plan seeks to secure the sustainable development and improvement of the economic, environmental, cultural and social assets of Cork County. The Plan has outlined objectives for biodiversity within the county. These include: -

- Providing protection to all designated sites, national and European, and to maintain or develop linkages between these,
- Providing protection to protected plants and animals in accordance with legal requirements, and
- Retain areas of local biodiversity value, ecological corridors and habitats which contribute to the county ecological network, to protect them from inappropriate development.

A Strategic Environmental Assessment (SEA) and Natura Impact Statement (NIS) was prepared for the Cork County Development Plan, which assessed the Plan and its potential to adversely affect the environment as a whole and the integrity of Natura 2000 sites. The findings of the SEA and NIS were integrated into the Plan, ensuring that potential impacts were avoided, reduced or offset. Thus, the finding of the assessments was that the Plan will not adversely affect the general biodiversity and the integrity of Natura 2000 sites due to the incorporation of mitigation measures into the Plan as a result of the assessment processes.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

Projects that have been granted planning permission in the vicinity of the proposed Cloghroe project within the last 5 years were reviewed through the Cork County Council Cork Planning Enquiry System and the National Planning Application Map Viewer (MyPlan.ie). In the vicinity of the proposed project, developments that have obtained planning permission include additional elements to existing residential buildings, e.g. extensions, garages and boundary walls, construction of new residential buildings and retention of and permission for commercial buildings. These developments have conditions attached to their planning permission relating to sustainable development, such as siting of septic tanks, foul surface water and effluent drainage facilities, and clean surface water run-off drainage facilities.

[11] National Biodiversity Data Centre (2015). Pollinator Friendly Planting Code. All-Ireland Pollinator Plan 2015-2020. www.biodiversityireland.ie/pollinator-plan.

To the west of the site (Ref. 195413; ABP-307785-20) planning permission was refused for a "*Construction of 73 no. residential units comprising 5 no. detached 5-ded dwellings, 15 no. detached 4-bed dwellings, 50 no. semi-detached 3 bed dwellings of varying designs and 3 no. terraced 3-bed dwellings. The proposed development will include flood mitigation and protection works along the R579 road and all associated site works including the culverting of an existing stream, foul and storm drainage with attenuation, public lighting, landscaping and amenity areas. The development incorporates 1 no. new access from the R579*". A 3rd party appeal was submitted and turned down.

A summary of planning applications in the immediate environs of the site is presented in Table 6.1. Based upon current permitted and proposed developments, it is not anticipated that there will be in-combination effects with the proposed Cloghroe SHD.

It is considered that the proposed development will not result in negative impacts on any of the features of interest for which the Great Island Channel SAC and Cork Harbour SPA have been designated. In the absence of any significant impacts , it is not anticipated that other projects will act in-combination with the proposed development to give rise to any cumulative effects on any European sites.

Table 9.7 Other relevant developments.

Application Reference	Applicant(s)	Description	Outcome/Current Status
21/40620	Kevin McDonnell and Paul Coburn	Construction of 73 no. residential units, Upgrade of existing access from the R579, flood mitigation works which include works to the R579, culverting of existing streams,	Application is currently being assessed by Cork City Council.
Cork City Council Ref: 20/39202	Tower Residential Developments Limited	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.
Cork City Council Ref: 19/39001	Gleann Fia Homes Ltd.	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.
Cork County Council Ref: 19/4718	Whitebon Developments Ltd	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019. Construction has commenced on site
Cork County Council Ref: 18/7111	Hydro Estates Ltd	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019. Decision upheld by An Bord Pleanála submission of third-party appeals (Ref: ABP-305373-19).
Cork County Reference 18/6802	The Board of Management of Cloghroe National School	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final Permission granted on 4th December 2019
Cork County Council Ref: 18/5562	Gleann Fia Homes Ltd	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018. Construction has commenced on site with some units completed and occupied.

9.8 DIFFICULTIES IN COMPILING INFORMATION

Ecological field survey work was undertaken on the 23rd October 2020; 12th and 26th November 2020; 25th August 2021, and again in May and September 2021 by the bat specialist. As such the site was visited in summer, autumn and winter seasons. There were therefore no seasonal constraints to the survey work. The assessment was undertaken following detailed liaison with the Landscape Architect, design team (architects & engineers) and the project planners. As such there were no difficulties in compiling this assessment.

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CHAPTER TEN
Noise & Vibration

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10 NOISE & VIBRATION

10.1 INTRODUCTION

This chapter of the EIAR has been prepared by AWN Consulting Limited (AWN) to assess the potential noise and vibration impact of the proposed residential development in support of a planning application. The assessment considers both the short-term construction phase and the long-term operational phase on the surrounding environment. The site is located in Coolflugh, Cloghroe, Co. Cork. A full description of the development is available in Chapter 2 *Description of the Proposed Development*.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated with minimal impact on the receiving noise environment.

10.2 METHODOLOGY

The assessment of effects has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration, which are set out within the relevant sections of this report. In addition to specific guidance documents for the assessment of noise and vibration effects, which are discussed further in the relevant sections, the following guidelines were considered and consulted for the purposes of this report:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017), and;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017).

The study has been undertaken using the following methodology:

- Environmental noise surveys have been conducted at various locations across the site to assess the existing baseline noise environment;
- A review of the most applicable standards and guidelines has been carried out in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed to determine the noise and vibration impact on the nearest sensitive locations during the construction phase;
- Predictive calculations have been performed to determine the noise impact on the nearest noise-sensitive locations during the operational phase;
- A schedule of mitigation measures has been proposed for both the construction and operational phases to reduce, where necessary, the outward noise and vibration from the development;
- An assessment of cumulative impact has been carried out considering other plans and projects in the vicinity.

10.3 ASSESSMENT CRITERIA

10.3.1 Construction Phase – Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. Construction noise sources include construction plant and machinery and construction related traffic on surrounding roads.

The British Standard BS 5228-1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Noise* is referenced here for the purposes of setting appropriate construction noise limits for the development. This is the most widely accepted standard for this purpose in Ireland. This document sets out a method whereby construction noise thresholds are determined based on ambient noise level. This method is summarised in Table 10.1.

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

Table 10.1: Threshold of potential significant effect at dwellings

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.

Ambient noise levels are rounded to the nearest 5 dB when comparing to the relevant threshold category. Construction noise limits are then set according to the category definitions above. This method is commonly referred to as the 'ABC' Method.

The proposed development is located within the 2019 expanded Cork city boundary. From the date of transfer onwards, the Cork County Council Development Plan, Local Area Plans, and Local Economic and Community Plan in force in the relevant area immediately before the transfer day will continue to apply until these plans are next made by Cork City Council. Accordingly, until the adoption of the Cork City Development Plan 2022-2028, the Cork County Development Plan 2014-2020 is the applicable development plan, and contains the following policies and objectives of relevance:

Objective GI 13-1 Noise Emissions:

a) *"Seek the minimisation and control of noise pollution associated with activities or development, having regard to relevant standards, published guidance and the receiving environment."*

b) *"Support the implementation of Noise Action Plans prepared for the Cork County area."*

The purpose of these Noise Action Plans is to act as a means of managing environmental noise, and to meet the aims of the European Noise Directive (END) of preventing, and reducing where necessary, environmental noise through the adoption of the Plans. The planning authority will have regard to the Noise maps in the Action Plans, when assessing planning applications. The planning authority will also give careful consideration to the location of noise sensitive developments so as to ensure they are protected from major noise sources where practical.

10.3.2 Construction Phase – Vibration

There are two aspects to the issue of vibration that are addressed in the standards and guidelines: the risk of cosmetic or structural damage to buildings; and human perception of vibration. There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Vibration*;
- British Standard BS 7385: 1993: *Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration*.
- In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

BS 5228-2 and BS 7385 define the following thresholds for cosmetic damage to residential or light commercial buildings: PPV should be below 15 mm/s at 4 Hz to avoid cosmetic damage. This increases to 20 mm/s at 15 Hz and to 50 mm/s at 40 Hz and above. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded. This is summarised in Table 10.2 below.

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

Table 10.2: Transient vibration guide values for cosmetic damage

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

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

Furthermore, BS 5228-2 and BS 7385 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 10.2 and major structural damage can occur at vibration magnitudes greater than four times those in Table 10.2.

BS 5228-2 also provides guidance relating to the human response to vibration during construction activities. Guidance is again provided in terms of PPV in mm/s since this parameter is routinely measured when monitoring the structural effects of vibration. The potential human response at different vibration levels, as set out in BS 5228-2, is summarised in Table 10.3.

Vibration level Note A) B) C) (mm/s)	Effect
0.14	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	Vibration might be just perceptible in residential environments.
1.0	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	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

Table 10.3: Guidance on human response to vibration levels

A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.

B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.

C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

10.3.3 Operational Phase – Building Services Plant

In the case that heating, cooling or other active process is carried out on site, there is the potential for additional plant noise to be introduced to the environment. To assess this, reference is made here to the British Standard BS 4142: 2014 +A1 2019: *Methods for Rating and Assessing Industrial and Commercial Sound*. This standard can be used to assess the impact of a new continuous source to a residential environment and is used commonly by local authorities in their standard planning conditions and also in complaint investigations.

The method for assessing plant noise set out in BS 4142 is based on the following definitions:

"Specific noise level, $L_{Aeq,\ T}$" — is the equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T. This level has been determined with reference to manufacturer's information for specific plant items;

"Rating level, $L_{Ar,\ T}$" — is the specific noise level plus adjustments for the character features of the sound (if any);

"Residual noise level, $L_{Aeq,\ T}$" — is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval, T;

"Background noise level, $L_{A90,\ T}$" — is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

Adjustments to the rating level are appropriate where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention. In these cases, penalties are applied of either an additional 2 dB, 4 dB or 6 dB depending on how perceptible the tone is at the noise receptor.

The background level should then be subtracted from the rating level. The greater this difference, the greater the magnitude of the impact will be, in general. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, while a difference of around +5 dB is likely to be an indication of an adverse impact (as referred to in BS 4142), depending on the context.

10.3.4 Operational Phase – Additional Traffic on Surrounding Roads

Vehicular movement to and from the proposed development, such as associated trucks and staff car trips, will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UK Highways Agency et al, 2020); and Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017). Table 10.4 relates changes in noise level to impact on human perception based on the guidance contained in these documents.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0	Inaudible	No impact	Imperceptible
0.1 – 2.9	Barely Perceptible	Negligible	Not significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very significant

Table 10.4: Classification of magnitude of noise impacts in the long term

10.3.5 Operational Phase – Deliveries and Waste Collections

In a residential development, such as the proposed Cloghroe SHD, there is the potential for noise sources relating to deliveries and waste collection. Acceptable noise limits for these sources, both internally and externally, can be determined by referring to the British Standard BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. The following guidance, summarised in Table 10.5, is provided in this standard for internal ambient noise levels in dwellings:

Activity	Location	Daytime (07:00 to 23:00hrs)	Night (23:00 to 07:00hrs)	Derived External Levels
Resting	Living room	35 dB $L_{Aeq,\ 16hr}$	-	50 dB $L_{Aeq,\ 16hr}$
Dining	Dining room	40 dB $L_{Aeq,\ 16hr}$	-	55 dB $L_{Aeq,\ 16hr}$
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hr}$	30 dB $L_{Aeq,\ 8hr}$	50 dB $L_{Aeq,\ 16hr}$ (45 dB $L_{Aeq,\ 8hr}$ at night)

Table 10.5: Guidance on Indoor Ambient Noise Levels for Dwellings

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233, and represent the appropriate noise level at the external façade of the building.

10.3.6 Operational Phase – Vibration

The development is residential in nature, therefore, it is not anticipated that there will be any outward impact associated with vibration for the operational phase.

10.4 RECEIVING ENVIRONMENT

Environmental noise surveys have been conducted at the site (shown in Figure 10.1) in order to quantify the existing noise environment. The surveys were conducted in general accordance with ISO 1996: 2017 *Acoustics – Description, measurement and assessment of environmental noise.*

10.4.1 Baseline Noise Survey Locations

The measurement locations were selected to represent the noise environment at noise-sensitive locations surrounding the proposed development. The selected locations are shown in Figure 10.1 and described as follows:

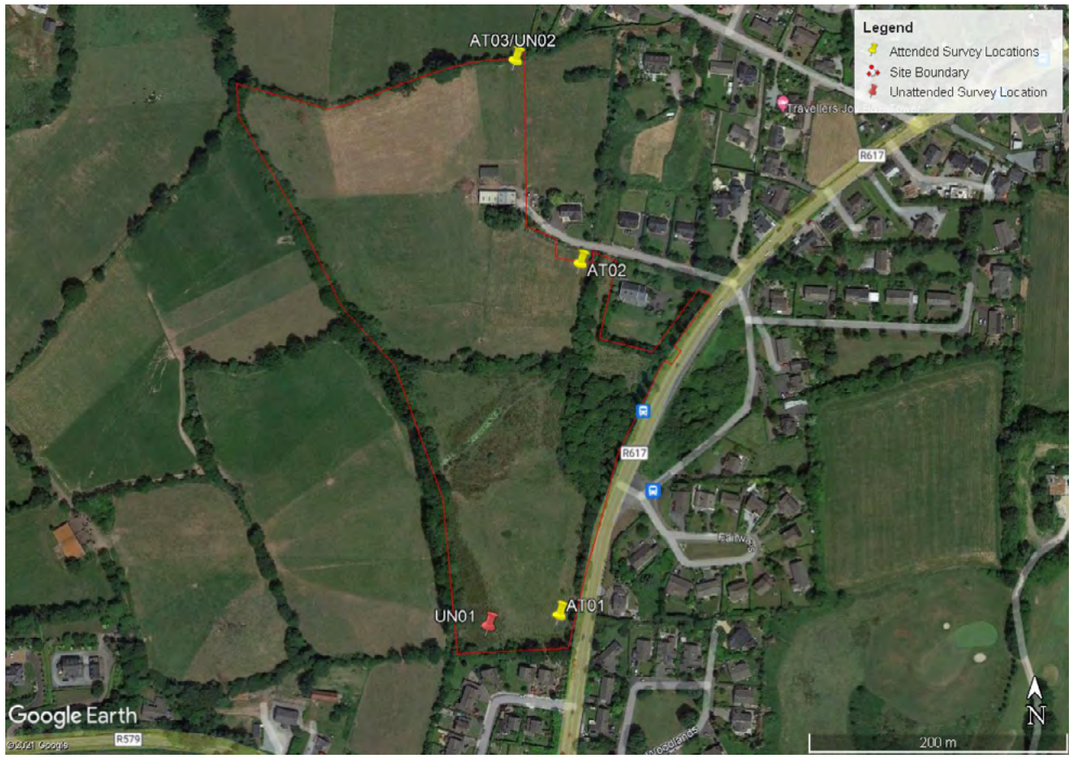
AT01 — Attended location selected to capture the daytime noise environment at the properties to the south of the site as well as to capture the noise level at the location of the proposed apartments at the southern end of the site.

AT02 — Attended location selected to capture the daytime noise environment at the properties to the east of the site.

AT03/UN02 — Selected to capture the daytime and night-time noise environment at the northern end of the site. Both attended and unattended measurements were carried out at this location.

UN01 — Unattended location selected to capture the daytime and night-time noise environment at the southern end of the site.

Figure 10.1: Baseline noise survey locations (Google Earth, 2021)



10.4.2 Survey Periods

All attended noise measurements were conducted between 12:00 and 16:00 on Wednesday 01 September 2021.

Unattended noise measurements were conducted between 12:00 on Wednesday 01 September and 18:00 on Thursday 02 September 2021.

Weather conditions during attended surveys were dry and overcast with temperatures between 17 and 18 degrees Celsius. Wind speeds were below 5 m/s, which is the maximum wind speed at which the microphone windshield is effective.

Weather conditions during unattended surveys were dry and overcast with temperatures between 13 and 18 degrees Celsius.

10.4.3 Personnel and Instrumentation

AWN installed and collected the noise monitoring equipment. The following instrumentation was used in conducting the noise surveys:

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	Brüel & Kjaer 2250L	3008402	04/11/2019
Sound Level Meter	Rion NL-52	164427	05/05/2020
Sound Level Meter	Rion NL-52	186672	04/05/2020

Table 10.6: Instrumentation details

10.4.4 Noise Measurement Parameters

The noise survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

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

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

The "A" suffix for the noise parameters denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2 x 10^{-5} Pa.

10.4.5 Survey Results

The results of the attended daytime noise surveys at AT01, AT02 and AT03 are summarised in Table 10.7, Table 10.8, Table 10.9 and Table 10.10, respectively. It should be noted that a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A10} and L_{A90} parameters.

AT01

Start Time	Measured Noise Levels (dB)				
	L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{A10}	L_{A90}
12:55	56	70	39	59	48
14:04	57	71	39	60	48
15:02	58	71	41	61	48
Average	**57**	-	-	**60**	**48**

Table 10.7: Summary of attended daytime noise measurements at AT01

The main noise sources at this location were road traffic from R617 (dominant), wind in trees and birdsong.

AT02

Start Time	Measured Noise Levels (dB)				
	L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{A10}	L_{A90}
12:08	45	54	36	48	40
13:22	49	65	41	52	45
14:23	48	56	40	50	44
Average	**48**	**-**	**-**	**50**	**43**

Table 10.8: Summary of attended daytime noise measurements at AT02

The main noise sources at this location were road traffic from R617 (dominant), occasional local car movements, noise from residents of nearby houses, wind in trees and birdsong.

AT03

Start Time	Measured Noise Levels (dB)				
	L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{A10}	L_{A90}
12:31	42	54	36	44	39
13:43	46	57	40	47	43
14:41	45	59	39	47	43
Average	**45**	**-**	**-**	**46**	**41**

Table 10.9: Summary of attended daytime noise measurements at AT03

The main noise sources at this location were road traffic from R617 (dominant), distant construction noise, distant tractor, occasional road traffic from Kiely's Lane, wind in trees and birdsong.

The results of the unattended noise surveys at UN01 and UN02 are plotted in Figure 10.2 and Figure 10.3 and are summarised in Table 10.11 and Table 10.12, respectively. Similar to the attended survey locations, a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A10} and L_{A90} parameters.

UN01

Figure 10.2: Time history plot of LAeq and LA90 at UN01

Date	Average Daytime Level	Background Daytime Level	Average Night-time Level	Background Night-time Level
	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
01/09/2021	55	44	46	27

Table 10.11: Summary of unattended noise measurements at UN01

The main noise sources at this location were road traffic from R617 (dominant), wind in trees and birdsong.

UN02

Figure 10.3: Time history plot of LAeq and LA90 at UN02

Date	Average Daytime Level	Background Daytime Level	Average Night-time Level	Background Night-time Level
	$L_{Aeq,16hr}$	$L_{A90,16hr}$	$L_{Aeq,8hr}$	$L_{A90,8hr}$
01/09/2021	45	38	34	25

Table 10.12: Summary of unattended noise measurements at UN02

The main noise sources at this location were road traffic from R617 (dominant), distant construction noise, distant tractor, occasional road traffic from Kiely's Lane, wind in trees and birdsong.

10.5 CHARACTERISTICS OF THE DEVELOPMENT

The proposed mixed-use residential and retail development is located in Coolflugh, Cloghroe, Co. Cork. The proposed residential development comprises 198 residential units consisting of 117 dwelling houses and 81 apartments, and a 2-storey creche. The proposed retail development consists of a single-storey retail food store as well as a 2-storey café building with a café on the ground floor and 2 apartments at first floor level. A full description of the development is available in Chapter 2.

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- Construction phase, and;
- Operational phase.

During the construction phase, the main source of noise and vibration will be plant items operating on site. During the operational phase, the main potential sources of outward noise from the development will be mechanical and electrical plant used to service the buildings, additional traffic on surrounding roads and deliveries and waste collections.

10.6 POTENTIAL IMPACTS OF THE DEVELOPMENT

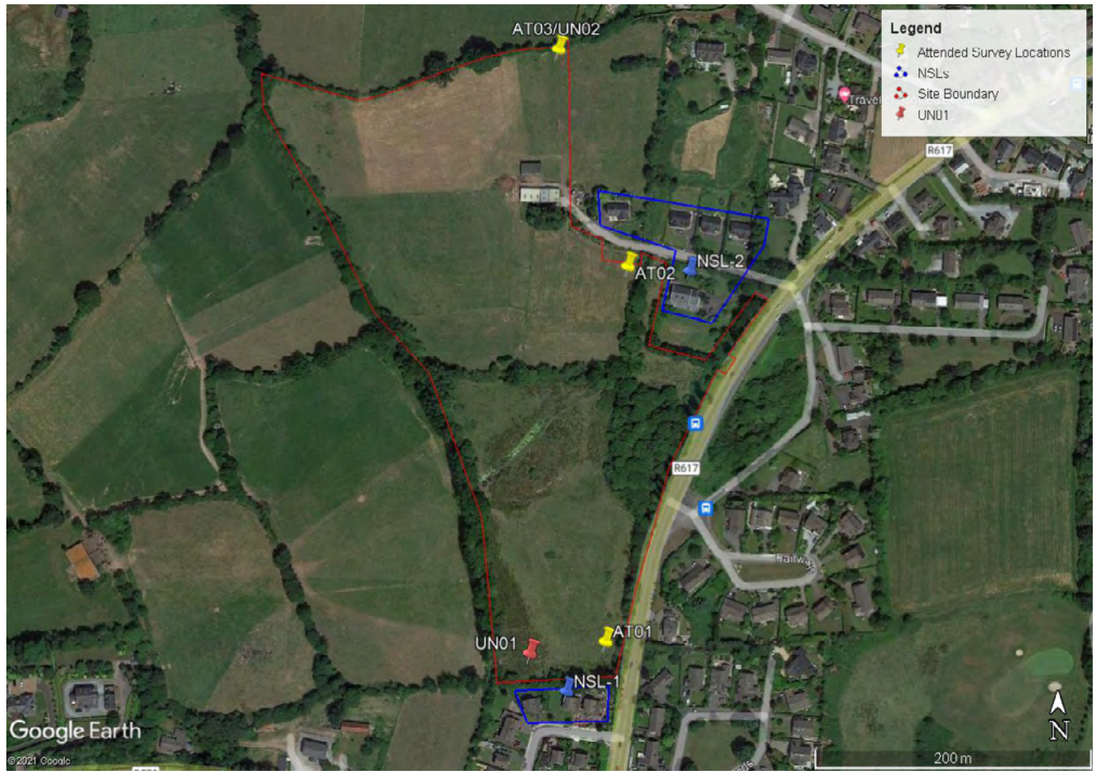
10.6.1 Construction Phase

The largest noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery and HGV movements to, from and around the site. However, the construction phase can be classed as a short-term phase (approximately four years in duration).

The nearest noise-sensitive locations to the site are shown in Figure 10.4 and are described as follows (distances refer to the nearest point of the development):

- Residential properties 15 m from the site boundary at the southern end (NSL-1);
- Residential properties 10 m from the site boundary at the north-eastern end (NSL-2).

Figure 10.4: Nearest noise-sensitive locations



Thresholds for significant noise from construction can be determined by referring to Table 10.1 (BS 5228-1) and the baseline ambient noise levels, as outlined in the assessment criteria section. The threshold is shown in Table 10.13. A night-time threshold is not included as construction work will not be taking place at night.

Location	Period	Significance Threshold
Noise-sensitive locations	Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65 dB $L_{Aeq,T}$

Table 10.13: Significance thresholds for construction noise

Based on the 'ABC' method described in BS 5228-1 and shown in Table 10.1, all noise-sensitive locations (NSLs) are in Category A.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m and an equivalent combined sound power level of 114 dB L_w(A). This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other along the closest site boundary to any NSL.

Guidance on the approximate attenuation achieved by barriers surrounding the site is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

The latter scenario can be assumed in this case due to the proximity of the noise-sensitive locations, i.e. a barrier height will be chosen so as to completely hide the source. Table 10.14 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 10 dB.

Description of Noise Source	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)				
	10	20	30	50	100
3 no. items each with SPL of 81 dB at 10 m operating simultaneously.	76	70	66	62	56

Table 10.14: Potential construction noise levels at varying distances assuming attenuation of 10 dB from site barrier

The calculated noise levels in Table 10.14 show that the significance thresholds for construction noise set out in Table 10.13 are exceeded at distances up to 30 m. The closest NSL is at 10 m. At this distance, in the worst-case scenario described above, the noise level may be as high as 76 dB. This indicates that mitigation measures will be necessary to prevent likely significant impacts at the noise-sensitive locations. Mitigation measures are set out in Section 10.7.

In terms of the potential vibration impact during the construction phase, site activities will be managed so as not to exceed the vibration limits set out in British Standard BS 5228-2 and summarised in Table 10.3 of this report. Furthermore, the mitigation measures set out in Section 10.7 of this report will be employed to further reduce the likelihood of significant effects.

10.6.2 Operational Phase

The main potential sources of outward noise from the development during the operational phase will be mechanical and electrical plant used to service the buildings, additional traffic on surrounding roads, deliveries and waste collections and childcare facilities.

10.6.3 Operational Phase – Building Services Plant

BS 4142: 2014: *Methods for Rating and Assessing Industrial and Commercial Sound* sets out a method for assessing the impact of a new continuous noise source to a residential environment such as plant items used to service the buildings of the proposed development. It states that if the rating level of the item exceeds the background noise level by 5 dB, an adverse impact is likely to occur, while an exceedance of 10 dB is likely to cause a significant adverse impact, depending on the context.

The background noise level at the boundaries of the site were determined through baseline noise surveys. Background noise levels during the day were in the range 38 to 48 dB $L_{A90,T}$. During the night, the average background noise level was 25 dB $L_{A90,8hr}$ in the south of the site and 27 dB $L_{A90,8hr}$ in the north of the site.

Based on the above, it is recommended that cumulative plant noise from mechanical plant associated with the development should not exceed 30 dB $L_{Aeq,15min}$ and should not contain audible tones at any noise sensitive locations.

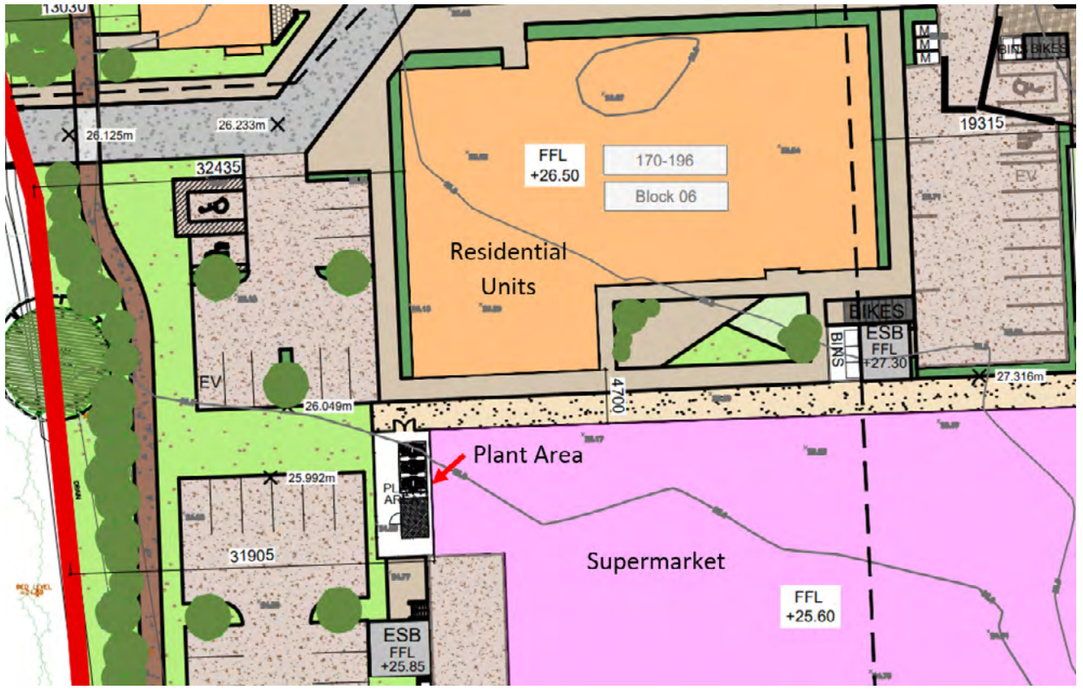
This is considered reasonable as it limits the level to 5 dB above the night-time background level and will result in a low internal noise level when considering the correction across a partially open window (Refer to Table 10.5).

The location or type of building services plant serving the residential units has not yet been established, therefore it is not possible to calculate the potential noise levels. In this instance, it is best practice to use the above guidance (BS 4142) to inform the detailed design during the selection and layout of building services for the development. Plant items will be selected, designed and located so that the cumulative operation of any external or vented plant items does not exceed a value of 30 dB $L_{Aeq,15min}$ external to the closest NSL. This will ensure that there is no negative impact on noise-sensitive locations.

With regard to the supermarket services plant specifically, the plant area, shown in Figure 10.6, is located such that one block of residential units overlook this area and have the potential to experience noise impacts in an unmitigated scenario. Other measures for plant noise control are set out in Section 10.7.2.

The layout of the supermarket plant area and apartment layout provides a high level of screening to other residential units in the proposed development such that operational plant noise impacts will be negligible across the remainder of the site.

Figure 10.6: Supermarket services plant location



10.6.4 Operational Phase – Additional Traffic on Surrounding Roads

The Traffic and Transportation Assessment (TTA) for the development states that the Government of Ireland document *Design Manual for Urban Roads and Streets (DMURS)* will be implemented. The objective of DMURS is to achieve better street design in urban areas to encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant, which will have the effect of lowering traffic speeds and reducing unnecessary car use.

In Chapter 5 Traffic and Transportation, changes to Annual Average Daily Traffic (AADT) are predicted for the opening year (2024). Table 10.15 presents these changes in relation to the affected links. Approximate corresponding changes to noise level are also presented in Table 10.15.

Road Link	24 Hour AADT for Opening Year (2024)		
	Without Development (AADT)	With Development (AADT)	% Increase (dB increase)
R579 (West)	8338	8888	6.6% (+0.3 dB)
R579 (East)	8525	9108	6.8% (+0.3 dB)
R617	10285	11418	11.0% (+0.5 dB)

Table 10.15: Predicted changes to 24 hour AADT with and without the development in place

With reference to Table 10.4 (DMRB), for the Opening Year 2024, the predicted change in noise level associated with additional traffic due to the proposed development has a negligible effect. The impact is therefore imperceptible and long term.

10.6.5 Operational Phase – Deliveries and Waste Collections

The internal layout of the proposed development has been designed to accommodate incoming service requirements such as deliveries to the residential units. Set-down spaces will be provided to accommodate this.

Waste collection from the apartment building within the proposed development will be organised and facilitated by the management company responsible for the upkeep of the proposed development's communal areas. Waste collection from the dwelling houses within the proposed development will be the responsibility of the individual householders who will engage an authorised waste collector for this purpose. As such, waste collection will follow a similar pattern to that of the existing surrounding area (e.g. weekly collections) and is not expected to result in a significant noise impact.

Deliveries to the supermarket are expected to occur once each morning, typically. However, further deliveries may be required throughout the day based on demand. The supermarket building is positioned favourably to accommodate deliveries from a noise perspective: it is approximately 50 m from the nearest off-site NSLs with a carpark in between, and; the supermarket building itself provides screening from the residential units within the development.

Due to the expected frequency of waste collection and deliveries to the proposed development as well as the positioning of the supermarket building, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area or on dwellings within the development.

10.6.6 Operational Phase – Childcare Facilities

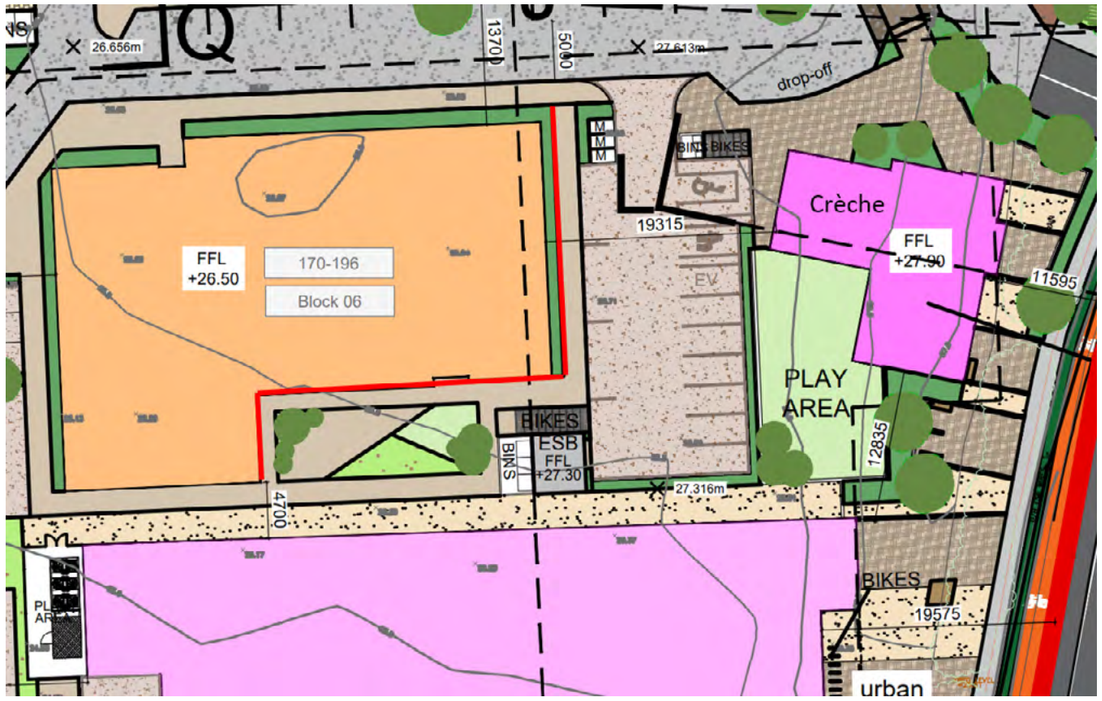
The proposed development includes a 2-storey crèche (c.405 m^2) located in the south-east of the development and this includes an outdoor play area. The proposed capacity of the crèche is 42 children.

There is a potential noise source from children playing in the outdoor area of the creche. The residential facades potentially exposed to this source are highlighted in red in Figure 10.5. Due to the location of the outdoor play area, it is considered there will be no impact on locations outside of the proposed development.

A value of 56 dB $L_{Aeq,1hr}$ at a distance of 5 m has been adopted to calculate noise levels from the external areas of the crèche. This value has been arrived at from a number of measurements taken by AWN of noise generated by children playing outdoors and is considered to represent the worst-case scenario.

The nearest façade to the outdoor play area is at a distance of 20 m. At this distance the predicted noise level resulting from the play area is 44 dB $L_{Aeq,1hr}$. With reference to BS 8233, as described in Section 10.3.5, the acceptable external noise level during the day at the façade of dwellings is 50 dB $L_{Aeq,16hr}$. Therefore, it is not considered that the proposed childcare facilities will result in a significant noise impact and mitigation will not be required. Notwithstanding this assessment, the best practice mitigation measures described in Section 10.7 should be employed.

Figure 10.5: Nearest residential facades to creche



10.7 REMEDIAL AND MITIGATION MEASURES

10.7.1 Construction Phase

BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites Parts 1 and 2 provide guidance on noise and vibration control in the context of construction. The control of noise from construction works can be divided into two categories:

- Controlling the noise at source, and;
- Controlling the spread of noise.

Mitigation measures that will be employed in order to control construction noise at its source include the following:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Minimise drop height of materials;
- Start up plant and vehicles sequentially rather than all together;

- The normal operating hours of the site will be adhered to. This also applies to the movement of plant onto and around the site;
- The plant and activities chosen to carry out the construction work will be the quietest available means of achieving the required purpose;
- Modifications will be made to plant and equipment, if appropriate, for noise attenuation purposes, provided the manufacturer has been consulted. For example, a more effective exhaust silencer may be fitted to a diesel engine;
- As far as is reasonably practicable, sources of significant noise will be enclosed provided that ventilation and potential hazards to operators have been considered;
- Plant and noisy activities will be located away from noise-sensitive areas where practicable and sources of directional noise should be oriented away from noise-sensitive areas;
- All plant and equipment will be regularly maintained (increases in plant noise are often indicative of future mechanical failure).

Mitigation measures that will be employed in order to control the spread of construction noise include the following:

- The distance between noise sources and noise-sensitive areas will be increased as much as is reasonably practicable;
- Where noise control at source is insufficient and the distance between source and receiver is restricted, screening will be implemented. The location of barriers providing screening is an important consideration. Barriers will be located either close to the source of noise (as with stationary plant) or close to the receptor. The height of the barrier must also be considered. BS 5228-1 states that an approximate attenuation of 5 dB is achieved when the top of the plant is just visible to the receiver over the noise barrier, while an attenuation of 10 dB is achieved when the noise screen completely hides the sources from the receiver. A barrier height will be chosen so as to completely hide the source at least along the boundaries adjacent to the commercial premises. Furthermore, where the noise source is 1 m from the façade of a building, an allowance of +3 dB will be made for reflection.

Mitigation measures that will be employed in order to control vibration from construction works, with reference to BS 5228-2, include the following:

- The plant and activities chosen to carry out the construction work will be chosen to cause as little vibration as possible while achieving the required purpose;
- All plant and equipment will be regularly maintained to reduce unnecessary vibration;
- Activities causing significant vibration will be located away from sensitive areas and/or isolated using resilient mountings where practicable.

10.7.2 Operational Phase – Building Services Plant

At the detailed design stage, best practice measures relating to building services plant will be taken to ensure there is no significant noise impact on noise-sensitive locations. Best practice measures in this context include the following:

- Where ventilation is required for plant rooms, acoustic louvers or attenuated acoustic vents will be used, where required and appropriate, to reduce noise breakout;

Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment;

- The use of perimeter plant screens will be used, where required, for roof-top plant areas to screen noise sources;
- The use of attenuators or silencers will be installed on external air-handling plant;
- All mechanical plant items, e.g. fans, pumps etc., shall be regularly maintained to ensure that excessive noise generated by worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document;
- Installed plant will have no tonal or impulsive characteristics when in operation.

10.7.3 Operational Phase – Childcare Facilities

In terms of crèche activities, particularly in the outdoor play area, the following mitigation measures are recommended:

- The play area surface should be a soft porous rubber to provide some additional sound absorption;
- Vegetation should be retained along the boundaries to discourage children from playing in the closest areas to the residential units.

10.7.4 Operational Phase – Additional Traffic on Surrounding Roads

As explained in Section 10.6.4, it is considered that the changes to traffic flows will not result in a significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case.

10.7.5 Operational Phase – Deliveries and Waste Collections

Based on the assessment in Section 10.6.5, it is not expected that deliveries and waste collections are likely to cause a significant impact. Therefore, no mitigation measures are necessary in this case.

10.8 CUMULATIVE IMPACT

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

There are no committed developments within range of the proposed development that would result in a significant cumulative impact during the construction phase. However, a planning application has been made for the construction of 73 residential units (ref. 21/40620) on the lands adjacent to the west of the proposed development. In the case that the construction phases of these developments coincide, there is potential for significant noise impacts to occur at the noise-sensitive locations to the south of the proposed development (NSL-1 in Figure 10.4) in the worst-case scenario.

To mitigate this, the measures set out in Section 10.7.1, as well as a barrier which completely hides the source from the receiver, will be implemented. Furthermore, activity at the closest works boundary to NSL-1 will be kept to a minimum. The duration of any such activity will be limited so as to be temporary.

As a result, the predicted cumulative impact is considered to be temporary, negative and moderate to significant in the worst-case scenario.

With regard to the operational phase, the assessment of additional traffic on surrounding roads includes that due to other committed developments and TII growth rates which take account of further development in the wider area.

10.9 INTERACTIONS

In compiling this impact assessment, reference has been made to the project description provided by the project co-ordinators, project drawings provided by the project architects and traffic flow projections associated with the development provided by the traffic consultants. Furthermore, this chapter has informed the Biodiversity and Population and Human Health chapters.

10.10 INWARD IMPACT

For the proposed development, the potential source of inward noise is road traffic from R617. The baseline noise surveys carried out, summarised in Section 10.4, indicate that road traffic noise dominates the noise environment of the site.

10.10.1 Methodology

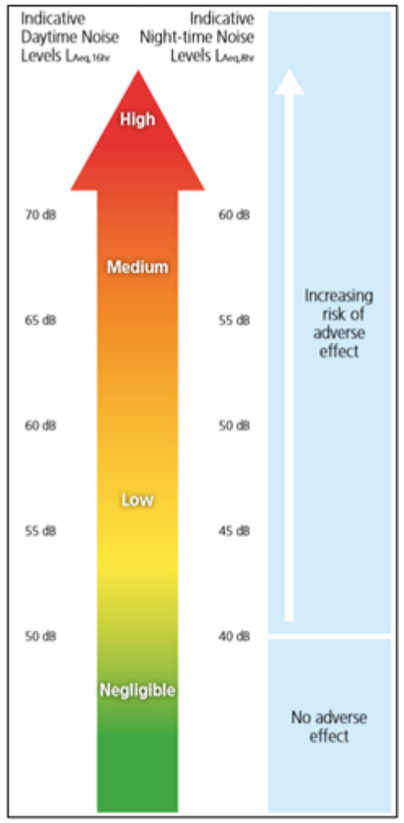
The approach taken is that recommended in the Professional Guidance on Planning & Noise (ProPG) document published in May 2017. This is the most relevant and recent document used to assess new residential developments in an area with an existing climate of environmental noise. ProPG is a systematic, proportionate, risk-based, 2-stage approach. Stage 1 is an initial noise risk assessment of the proposed development site. Stage 2 is a systematic consideration of the following four elements:

- Demonstrating a good acoustic design process;
- Observing internal noise level guidelines;
- Undertaking an external amenity area noise assessment;
- Consideration of other relevant issues.

10.10.2 Stage 1 Assessment

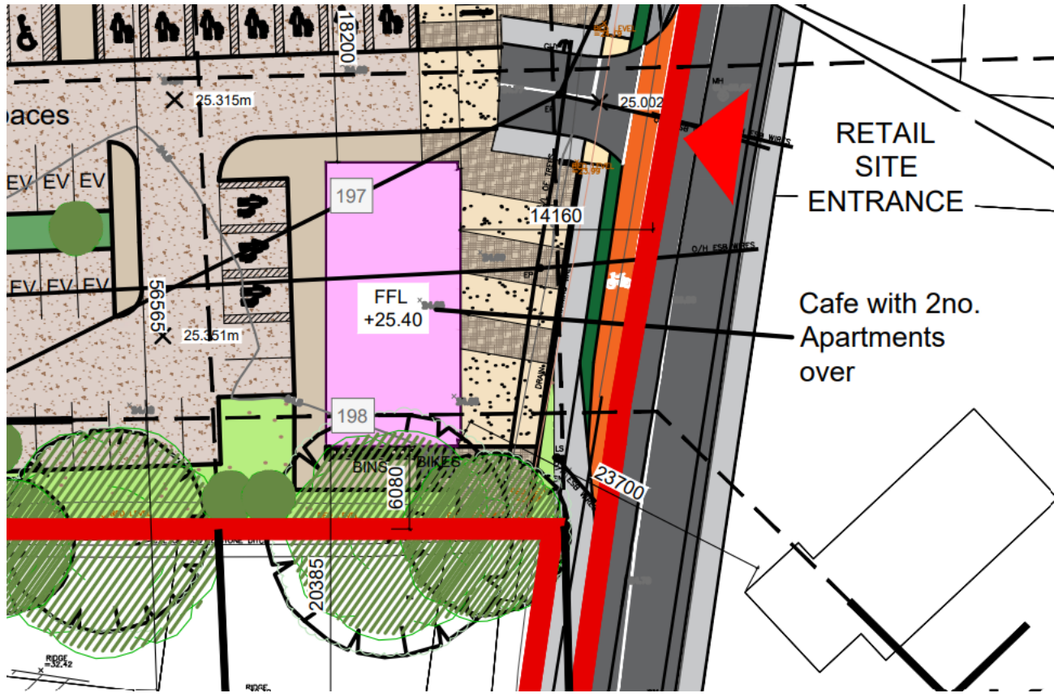
Figure 10.7, taken from the ProPG document, outlines the recommended method of assigning risk relating to adverse noise effects.

Figure 10.7: ProPG initial noise risk assessment



Based on the results of the baseline noise surveys, all locations of proposed development on site were found to have a negligible risk of inward impact with the exception of the two apartments facing the R617 on the first floor of the café building at the southern end of the site. Therefore, this assessment will focus on these apartments which are shown in Figure 10.8.

Figure 10.8: Cafe building with two apartments on the first floor



Baseline noise surveys were taken at the proposed location of the façade of these apartments which faces R617. The results of the surveys indicate that the ambient daytime and night-time noise levels at this location are 57 and 48 dB $L_{Aeq,T}$, respectively. For the purposes of this assessment, worst-case levels of 60 and 50 dB $L_{Aeq,T}$ will be used for day and night-time, respectively.

Based on the ProPG risk assessment method outlined in Figure 10.7 and the measured daytime and night-time noise levels, the proposed location of the apartments is considered to be low risk during both day and night-time periods. The following pre-planning application advice is provided in the ProPG document in relation to low risk sites:

"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."

10.10.3 Stage 2 Assessment

Element 1 – Good Acoustic Design Process

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating or reducing noise levels from relevant sources;
- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
- Assess the viability of alternative solutions, and;
- Assess external amenity area noise.

In the context of the proposed Cloghroe SHD, each of the considerations listed above have been addressed in the following subsections.

Relocation or Reduction of Noise from Source

Noise sources incident upon the development site have been determined to be low risk at one location. The majority of the site has been determined to have negligible risk. With regards to road noise, this source is located outside the redline boundary of the site and therefore it is beyond the scope of this development to introduce any noise mitigation at source. Screening proposed as part of landscaping works will benefit noise levels across the site at ground level but will have no significant benefit in terms of residential units at upper levels that retain a direct line of sight to R617.

Planning, Layout and Orientation

As part of the project design, the proposed buildings are set back from the road boundary. The orientation of the site is such that the buildings themselves screen the common external amenity areas associated with the development.

Select Construction Types for meeting Building Regulations

The design of all buildings is required to meet with all relevant parts of the Building Regulations. The specific detail of which will be completed at detailed design stage. In terms of the building sound insulation, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade. For the purposes of this assessment it is assumed that the building with be ventilated by heat recovery units therefore removing the need to open windows to ventilate living spaces.

Sound insulation performance for glazing will be implemented, where required, to achieve suitable internal noise levels within the development. Achievement of acceptable internal ambient noise levels does not form part of building regulation requirements. However, this will be incorporated into the building design in line with best practice and compliance with the guidance set out in ProPG.

Impact of noise control measures on fire, health and safety etc.

The good acoustic design measures that have been implemented on site, e.g. locating properties away from the road are considered to be cost neutral and do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

The main noise source incident on the site is road traffic. This source is largely mitigated by the distance to the buildings, screening by the on-site building and orientation of building layouts to avoid overlooking of sensitive amenity spaces to the main noise sources. All the measures listed above aid in the control of noise intrusion to the buildings across the development site.

Assess External Amenity Area Noise

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

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

The baseline noise surveys demonstrate that the noise levels at the location of proposed external amenity areas are within this range. Screening from buildings that will form part of the proposed development will provide further reduction in noise level.

Summary

Considering the constraints of the site, insofar as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

Element 2 – Internal Noise Levels

Calculations were performed in accordance with BS EN 12354, as per BS 8233 Appendix G.2, to determine the internal noise levels within the rooms of the apartments under consideration during the day and night.

As is the case in most buildings, the windows, or glazed elements, of the building envelope are typically the weakest element from a sound insulation perspective. BS 8233 is the relevant standard that applies to indoor ambient noise levels. The guidance provided in this standard is summarised in Table 10.5 of this report.

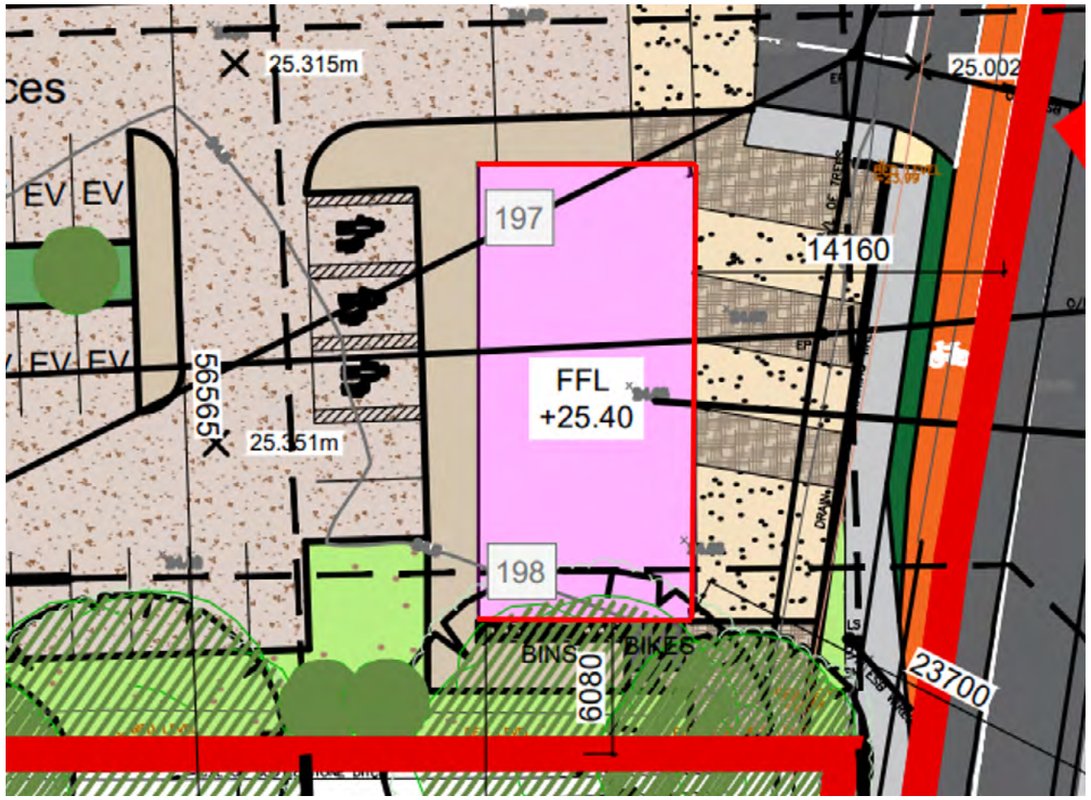
Based on the room volume, façade area, window area, sound insulation performance of vents and other considerations, a glazing specification was determined which will achieve the recommended indoor ambient noise levels as per BS 8233. This glazing specification is detailed in Table 10.16. The sound insulation performance detailed in Table 10.16 is typically achieved with a standard thermal double glazed window system.

Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
Eastern façade of apartments on first floor of café building	17	21	30	38	36	35	33

Table 10.16: Sound insulation performance requirements for glazing for each category (dB)

This glazing specification will be applied to the façades of the two apartments on the first floor of the café building that are marked in red in Figure 10.9. Incorporating this glazing specification, the worst-case internal noise levels within the apartments were calculated to be 33 dB L_{Aeq} during the day and 23 dB L_{Aeq} at night. These are below the recommended levels provided in BS 8233.

Figure 10.9: Facades to which glazing specification applies



The overall R_w outlined above is provided for information purposes only. The over-riding requirement is the octave band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 10.16 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

It is recommended that the window supplier provides laboratory tests confirming the sound insulation performance (with reference to British Standard 2750 Part 3:1980 and British Standard 5821, or British Standard EN ISO 140 Part 3 1995 and British Standard EN ISO 717, 1997).

Element 3 – External Amenity Areas

External noise levels within the public open spaces and private gardens across the development site are within the recommended range of noise levels from ProPG of between 50 and 55 dB $L_{Aeq,16hr}$ as determined by the baseline noise surveys. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site.

10.11 REFERENCES

- BS 5228-1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Noise*.
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes. Transport Infrastructure Ireland. 2014.
- BS 5228-2: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Vibration*.
- BS 7385: 1993: Evaluation and measurement for vibration in buildings. Part 2: *Guide to damage levels from ground borne vibration*.
- BS 4142: 2014: *Methods for Rating and Assessing Industrial and Commercial Sound.*
- BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*.
- Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2. UK Highways Agency et al. 2020.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environmental Protection Agency. 2017.
- ISO 1996: 2017 Acoustics – *Description, measurement and assessment of environmental noise.*
- Design Manual for Urban Roads and Streets (DMURS). Government of Ireland. May 2019.
- Professional Practice Guidance on Planning & Noise. May 2017

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Cultural Heritage

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1 CULTURAL HERITAGE

11.1 INTRODUCTION

This chapter assesses the likely significant impacts of the proposed Cloghroe strategic housing development (as detailed in Chapter 2) on the known and potential cultural heritage resource. The term 'Cultural Heritage' encompasses heritage assets relevant to both the tangible resource (archaeology and architectural heritage); and non-tangible resources (history, folklore, tradition, language, placenames, etc.). The recorded and potential cultural heritage resource within a study area encompassing the proposed development site and the lands extending for 1km from its boundary, was reviewed in order to compile a comprehensive cultural heritage baseline for this assessment. The chapter was prepared by John Cronin of John Cronin and Associates.

11.2 METHODOLOGY

The methodology used for this assessment is based on guidelines presented in the Environmental Protection Agency (EPA) *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA 2017), the European Commission *Guidance on the preparation of the Environmental Impact Assessment Report* (2017), *Framework and Principles for the Protection of Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht and the Islands 1999) and *Architectural Heritage Protection Guidelines for Local Authorities* (Department of. Arts, Heritage and the Gaeltacht 2011) as well as the *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (International Council on Monuments and Sites (ICOMOS) 2011).

A study area comprising the area of the proposed development site and lands extending for 1km in all directions was reviewed as part of the assessment. The review commenced with a programme of desk-based research which was followed by site inspections by the author and these studies were undertaken to identify any known or potential features of archaeological, architectural or cultural heritage significance likely to be impacted by the proposed development. The chapter also assesses cumulative impacts including those associated with relevant proposed and permitted developments and plans within the surrounding landscape.

11.2.1 Desktop Study

Documentary research on the recorded and potential cultural heritage resource within the study area and its environs was carried out in order to identify any recorded archaeological, architectural and other cultural heritage sites and features. This information has provided an insight into the development of the study area over time and also assisted in an evaluation of the potential presence of unrecorded cultural heritage sites or features.

The principal sources reviewed for the assessment of the recorded archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). Cork County Council's Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH) were consulted to assess the designated architectural heritage resource. Summaries of the legal and planning frameworks designed to protect these elements of the cultural heritage resource are also provided within the chapter.

Other sources consulted as part of the assessment included the following:

Development Plan

While the proposed development is located within the 2019 expanded Cork city boundary, the Cork County Council Development Plan (2014-2020) as well as the Blarney Macroom Municipal District Local Area Plan (2017) remain in force in the relevant area and will continue to apply until these plans are next made by Cork City Council. Relevant information, such as planning objectives, Record of Protected Structures, Architectural Conservation Areas and Special Policy Areas, published in the current County Development Plan and Local Area plan were, therefore, reviewed as part of the assessment. The current Cork City Development Plan (2015-2021) was also consulted.

Database of Irish Excavation Reports

The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland (North and South) from 1970 to present. Current data was accessed via www.excavations.ie in November 2021.

Literary Sources

Various published literary sources were consulted in order to assess the archaeological, historical, architectural heritage and folklore record of the study area and these are listed in **Section 11.8** of this chapter.

Archaeological Inventory of County Cork Vol. 3: Mid Cork

This publication presents summary descriptions of the recorded archaeological sites within this area of the county and the relevant entries are included within the chapter. In addition, the current national online database resources pertaining to same were accessed on Historical Environment Viewer at www.archaeology.ie in November 2021.

Historic Maps

The detail on historic maps sources can indicate the presence of past settlement patterns, including features of archaeological and architectural heritage significance that no longer have any surface expression. Available cartographic sources dating from the 17th century onward were reviewed.

Aerial/Satellite Imagery

A review of available online aerial images of the study area was undertaken in order to ascertain if any traces of unrecorded archaeological sites were visible and to review the extent of development within the study area during recent decades.

Irish Heritage Council: Heritage Map Viewer

This online mapping source (www.heritagemaps.ie) is a spatial data viewer which collates various cultural heritage datasets sourced from, among others, the National Monuments Service, National Museum of Ireland, local authorities, the Royal Academy of Ireland and the Office of Public Works. The published dataset of archaeological artefact discovery locations published on this online resource does not record any examples within the study area.

Irish National Folklore Collection

Transcribed material from the National Folklore Collection archive has been digitised and published online at www.duchas.ie.

Placenames Database of Ireland

This online database (www.logainm.ie) provides a comprehensive management system for data, archival records and place names research conducted by the State.

UNESCO designated World Heritage Sites and Tentative List

There are two world heritage sites in Ireland and a number of other significant sites are included in a Tentative List (2010) that has been put forward by Ireland for inclusion.

11.2.2 Field Survey

The proposed development site was inspected in clear weather conditions in August 2021 and all areas were subject to a programme of field-walking surveys. No constraints were encountered during these surveys and all areas of the proposed development site were accessible. The lands within the development boundary were assessed in terms of modern land use, vegetation cover and the potential for the presence of previously unrecorded archaeological sites or structures of architectural heritage interest. The field survey results are described within the chapter (**Section 11.4.5**) and extracts from the photographic record compiled during the field survey are presented in **Appendix 11.1**.

11.2.3 Impact Assessment

The following section presents a summary of the methodology used to compile this assessment including the criteria for the determination of the nature of impacts as well as the scope of desktop studies and site inspections. The methodology used for this assessment has been informed by the European Commission *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report* (2017) and the Environmental Protection Agency (EPA) *Draft Guidelines for Information to be Contained in EIAR* (2017). The following summation of the criteria used to assess impacts is provided in order to clearly and concisely outline the methodology specifically applied to the cultural heritage resource.

Duration of Effect

The duration of effects is assessed based on the following criteria:

- Momentary (seconds to minutes)
- Brief < 1 day
- Temporary <1 year
- Short-term 1-7 years
- Medium Term 7-15 years
- Long Term 15-60 years
- Permanent > 60 years
- Reversible: Effects that can be undone, for example through remediation or restoration

Quality of Effect

The quality of an effect on the cultural heritage resource can be positive, neutral or negative.

- Positive Effect: a change which improves the quality of the cultural heritage environment (e.g. increasing amenity value of a site in terms of managed access, signage, presentation etc. or high-quality conservation and re-use of an otherwise vulnerable derelict structure).
- Neutral Effect: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment.
- Negative Effect: a change which reduces the quality of the cultural heritage resource (e.g. visual intrusion on the setting of an asset, physical intrusion on features/setting of a site etc.)

Type of Effect

The type of effect on the cultural heritage resource can be direct, indirect or no predicted impact.

- Direct Impact – where a cultural heritage site is physically located within the footprint of the proposed development, which will result in its complete or partial removal.
- Indirect Impact – where a cultural heritage site or its setting is located in close proximity to the footprint of the proposed development.
- No predicted impact – where the proposed development will not adversely or positively affect a cultural heritage site.

Magnitude of Effect

This is based on the degree of change, incorporating any mitigation measures, on a cultural heritage asset and can be negative or positive. The magnitude is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible and has been informed by criteria published in the International Council on Monuments and Sites *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011) (**Table 11.1**).

Table 11.1: Magnitudes of Effect on Cultural Heritage Assets

Magnitude	Description
High	Most or all key archaeological or architectural materials affected such that the resource is totally altered Comprehensive changes to setting Changes to most or all key historic landscape elements, parcels or components; extreme visual effects; fundamental changes to use or access; resulting in total change to historic landscape character Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation
Medium	Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified. Considerable changes to setting that affect the character of the archaeological asset. Changes to the setting of a historic building, such that it is significantly modified. Change to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, considerable changes to use or access, resulting in moderate changes to historic landscape character. Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

Magnitude	Description
Low	Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different. Slight changes to setting of an archaeological monument. Change to setting of a historic building, such that it is noticeably changed. Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; slight changes to use or access; resulting in limited change to historic landscape character Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Negligible	Very minor changes to key archaeological materials or setting. Slight changes to historic building elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels or components; virtually un-changed visual effects; very slight changes to use or access; resulting in very small change to historic landscape character. Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

Value Assessment

While various national and local authority legal designations exist for elements of the Irish cultural heritage resource (see Section 11.3.2), there are currently no formal criteria for grading the values of individual elements of this resource. The National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Local, Regional and National) to structures included in that inventory and, while these rankings do not confer a graduated level of protection they have been utilised as a value indicator for NIAH-listed structures for the purpose of this assessment.

Given the absence of formal criteria the evaluations used in this assessment (**Table 11.2**) have been informed by guidelines presented in the ICOMOS *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011). The evaluation of the values of cultural heritage assets is, therefore, not intended as definitive but rather as an indicator which contributes to a wider judgment-based assessment of the individual circumstances of each asset. The application of values included a consideration of their legal designations (e.g., National Monuments), condition/preservation; documentary/historical significance, group value, rarity, visibility in the landscape, fragility/vulnerability and amenity value on a case-by-case basis. It is noted that archaeological monuments, whether extant or levelled, have the potential to possess sub-surface attributes, such as artefacts, human burials or other archaeological remains, that may possess values that cannot be discerned without recourse to archaeological excavation but are unlikely to be affected in the absence of direct negative impacts. The value of all known or potential assets that may be impacted by development are ranked according to the following scale as defined by ICOMOS: Very High; High; Medium; Low and Negligible. The values assigned to relevant cultural heritage assets within the area were determined following the completion of the desktop research combined with subsequent site inspections and are outlined in **Section 11.4.6**.

Table 11.2: Indicative factors for assessing the Value of Cultural Heritage Assets

Indicative Value	Example of Asset Types
Very High	International Significance which may potentially include: World Heritage Sites (including Tentative List properties) Assets of acknowledged international importance Assets that can contribute significantly to international research objectives
High	National Significance which may potentially include: Designated *National Monuments in State Care* Assets of significant quality, rarity, preservation and importance, including designated RMP sites Assets that can contribute significantly to acknowledged national research objectives Protected Structures/National NIAH Grade Buildings Conservation Areas containing significant buildings of importance, including group value Archaeological Landscapes with significant group value
Medium	Regional Significance which may potentially include: Assets of moderate quality, preservation and importance Assets that can contribute significantly to acknowledged regional research objectives Regional Grade NIAH structures Other undesignated buildings that can be shown to have exceptional qualities in their fabric or historical associations Undesignated structures of potential importance (archaeological, potential 'new sites') Conservation Areas containing buildings that contribute significantly to its historic character Historic townscape or built-up areas with notable historic integrity in their buildings and settings
Low	Local Significance which may potentially include: Assets of local importance, including structures graded as Local by NIAH Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value, but with potential to contribute to local research objectives Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Negligible	Assets with very little or no surviving archaeological interest Buildings of no architectural or historical note; buildings of an intrusive character

Significance of Effects

This is based on a consideration of the Magnitude of the Impact (graded from High to Negligible, based on a consideration of character, duration, probability and consequences) combined with the Value (graded from High to Negligible, based on a consideration of significance/sensitivity) of the cultural heritage asset. The Significance can be described as Profound, Very Significant, Significant, Moderate, Slight, Not Significant or Imperceptible (**Tables 11.3 and 11.4**).

Table 11.3: Significance of Effects (per EPA Draft EIAR Guidelines 2017)

Significance	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	An effect which causes noticeable changes in the character of the environment but 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 most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 11.4: Significance of Effects Matrix (after EPA Draft EIAR Guidelines 2017)

Magnitude of Impact	**High**	Not Significant/ Slight	Moderate/ Significant	Significant/ Very Significant	Very Significant/ Profound
	Medium	Not Significant	Slight	Moderate/ Significant	Significant/ Very significant
	Low	Not Significant/ Imperceptible	Slight/ Not Significant	Slight	Moderate
	Negligible	Imperceptible	Not Significant/ Imperceptible	Not Significant/ Slight	Slight
		Negligible	**Low**	**Medium**	**High**
		Value/Sensitivity of the Asset			

11.2.4 Statutory Consultation

A requested scoping opinion for the proposed development was issued by the Development Applications Unit on 19th November 2021. This contained observations/recommendations in relation to the need for an archaeological impact assessment of the proposed development given its large scale and that this should include assessment of any watercourses within the footprint of the proposed development. This chapter presents the results of the archaeological impact assessment.

11.3 DESCRIPTION OF EXISTING ENVIRONMENT

11.3.1 General Context

The study area is located within the townland of Coolflugh which is located on the western outskirts of Tower village and is c.3.5km to the west-south-west of the town of Blarney, County Cork. In general, the lands within the site boundary comprise an area of poorly-drained and sloping farmland bounded by modern suburbs to the east and farmland to the west. As is detailed within this chapter, there are no recorded archaeological sites or designated architectural structures located within the proposed development site or immediately adjacent to its boundaries.

11.3.2 Legal and Planning Context

This section presents a concise summary of the legal and planning policy frameworks relevant to this assessment in order to provide a context for the statutory protection assigned to the cultural heritage resource. The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the Granada Convention (1985) (formally the European Convention on the Protection of Architectural Heritage), ratified by Ireland in 1997; and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified by Ireland in 2015. The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed and none are located within the region of the country containing the proposed development.

The National Monuments Service (NMS), which is currently based in the Department of Housing, Local Government and Heritage is responsible for the protection and promotion of Ireland's archaeological heritage.

The national statutes and guidelines relevant to this assessment include:

- National Monuments Acts 1930-2014
- Heritage Council Acts 1995 and 2018
- National Cultural Institutions Act 1997
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous) Provisions Act 1999
- Planning and Development Acts 2000 to 2021
- Department of Arts, Heritage and Gaeltacht 2011 *Architectural Heritage Protection: Guidelines for Planning Authorities.*
- Department of Arts, Heritage, Gaeltacht and the Islands 1999 *Framework and Principles for the Protection of Archaeological Heritage*

11.3.2.1 Relevant Archaeological Legislation and Planning Policies

The National Monuments Acts, the Heritage Council Acts and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains. There are a number of mechanisms under the National Monuments Acts that are applied to secure the protection of archaeological monuments. These include the designation of National Monument status for sites of national significance, the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP), the Sites and Monuments Record (SMR), and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites[1].

[1] https://www.archaeology.ie/sites/default/files/media/publications/NMS%20-%20Managing%20and%20Protecting%20Ireland%27s%20Archaeological%20Heritage%202013.pdf

The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed as part of the assessment and none are located in the vicinity of the proposed development.

Section 2 of the National Monuments Act, 1930 defines a National Monument as '*a monument or the remains of a monument, the preservation of which is a matter of national importance'*. The State may acquire or assume guardianship of examples through agreement with landowners or under compulsory orders. Archaeological sites within the ownership of local authorities are also deemed to be National Monuments. The prior written consent of the Minister is required for any works at, or in proximity to, a National Monument or at sites which are subject to a Preservation Order. There are no National Monuments in State Care located within the study area.

The RMP was established under Section 12 (1) of the National Monuments (Amendment) Act, 1994 and was based on the earlier SMR and RHM. It comprises lists and maps of all known archaeological monuments and places for each county in the State and all listed archaeological sites receive statutory protection under the National Monuments Act 1994. No works can be undertaken at their locations or within their surrounding designated Zones of Notification without providing two months advance notice to the NMS.

There are no recorded archaeological sites located within the proposed development site while there are six examples in the surrounding 1km study area (Table 11-5). None of these archaeological sites are included in the current list of monuments that have been assigned Preservation Orders by the NMS[2]. The SMR was also reviewed to ascertain it contains any entries for recorded but unlocated archaeological sites within the townland containing the proposed development (Coolflugh) and no such entries are present.

The study area is located within the extended 2019 Cork City Council boundary. From the date of transfer onwards, the Cork County Council Development Plan, Local Area Plans, and Local Economic and Community Plan in force in the relevant area immediately before the transfer day will continue to apply until these plans are next made by Cork City Council. Accordingly, until the adoption of the Cork City Development Plan 2022-2028, the Cork County Development Plan 2014-2020 is the applicable development plan, and contains the following policies and objectives of relevance:

HE 3-1: Protection of Archaeological Sites

a) *Safeguard sites and settings, features and objects of archaeological interest generally.*

b) *Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments including the Sites and Monuments Record (SMR) (see www.archeology.ie) and the Record or Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, as amended and of sites, features and objects of archaeological and historical interest generally.*

HE 3-2: Underwater Archaeology

Protect and preserve the archaeological value of underwater archaeological sites and associated features. In assessing proposals for development, the Council will take account of the potential underwater archaeology of rivers, lakes, intertidal and subtidal environments.

HE 3-3: Zones of Archaeological Potential

Protect the Zones of Archaeological Potential (ZAPs) located within historic towns and other urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the potential for subsurface archaeology and if archaeology is demonstrated to be present appropriate mitigation (such as preservation in situ/buffer zones) will be required.

E 3-4 Industrial and Post Medieval Archaeology

Protect and preserve the archaeological value of industrial and post medieval archaeology such as mills, limekilns, bridges, piers, harbours, penal chapels and dwellings. Proposals for refurbishment, works to or redevelopment/ conversion of these sites should be subject to careful assessment.

A review of the Blarney Macroom Municipal District Local Area Plan 2017 revealed that this publication contains no specific development objectives in relation to the archaeological resource within the Tower village area, which encompasses the location of the proposed development.

In addition, for the sake of completeness, the current Cork City Development Plan 2015-2021 includes the following objectives in relation to the protection of the archaeological resource:

Objective 9.4 Archaeological Heritage: Cork City Council will aim to protect, record and promote the rich archaeological heritage of the city

Objective 9.5 Sites of Established Archaeological Interest: Cork City Council will protect and enhance the archaeological value of the sites (and their settings) listed in the Record of Monuments and Places (RMP).

Objective 9.6 Newly Discovered Sites: Cork City Council will protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places (RMP)

Objective 9.7 Preservation of archaeological remains in-situ: In accordance with national policy (and in the interests of sustainability) impacts on the buried archaeological environment should be avoided where possible.

Objective 9.15 Surveys, Test Trenching and Monitoring: Archaeological surveys, test excavation and /or monitoring will be required for development proposals in areas of archaeological importance, if the application is likely to impact upon in-situ archaeological structures or deposits

Objective 9.16 Large-scale Development (outside the boundaries of a RMP): Outside the Zone of Archaeological Potential of a RMP, where in the opinion of the City Council a development involves major ground disturbance; archaeological conditions may be applied particularly in the vicinity of known monuments.

11.3.2.2 Relevant Architectural Heritage Legislation and Planning Policies

Protection of architectural or built heritage is provided for through a range of legal instruments that include the Heritage Act 1995, the Architectural Heritage (National Inventory) and National Monuments (Miscellaneous Provisions) Act 1999, and the Planning and Development Act 2000. The Planning and Development Act 2000, as amended, requires all Planning Authorities to keep a 'Record of Protected Structures' (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In addition, local authorities must provide for the preservation of places, groups of structures and townscapes of architectural heritage significance through designation of Architectural Conservation Areas (ACAs).

The National Inventory of Architectural Heritage (NIAH) was established to record architectural heritage structures within the State and while inclusion in the NIAH does not provide statutory protection it is intended to advise local authorities on compilation of their Record of Protected Structures. The NIAH also includes a Survey of Historic Gardens and Landscapes which comprises a non-statutory, desk-based survey of such features.

There are no Protected Structures or NIAH-listed structures located within the proposed development site and there are no Architectural Conservation Areas within its environs. The surrounding 1km area contains one Protected Structure and a building listed in the NIAH and these structures are detailed in Section 11.3 of this chapter.

[2] https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf

The Cork County Development Plan 2014-2020 contains the following policies and objectives of relevance:

HE 4-1: Record of Protected Structures

a) *The identification of structures for inclusion in the Record will be based on criteria set out in the Architectural Heritage Protection Guidelines for Planning Authorities (2005)*

HE 4-2: Protection of Structures on the NIAH

Give regard to and consideration of all structures which are included in the NIAH for County Cork, which are not currently included in the Record of Protected Structures, in development management functions.

HE 4-3: Protection of Non- Structural Elements of Built Heritage

Protect important nonstructural elements of the built heritage. These can include designed gardens/garden features, masonry walls, railings, follies, gates, bridges, and street furniture. The Council will promote awareness and best practice in relation to these elements

HE 5-1:Cultural Heritage

Protect and promote the cultural heritage of County Cork as an important economic asset

A review of the Blarney Macroom Municipal District Local Area Plan 2017 revealed that this publication contains one site specific objective in relation to the architectural heritage resource within the Tower village area, which encompasses the location of the proposed development. This relates to the designation of the location of St. Anne's Hydropathetic Establishment, including its historic demesne, as a Special Policy Area (Plan ref. X-01). This Protected Structure is located outside of the study area at a distance of c. 1.46km to the northeast of the proposed development.

In addition, for the sake of completeness, it should be noted that the Cork City Development Plan 2015-2021 presents a number of objectives intended to protect the architectural heritage resource within the City Council's administrative area and these include the following:

Objective 9.23 Record of Protected Structures (RPS): Cork City Council will maintain a Record of Protected Structures within the Cork City Development Plan, which shall include structures or parts of structures which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, and which it is an objective to protect.

Objective 9.25 Recording of Protected Structures: Any alteration or demolition of a Protected Structure shall require a full record to Best Conservation Practice.

Objective 9.26 Historic Landscapes: Cork City Council will ensure the historic landscapes and gardens throughout the city are protected from inappropriate development.

Objective 9.27 Enabling Development: Cork City Council will consider permitting the following, notwithstanding the zoning objectives of the area: - The restoration of a Protected Structure, or other buildings of architectural or other merit, currently in poor condition, to conservation best practice standard for any purpose compatible with the character of the building; - The conservation of a Protected Structure or other building of architectural merit or other merit, independent of its current condition, to a tourist related use, in cases where, in the City Councils opinion, the converted building is capable of functioning as an important additional tourist attraction or facility, and the use is compatible with the character of the building.

Objective 9.28 Protection of NIAH and other structures of built heritage interest: The City Council as planning authority aims to protect structures of built heritage interest. The "Ministerial Recommendations", made under Section 53 of the Planning Acts, asking the City Council to protect structures will be taken into account when the City Council as planning authority is considering proposals for development that would affect the historic interest of these structures of significance. The City Council will protect structures by making additions to the Record of Protected Structures, designating Architectural Conservation Areas, or other appropriate means.

Objective 9.29 Architectural Conservation Areas: To seek to preserve and enhance the designated Architectural Conservation Areas in the City.

Objective 9.34 Individual buildings of character in suburban areas/ villages: There will be a presumption against the demolition of buildings of Historic or Vernacular character in suburban areas/villages.

Objective 9.35 Elements of the Built Heritage: To ensure the protection of important elements of the built heritage and their settings as appropriate.

11.3.3 Desktop Study

11.3.3.1 Archaeological and Historical Context

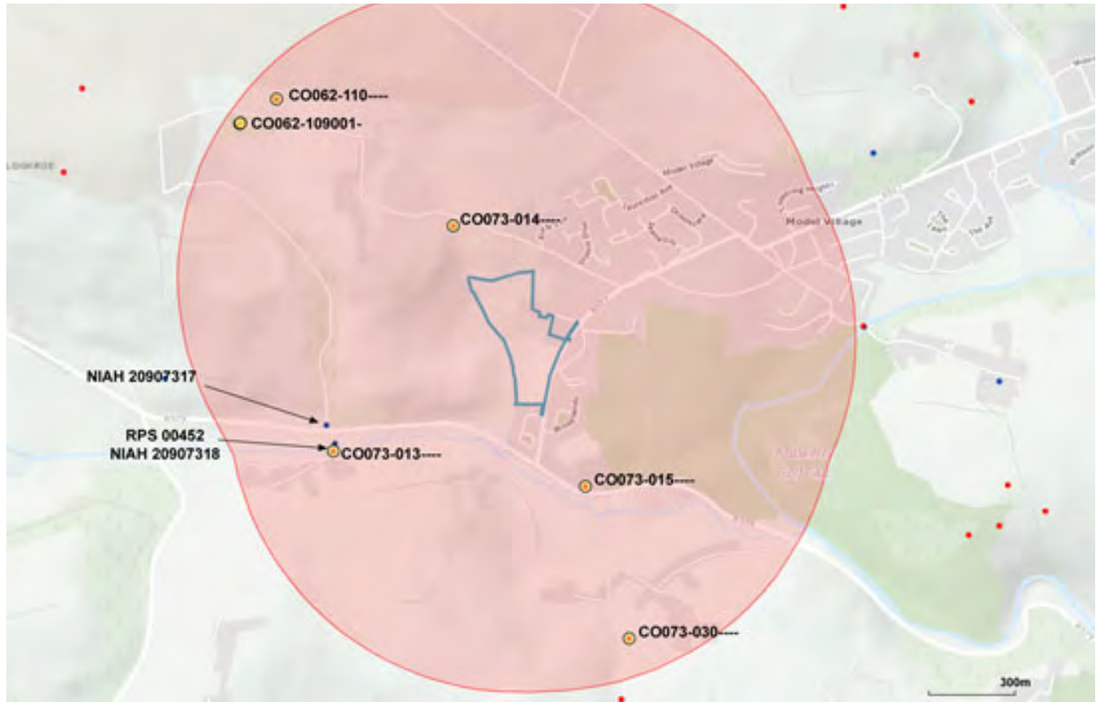
Relevant datasets have been interrogated and retrieved from current state and local authority sources and are considered accurate at the time of writing in September 2021. The dating framework used for each period of the archaeological record is based on the framework presented in the *Guidelines for Authors of Reports on Archaeological Excavations* as published by the National Monuments Service[3]. The published inventory entries of all recorded archaeological sites and designated architectural structures within the study area are provided as is information acquired from other sources consulted during the desktop study, including details on previous archaeological investigations, historic maps and literary sources.

Table 11.5: Recorded archaeological sites within 1km study area

Monument No.	Class	Townland	ITM E	ITM N	Distance from proposed development
C0062-109001- C0062-109002-	Moated site / Unclassified castle	CLOGHROE	556392	575386	945m to northwest
C0062-110----	Burial ground	DROMIN (Muskerry East By.)	556519	575472	890m to northwest
C0073-013----	Bridge	CLOGHROE,DROMIN (Muskerry East By.)	556713	574257	640m to southwest
C0073-014----	Fulacht fia	COOLFLUGH	557127	575034	180m to north
C0073-015----	Bullaun stone	COOLFLUGH	557583	574134	330m to south
C0073-030----	Road unclassified togher	COOLATUBBRID	557734	573612	860m to south

Figure 11.1: Recorded archaeological sites and designated architectural structures within the 1km study area (shaded)

[3] https://www.archaeology.ie/sites/default/files/media/publications/excavation-reports-guidelines-for-authors.pdf



Early Prehistoric Periods

Until the recent identification of Palaeolithic human butchery marks on a bear bone recovered from a cave site in County Clare, the earliest recorded evidence for human activity in Ireland dated to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers lived on the heavily wooded island. The archaeological record indicates that these mobile groups favoured coastal, lake and river shores which provided a transport and food resource. They did not construct any settlements or monuments that have left any above ground traces although their presence in an area can often be identified by scatters of worked flints in ploughed fields or during earth-moving undertaken as part of development works. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns in farmlands within areas of cleared forestry. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, and artefacts such as pottery begin to appear in the archaeological record during this period. While there are no recorded Mesolithic or Neolithic sites within the 1km study area, examples dating to these periods has been revealed elsewhere in County Cork.

Late Prehistoric Periods

The advent of the Bronze Age period (c. 2400–500 BC) in Ireland saw the introduction of a new artefactual assemblage, including metal and ceramic objects, to the island. This period was also associated with the construction of new monument types such as wedge tombs, standing stones, stone rows/circles and burnt mounds known as fulachta fia. The development of new burial practices during this period also saw the construction of funerary monuments such as cairns, barrows, boulder burials and cists. The arrival of iron-working technology in Ireland saw the advent of the Iron Age (600 BC – 400 AD). Relatively little has been known about Iron Age settlement and ritual practices until recent decades when the corpus of evidence has been greatly increased by the discovery of sites dating to this period during bog-cutting works and road construction projects. It is noted that while the vast majority of prehistoric settlement sites leave no above ground remains their foundations and occupation deposits, which may contain artefactual and environmental remains, can often survive below modern ground surfaces.

There is one site of probable late prehistory date within the 1km study area, and this comprises a *fulacht fiadh* (CO073-014----) which is a site type typically interpreted as the remains, of Bronze Age cooking activities. While many have been levelled by ploughing or land improvement works, in their undisturbed form they comprise horseshoe-shaped mounds of heat-cracked stone and charcoal-enriched soil often built up around a central trough. They functioned by placing heated stones into a water-filled trough in order to raise the water to boiling point and are typically located near or adjacent to streams, springs or marshy areas. The example within the 1km study area has been described as follows in the *Archaeological Inventory of County Cork. Volume 3: Mid Cork* (Power 1997):

> ***CO073-014—***
>
> *Class: Fulacht fia*
>
> *Description: In marshy ground, on E side of stream and c. 10m S of Polly's Well. Overgrown horseshoe-shaped mound of burnt material (Wth 7.7m; H 0.65m); opening faces S.*

The recorded location of a timber trackway, or togher, (CO073-030----) is located within the southern end of the study area. These types of sites often date to the late prehistoric period but as described in the following inventory description the example within the study area did not produce any timbers suitable for dendrological dating (Power 1997):

> ***CO073-030—***
>
> *Class: Road - unclassified togher*
>
> *Description: Along valley bottom of small stream flowing S to N. Two oak planks (L 1.6m; 0.3m x 0.3m; L 1.7m; c. 0.4m x c. 0.3m) and other small fragments of same dredged when remains of 19th century roadway were being removed from bed of valley. The planks appear to be remains of togher or wooden trackway following same line as later road. When stream dredged, section of trackway evident, crossing line of stream. Timbers recovered but insufficient rings for dendrochronology date.*

Early Medieval Period

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to the settlement sites of the period but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. The study area contains the present location of a bullaun stone (CO073-015----), an archaeological object which comprises a boulder with a carved hollow which are often found associated with early ecclesiastical sites. The example within the study area was recovered during an excavation of Inishleena Abbey (CO072-044001-), which is located 5.7km to the west of the proposed development site, in advance of the Lee Valley Hydro-Electric Scheme and the bullaun stone is now situated within a secondary location within the grounds of Cloghroe National School in the southern end of the study area.

While this period saw the emergence of the first phases of urbanisation around the Hiberno-Norse ports, the dominant settlement pattern continued to be rural-based and centred around enclosed farmsteads known as ringforts. These are

the most common early medieval sites within the Irish landscape and comprise circular enclosures delimited by earthen banks formed of material thrown up from a concentric external ditch. The ubiquity of these enclosures within the Irish landscape is attested to by the fact that their original Gaelic names (*rath and lios*) still form some of the most common place-name elements in the country. Archaeological excavations have demonstrated that the majority comprised enclosed farmsteads containing the foundations of domestic and agricultural buildings. Ringforts may form the visible element of wider farmlands (known as *airlise*) that may contain unrecorded, sub-surface archaeological features such as associated field systems, stockades, barns, mills and drying kilns. While there are no recorded ringforts located within the study area, there are numerous examples within the wider region indicating a widespread settlement pattern had been established in the area by this period.

High and Late Medieval Periods

The arrival of the Anglo-Normans in the late 12th century broadly marks the advent of the Irish high medieval period which continued to c.1400 and was followed by the late medieval period which extended to c.1550. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and numerous villages and towns began to develop throughout the country, often within the environs of Anglo-Norman manorial centres which were defended by masonry castles. By the 15th century the native Irish chieftains and lords began to construct tower-house castles within their own landholdings as centres of territorial control. There is little historical information on the settlement and land-use patterns within the environs of the proposed development site during these periods and there is one known archaeological sites dating to these periods located within the surrounding study area and this comprises a moated site (CO062-109001-), which is also listed as an unclassified castle (CO062-109002-). located 945m to the northwest of the proposed development site. A potential burial ground (CO062-110----) in a field to the north of the moated site may also date to these periods although given the lack of any dating for this site such an interpretative is tentative. These sites are described as follows in the *Archaeological Inventory of County Cork. Volume 3: Mid Cork* (Power 1997):

CO062-109001-

Class: Moated site

Description: In level tillage, surrounded by mature coniferous trees to E and W. Roughly square area (c. 40m N-S; c. 40m E-W) raised 3.4m above surrounding ground level, with traces of bank surviving to N. Interior enclosed by wide fosse (c. 18m) with substantial outer earthen bank (H 1.8m). Fosse dry and infilled to S. Breaks in inner bank to N and in scarp to E, with no corresponding breaks in outer bank. Interior surface uneven and heavily overgrown. Circular stone-lined depression (diam. 3.6m; D 1.4m) in NW corner of interior. In NE quadrant, roughly square area (8m N-S; 8m E-W) is defined by low rise to E; scarp to S with walling (L 3.2m; H 1.2m; min. T 1.2m) at E end of S side; outer face of single course of walling visible for c. 4m at centre of W side. Probably site of 'Gynes Castle (site of)', indicated in NE quadrant on 1937 OS 6-inch map. Castle built by Ralph de Guines who died in 1280; survey in 1656 declared castle as 'ruinous' (Healy 1988, 46-7). Day (1892, 187) described 'brick-arched recess with finely-cut and moulded stone stairs' where body of Captain Joseph Capel of Cloghroe House' lay according to his desire for a day and night', hence named 'Capel's Hole' on 1937 OS 6-inch map. Hartnett (1939, 278) notes that this was in SE corner of interior. Day (ibid., 188) also described 'stone chair looking NW, which appears to have been one of those in which the chieftains were enthroned in ancient days', which Hartnett (ibid., 279) located towards centre of interior. No visible surface trace of stone chair or brick-lined vault noted, however area overgrown and fallen trees remain scattered across site. Named 'site of Grave Yard' on 1842 OS 6-inch map.

CO062-110—

Class: Burial ground

Description: In pasture, c. 100m to NE of moated site (9387). Depicted on 1842 OS 6-inch map as roughly circular area (c. 60m NW-SE) defined by broken line. Slight rise visible in area of site. According to Hartnett (1939, 279), field to E locally known as 'Pairc na Croiche (the field of the gallows)...and from time to time human bones are unearthed here during tillage operations'.

Post-Medieval and Early Modern Periods

The centuries following 1550 comprise the post-medieval period which continued into the middle of the 19th century and the period thereafter is often described as early modern. The early part of the post-medieval period was a turbulent time in Ireland history and saw a prolonged period of wars between the 1560s and 1603 with further conflicts arising during the Cromwellian Wars (1649–53). This period saw the extensive dispossession of forfeited Gaelic lands and the final disintegration of the Gaelic order in the early 17th century followed the Battle of Kinsale (1601), the conclusion of the Nine Years War (1603) and the Flight of the Earls (1607). The townland of Coolflugh is included in a list of Irish lands in a 16th century Tudor document as *Cwilfliughe* indicating that the townland was in existence by that time[4]. The Down Survey, which was compiled during the 17th century as part of the Cromwellian Plantation, records that Coolflugh townland formed part of the extensive County Cork landholdings of the Catholic MacCarthy family and is listed amongst the holdings of Donough MacCarthy, Viscount Muskerry in 1641 and Callaghan MacCarthy, earl of Clancarthy in 1671.

The post-medieval period saw the development of high and low status stone houses throughout the Irish countryside and rural settlement clusters at this time typically consisted of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common as the 19th century progressed. An agricultural boom in the late 18th and early 19th centuries saw a rise in prices for both tillage and dairy produce and resulted in Irish landlords investing in extensive land improvement works within their holdings. This included widespread land drainage works, introduction of soil nutrients, grass planting and the enclosure of open lands into field systems that survive to the present-day. The popularity and success of potato farming contributed to a population boom during the 18th and early 19th centuries and its failure in the middle of the latter century was to have devasting consequences. The settlement pattern throughout much of the rural landscape was greatly affected by the Famine period and its aftermath which saw the depopulation of many areas. The following decades were marked by an increasing move away from small-scale subsistence farming towards more market-led pasture, assisted by the development of the Co-Op system, which also increased the extent of land reclamation of previously marginal lands.

Samuel Lewis' *Topographical Dictionary of Ireland* (1837) provides historical and statistical descriptions of several of the counties, cities, boroughs, parishes, villages and post towns throughout Ireland from this time. The description of the parish of Inishcarra does not include any references to the townland of Coolflugh. The Griffith's Valuation of 1852 records that the owner of the lands within the proposed development site was Thomas Fitzgerald who were leased an area of the holding to a tenant farmer, named Timothy Cowney.

There is one post-medieval archaeological site within the study area, and this comprises a late 18th century bridge (CO073-013----) located 640m to the southwest of the proposed development site. This has been described as follows in the *Archaeological Inventory of County Cork. Volume 3: Mid Cork* (Power 1997):

4

C0073-013—

Class: Bridge

Description: Hump-backed road bridge (Wth 5.52m) over Owennagearagh River. Three semicircular arches; rough voussoirs; N arch repaired; width of bridge extended at S end by 2.1m allowing road to cut across corner; new face of arch has cut voussoirs. Low, pointed breakwaters added on upstream side. Stone paving underneath bridge. Parapet wall with vertical stone coping probably contemporary with additions.

Excavations Database

The Database does not contain any entries for licensed archaeological investigations within the proposed development site or at the locations of the modern residential developments within the study area. The Database does contain one entry describing the results of a project of monitoring of church refurbishment works within the study area and a number of pre-development investigations within lands outside the study area and to the east of Tower village. Nothing of archaeological significance was identified at any of these investigated locations and the following are the relevant Database entries:

Licence: 14E03665

Archaeologist: Avril Purcell

Monitoring of the refurbishment of St Senan's Church, Cloghroe was carried out from December 2014 to September 2105. No features or finds of archaeological significance were revealed.

Licence: 05E09856

Archaeologist: Ciara Brett

Two test-trenches were excavated across the site in advance of the proposed construction of two dwelling houses. No features or finds of archaeological significance were revealed.

Licence: 06E04597

Archaeologist: Máire Ní Loingsigh

Five test-trenches were excavated at the site of a proposed housing development in a field to the north-east of Tower village. Stratigraphy in the trenches consisted of a mid-brown stony soil, 0.4–0.5m deep, over orange/brown stony, sandy subsoil; limestone bedrock was visible in places. The 'Hydro' (C0062–235) directly to the north will not be affected by the proposed development. No archaeological finds or features were noted during testing.

Licence: 18E02878

Archaeologist: Colm Chambers

Testing was carried out ahead of a proposed housing development. Eleven trenches were mechanically excavated on the footprint of the development. The trenching layout was designed to target a number of potential archaeological features identified within the development site during geophysical survey (18R0064). No archaeological features or artefacts were noted in any of the test trenches.

[5] http://excavations.ie/report/2015/Cork/0024616/
[6] http://excavations.ie/report/2005/Cork/0013222/
[7] http://excavations.ie/report/2006/Cork/0015094/
[8] http://excavations.ie/report/2018/Cork/0026406/

11.3.3.2 Designated Architectural Heritage

There are no Protected Structures or NIAH-listed buildings located within the boundary of the proposed development site. The surrounding study area contains one Protected Structure (RPS 00452) which comprises a late 18th century road bridge, known locally as the Sheep Bridge, over the Owennagearagh River that is also listed in the RMP (C0073-013----) and NIAH (20907318). A 19th century building currently in use as a private residence is located to the north of the bridge is also listed in the NIAH (20907317). This was originally a gate lodge associated with Cloghroe House, the site of which is located outside the west end on the study area. The road bridge and former gate lodge are both located over 600m from the proposed development site (**Table 11.6** and **Figure 11.1**).

Table 11.6: Designated architectural heritage structures within 1km study area

RPS	NIAH Ref.	Structure	ITM E	ITM N	Distance from Proposed Development
00452	20907318	Road Bridge	556713	574257	640m to southwest
-	20907317	House	556690	574347	630m to southwest

The NIAH has published the following inventory descriptions of these two structures:

Sheep Bridge

Registration No: 20907318

Rating: Regional

Description: Triple-arch humpback road bridge, built c. 1780, spanning Owennagearagh River. Segmental-headed acres having dressed stone voussoirs springing from rubble stone piers with V-cutwaters. Rubble stone spandrels and parapet walls having solider coping stones to parapet.

Appraisal: This well-executed bridge with its fine rubble stone walls and dressed voussoirs is an important feature of the surrounding area. The use of local materials in its construction helps the bridge to blend into its surroundings. It is a technically impressive structure that forms an important crossing point over the Owennagearagh River.

House

Registration No: 20907317

Rating: Regional

Description: Detached three-bay single-storey former gate lodge, built c. 1820, having central single-bay breakfront to front (east) elevation and lean-to extension to rear (west). Now in use as house. Hipped slate roof with overhanging eaves, angled rendered chimney stack with yellow brick coping and uPVC rainwater goods. Rendered walls. Square-headed window openings with painted stone sills, having arcaded timber casement windows to front elevation and timber tripartite casement windows to side elevations. Square-headed door opening with glazed timber door to front elevation breakfront. Painted rubble stone gate piers with cast-iron gate and flanking walls to south-east.

Appraisal: The modest size and scale of this former gate lodge make it a notable feature of the roadside and surrounding landscape. Its form is typical of gate lodges of its time in Ireland with its over hanging eaves anchoring the lodge in its setting. Its appearance is further enhanced by the retention of timber windows that are respectful to historic models.

11.3.3.3 Review of Cartographic and Aerial Sources

The cartographic sources examined for the study area include the 17th-century Down Survey map (Figure 11.2), the 1st edition 6-inch Ordnance Survey (OS) map (surveyed c.1841) (Figure 11.3), the 25-inch OS map (1888-1913 series) (Figure 11.4) and the Cassini 6-inch edition (1930s-40s series) (Figure 11.5). Available online aerial and satellite images of the proposed development site dating from 1995 onward were also reviewed.

The review of the 17th century Down Survey map revealed that Coolflugh (Culeflugh) townland is depicted and that no large residences, routeways or other built feature are indicated within its boundary. The annotation on the map indicates that the townland was occupied by pasture and arable farmland at the time.

All three reviewed editions of the historic OS maps show the proposed development site as vacant farmland and indicate that the general layout of the existing field system has been in place since at least the first half of the 19th century. There are no buildings indicated within the fields and the only structure depicted within the planning boundary is a lime kiln shown in the northeast corner on the first edition 6-inch map and the 25-inch map in an area now occupied by a modern section of road constructed over its indicated location.

The first edition 6-inch OS map shows a now absent roadway extending east-west immediately outside the northern boundary of the proposed development site and this extends towards woodland associated with Cloghroe House in an area outside the boundary of the 1km study area. This is shown as a trackway on the 25-inch OS map and is absent on the Cassini edition indicating that the route went out of use during the early decades of the 20th century. A section of the existing roadway to the east of the south end of the proposed development site is present on all of the historic OS maps while the section of this road adjacent to the north end of the site was constructed as a realignment in the second half of the 20th century. The detail on the 25-inch and Cassini editions show the area within the northwest section of the proposed development site as marginal ground, which is labelled as a 'fox covert' on the latter map, indicating that this area comprised overgrown land not in use as farmland at that time.

The first edition 6-inch OS map shows the immediate area surrounding the proposed development site occupied by dispersed farms to the west of Tower village, which is shown as a small settlement concentrated on a crossroads located 750m to the east of the site. This settlement formed the nucleus of a model village development in the early 20th century in part due to the construction of the Cork and Muskerry Light Railway which opened in 1887 and operated until its closure in 1934. A section of the railway line extended in an east-west direction at a distance of 170m to the south of the proposed development site. The detail on the 25-inch and Cassini edition OS maps show that while the amount of dispersed settlement within the environs of the proposed development site gradually increased into the 20th century the area retained its character as a rural area outside of the village. A review of publicly accessible aerial and satellite imagery published by the Ordnance Survey of Ireland, Google and Bing Maps was undertaken in order to assess if any traces of potential unrecorded archaeological sites were visible within the proposed development site or its close environs. All reviewed images show the site occupied by grass fields and no traces of any potential unrecorded archaeological sites or any other features of cultural heritage significance were observed (Figure 11.6). The detail on these images demonstrates the development of extensive modern suburbs concentrated around the historic village to the east and the proposed development site is located within a wider area of farmland on the western margins of these modern suburbs.

Figure 11.2: Extract from 17th-century Down Survey map with Coolflugh townland highlighted

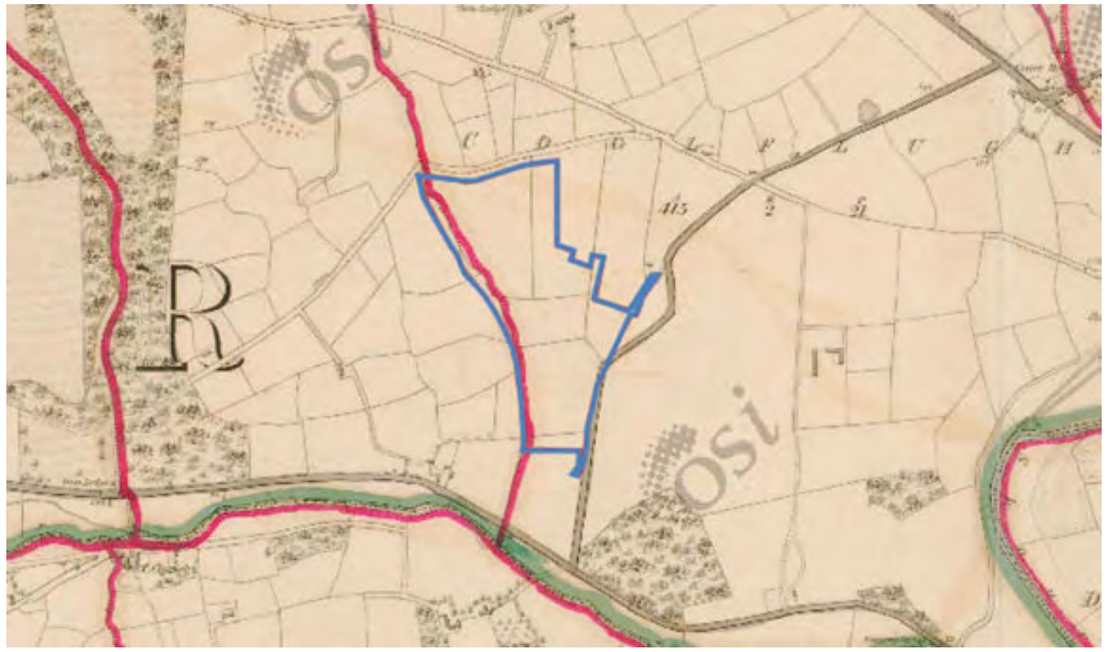


Figure 11.3: Extract from 6-inch O.S map showing boundary of proposed development (blue line) [OSI licence ref. 0003321]

Figure 11.4: Extract from 25-inch O.S map showing boundary of proposed development (blue line) [OSI licence ref. 0003321]

Figure 11.5: Extract from Cassini edition O.S map showing boundary of proposed development (blue line) [OSI licence ref. 0003321]

Figure 11.6: 2017 OSI Aerial image of proposed development site (OSI licence ref. 0003321)

11.3.3.4 Undesignated Cultural Heritage Assets

While encompassing the archaeological and designated architectural heritage resources, cultural heritage also includes various undesignated assets including vernacular structures, historical townscapes, demesne features, townland boundaries, folklore and place names. The review of historical mapping of the proposed development site did not reveal the presence of any undesignated cultural heritage features such as demesne lands, vernacular structures or historic settlements within its boundary or close environs.

Townlands are the smallest unit of land division in the Irish landscape and many preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The layout and nomenclature of Irish townlands was recorded and standardised by the work of the Ordnance Survey in the 19th century. The Irish translations of the townlands names often refer to natural topographical features, but some name elements may also indicate the presence of past human activity within the area, e.g., dun, lios or rath indicate the presence of a ringfort while temple, saggart, termon or kill record an association with a church site. The proposed development site is located within the townland of Coolflugh which derives from *An Chúil Fhliuch* (wet corner or nook) and indicates that the site has been historically an area of poorly drained land. While there are no townland boundaries extending through the proposed development site the stream along its western side forms the townland boundary between Coolflugh and Dromin to the west.

A review of the Schools Collection of the National Folklore Collection (www.duchas.ie) revealed records of a number of songs relating to the Cloghroe area as well as an account of a murder within the general area. One of the entries contains a reference to Coolflugh and this comprises a story that contains a brief mention of the accidental burning of a mill within the townland. This may refer to a paper mill shown in the east end of the townland on the first edition 6-inch OS map which is not present on the later 25-inch map. This mill site was located 840m to the east of the proposed development site.

11.3.4 Field Survey

The proposed development site and its environs were inspected in September 2021 and the lands were assessed in relation to existing use, vegetation cover and the potential for the presence of unrecorded archaeological features and other features of potential cultural heritage interest. Annotated extracts from the photographic record of the site survey are provided in **Appendix 11.1**.

In general, the lands within the proposed development site comprise fields bounded by overgrown earthen banks and are accessed via modern field gates. The lands comprise grazing fields within no evidence for modern tillage farming was observed. The stream that extends along the western site boundary, and which forms the townland boundary between Coolflugh and Dromin to the west, is within an area dominated by heavily overgrown field boundaries. A visual appraisal of the watercourse revealed it to be a narrow, shallow streamlet unlikely to have required bridging or fording in the past and no traces of associated features such as farm lanes extending towards potential crossing points were noted within its environs. The proposed development will not require any interventions to this watercourse, such as bridging or culverting. The lands within the northern end of the proposed development site are broadly defined by moderately sloping ground that extend gradually down towards the fields in the central and southern end of the site. The northern fields are generally well-drained and were all under untended grass growth with areas colonised by weeds and gorse. There are two farm outbuildings located within the east boundary of the north end of the proposed development site. These comprise modern agricultural sheds that are of no architectural or cultural heritage interest. The southern end of the proposed development site extends into an area of level terrain and the poorly drained field within this area comprises an area of marginal grassland dominated by tall reed growth.

In summary, there were no surface traces of any unrecorded, archaeological sites noted within the proposed development site during the site inspection. It was noted that the poorly drained lands, particularly those within the environs of the narrow stream along the western side of the landholding, comprise an environment that has the potential to contain archaeological burnt spreads and levelled *fulachta fia.* These site types are susceptible to levelling by modern land reclamation and ploughing and in many instances their presence within overgrown, poorly drained greenfield locations cannot be determined without recourse to archaeological excavation. The two extant structures located within the proposed development site comprise modern agricultural sheds that are of no cultural heritage interest.

11.3.5 Summary

There are no recorded archaeological sites located within the proposed development site or within 180m of its boundary. There are no National Monuments in State Care located within the surrounding 1km study area and the recorded elements of the archaeological resource within this area are types commonly found with the wider region and are of likely medium to high value. While no evidence for potential unrecorded archaeological sites within the proposed development boundary was identified during the desktop study and field surveys undertaken as part of this assessment, the potential does exist for the presence of unrecorded, sub-surface archaeological sites in the undisturbed greenfield areas within the boundary.

There are no extant designated architectural heritage structures located within the proposed development site or within 600m of its boundary and the examples within the wider study area are deemed to be of regional significance by the NIAH and are, therefore, of likely medium value.

11.4 IMPACT ASSESSMENT

11.4.1 Do Nothing Scenario

The European Commission EIAR Guidance (2017) requires consideration of the 'do-nothing' scenario in relation to the evolution of the cultural heritage baseline, i.e. how the situation would be expected to develop over time, rather than a static description of the state of the environment at the time of the assessment. A 'Do Nothing Scenario' will result in no predicted impacts on recorded and potential cultural heritage assets within the study area.

11.4.1.1 Construction Phase

Archaeology

There are no recorded archaeological sites within the proposed development site, or within 180m of its boundary, and the construction phase of the proposed development will, therefore, result in no direct or indirect impacts on the recorded archaeological resource.

While no evidence for unrecorded archaeological sites or features was identified within the proposed development site during the desktop research and field surveys carried out as part of this assessment, the potential exists for the presence of unrecorded, sub-surface archaeological features in undisturbed greenfield lands. As the existence, nature and extent of any unrecorded archaeological features within the proposed development site are unknown; the nature and significance of potential impacts is indeterminable. However, ground works required for housing construction projects will have the potential to result in negative, direct, permanent, irreversible impacts of unknown significance on any sub-surface archaeological features that may exist within the footprint of the proposed development.

There is one watercourse within the environs of the proposed development, and this comprises a narrow stream extending along the west boundary. No interventions to this watercourse will occur as part of the proposed development and, therefore, no impacts to any potential unrecorded in-channel features are predicted.

Architectural Heritage

There are no designated architectural heritage sites located within the proposed development area or within 600m of its boundary and the surrounding built environment is modern in character. The proposed development will, therefore, result in no likely direct or indirect impacts on the architectural heritage resource during the construction phase.

Undesignated Cultural Heritage Assets

The only undesignated cultural heritage feature identified within the proposed development site is the stream that forms the boundary between Coolflugh and Dromin townlands which extends along the west side of the landholding. No interventions to this stream will occur as part of the proposed development and no impacts on this undesignated townland boundary feature are, therefore, predicted.

11.4.2 Operational Phase

There are no extant designated architectural heritage structures located within 600m of the proposed development site and there are no recorded archaeological sites within 180m of its boundary. No operational phase impacts on the designated elements of the cultural heritage resource are, therefore, predicted. In addition, the implementation of the mitigation measures outlined in **Section 11.5** will provide for either the preservation by avoidance or preservation by record of any unrecorded, subsurface archaeological features that may exist within the boundary of the proposed development. As a result, there will be no predicted impacts on this potential element of the cultural heritage resource during the operational phase. There will also be no predicted operational phase impacts on the stream extending along the western boundary of the proposed development.

11.4.3 Cumulative Impacts

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 8 as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *Protect and, where appropriate, enhance the character, diversity and special qualities of architectural, archaeological and cultural heritage (including Gaeltachtaí) in County Cork.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 8.

EPO 8 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is to

> *Protect and, where appropriate, enhance the character, diversity and special qualities of architectural, archaeological and cultural heritage (including Gaeltachtaí) in County Cork.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a neutral interaction with the status of EPO 8.

A review of a number of permitted and proposed developments within the surrounding landscape was carried out in order to assess potential cumulative impacts on the cultural heritage resource of the area (Table 11.7). This included a consideration of the known locations of recorded archaeological sites and designated architectural heritage structures in relation to these development combined with reviews of relevant online planning enquiry files and the Excavations Database in order to establish whether any resulted in impacts on the known cultural heritage resource.

Table 11.7: Summary of developments assessed for cumulative impacts

Application Reference	Description	Outcome/Current Status	Cultural Heritage Comments
Cork City Council Ref: 21/40620	Construction of 73 no. residential units, Upgrade of existing access from the R579, flood mitigation works which include works to the R579, culverting of existing streams	Application is currently being assessed by Cork City Council.	There are no recorded archaeological sites or designated architectural sites located within the boundary of the proposed development or its close environs
Cork City Council Ref: 20/39202	Construction of 37 no. dwelling houses	Final permission granted on 19th May 2021.	There are no recorded archaeological sites or designated architectural sites located within the boundary of the proposed development. The grant of permission includes a condition requiring pre-construction archaeological test trenching. A summary of the results of test trenching at this location is not included in the Excavations Database as of November 2021.
Cork City Council Ref: 19/39001	Construction of 40 no. dwelling houses	Final permission granted on 06/01/2021. Construction has commenced on site.	There are no recorded archaeological sites or designated architectural sites located within the boundary of the proposed development. The grant of permission for the development does not contain any archaeological or architectural heritage conditions
Cork County Council Ref: 19/4718	Construction of 12 no. dwelling houses	Final permission granted by Cork County Council on 08/08/2019. Construction has commenced on site	There are no recorded archaeological sites or designated architectural sites located within the boundary of the proposed development.

Application Reference	Description	Outcome/Current Status	Cultural Heritage Comments
Cork County Council Ref: 18/7111	Construction of nursing home & 21 no. dwelling houses.	Conditional permission granted by Cork County Council on 13/08/2019. Decision upheld by An Bord Pleanála submission of third-party appeals (Ref: ABP-305373-19).	This development site contains a Protected Structure (Hydropathic Establishment RPS 00815), which is also an archaeological site (C0062-235----) as well as an additional archaeological site (fulacht fia C0062-227----). These cultural heritage assets will be retained *in situ* as part of the development. The An Bord Pleanála grant of permission included a condition requiring archaeological monitoring of ground works. A summary of the results of monitoring at this location is not included in the Excavations Database as of November 2021.
Cork County Reference 18/6802	The construction of a new car park with 67 no. general parking spaces, 53 no. staff parking spaces, new entrance and all associated ancillary site works at a green-field site opposite Cloghroe National School.	Final Permission granted on 4th December 2019	A recorded archaeological feature (Bullaun stone C0073-015----) is located within the school grounds but this is *ex situ* and was moved to this location in the 1950s. A programme of archaeological test trenching of the development site was carried out to comply with planning requirements and nothing of archaeological significance was identified.
Cork County Council Ref: 18/5562	Construction of 54 no. dwelling houses.	Permission granted by Cork County Council for on 27/11/ 2018. Construction has commenced on site with some units completed and occupied.	There are no recorded archaeological sites or designated architectural sites located within the boundary of the proposed development or its close environs

The Excavations Database does not include any entries for archaeological investigations associated with any of the other modern housing developments located within the study area and there are no recorded archaeological sites or designated architectural heritage structures located within the boundaries of these developments. A review of the results of pre-development archaeological investigations within the wider environs of Tower village revealed that none of these identified previously unrecorded archaeological features.

Based on the details presented in Table 11.7 combined with the absence of known archaeological sites or architectural heritage structures, whether designated or not, within the site boundary, it is concluded that the proposed development will not contribute to any adverse cumulative impacts on the cultural heritage resource.

11.4.4 'Worst Case Scenario'

If the proposed development were to proceed without the implementation of the archaeological mitigation measures outlined in **Section 11.5** then construction works could potentially result in permanent, direct, significant, negative impacts on any unrecorded, sub-surface archaeological features that exist within the proposed development site.

11.5 MITIGATION MEASURES

Archaeology

Given the scale and extent of the proposed development works within an undeveloped greenfield area, a programme of confirmatory archaeological investigations will be carried out prior to the commencement of the construction phase. The presence of vegetation overgrowth and areas of waterlogging within the proposed development site will act as a constraint on geophysical surveying but will not hinder the excavation of archaeological test trenches within any of the fields. A thorough advance programme of archaeological test trenching within the proposed development site will, therefore, be carried out by a suitably qualified archaeologist under a licence issued by the National Monuments Service. In the event that any sub-surface archaeological deposits, features or artefacts are identified during the test trenching investigations then their surfaces will be manually cleaned, recorded and left to remain *in situ* while the Planning Authority and the National Monuments Service are consulted to determine further appropriate mitigation measures, which may involve preservation *in situ* (avoidance) or preservation by record (archaeological excavation).

Designated Architectural Heritage Structures

There are no designated architectural heritage buildings located within the proposed development site or within 600m of its boundary and it is not located in an Architectural Conservation Area. No potential undesignated structures of architectural heritage significance were noted within the site during the desktop research and field surveys undertaken as part of this assessment. It is, therefore, concluded that no mitigation measures for the architectural heritage resource are required.

Undesignated Cultural Heritage Features

The only undesignated cultural heritage feature identified within the proposed development site is the stream which forms the boundary Coolflugh and Dromin townlands and extends along the western side of the landholding. The proposed development will not result in any interventions or impacts on this watercourse, and it is concluded that no mitigation measures for this townland boundary are required.

11.6 MONITORING OF MITIGATION MEASURES

There are a number of obligatory processes to be undertaken as part of archaeological licence applications and these will allow for monitoring of the successful implementation of the archaeological mitigation measures outlined in **Section 11.5**. Method statements detailing the proposed strategy for all pre-construction site investigations will submitted for approval to the National Monuments Service as part of the licence applications. These will clearly outline the proposed extent of works and outline the consultation process to be enacted in the event that any unrecorded archaeological sites or features are identified. A report will be compiled on all site investigations which will clearly present the results in written, drawn and photographic formats. Copies of these reports will be submitted to the National Monuments Service, Cork City Council and the National Museum of Ireland. In the event that any sub-surface archaeological deposits, features or artefacts are identified during site investigations then they will be cleaned, recorded and left to remain in situ while the Planning Authority and the National Monuments Service are consulted to determine further appropriate mitigation measures.

11.7 RESIDUAL IMPACTS

All potential archaeological impacts will be addressed by mitigation during the pre-construction phase of the proposed development which will provide for the recording and/or avoidance of any potential sub-surface archaeological features that may exist within the proposed development site. As a result, no residual impacts on the archaeological resource are predicted.

11.8 PROJECT REFERENCES

Cork City Council (2015) *Cork City Development Plan 2015-2021*

Cork County Council (2014) *Cork County Development Plan 2014*

Department of Arts, Heritage and the Gaeltacht (2011) *Architectural Heritage Protection Guidelines for Local Authorities*

Department of Arts, Heritage, Gaeltacht and the Islands (1999) *Framework and Principles for the Protection of Archaeological Heritage*

EPA (2017) *Draft Guidelines on the Information to be contained in EIARs*

European Commission (2017) *Guidance on the preparation of the Environmental Impact Assessment Report*

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http://maps.osi.ie/publicviewer/#V2,591271,743300,1,10 (Historic maps)

http://downsurvey.tcd.ie/down-survey-maps.php (Down Survey)

http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple (Bedrock)

www.archaeology.ie (SMR and NIAH)

www.duchas.ie (Folklore)

www.excavations.ie (Archaeological investigations)

www.logainm.ie (Placenames)

www.heritagemaps.ie/WebApps/HeritageMaps/index.html (Partial NMI finds database)

http://www.askaboutireland.ie/griffith-valuation/ (Griffiths Valuation)

http://landedestates.nuigalway.ie/LandedEstates/jsp/property-show.jsp?id=2025 (Landed Estates Database, National University of Galway)

CHAPTER TWELVE
Air Quality & Climate

CHAPTER TWELVE
Contents

CHAPTER TWELVE

12 Air Quality & Climate

12.1 INTRODUCTION

This chapter assesses the likely air quality and climate impacts associated with the proposed development at Cloghroe, Tower, Co. Cork. A full description of the development is available in Chapter 2.

This chapter was completed by Ciara Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd.

12.2 METHODOLOGY

12.2.1 Criteria for Rating of Impacts

12.2.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 12.1 and Appendix 12.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, as amended, which incorporate Directive 2008/50/EC which has set limit values for a number of pollutants with the limit values for NO_2, PM_{10} and $PM_{2.5}$ being relevant to this assessment (see Table 12.1). Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC).

Table 12.1 Ambient Air Quality Standards & TA Luft

Pollutant	Regulation Note 1	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/(m²*day)
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m³
		Annual limit for protection of human health	40 µg/m³
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m³ PM_{10}
		Annual limit for protection of human health	40 µg/m³ PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m³ $PM_{2.5}$

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

12.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined in section 12.2.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m²*day) averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/(m²*day) be applied to the site boundary of quarries. This limit value can be implemented with regard to potential dust impacts from construction of the proposed Cloghroe SHD.

12.2.1.3 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 ("the Climate Action Act") was enacted, with the objective of enabling Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*', i.e., the '*national transition objective*'.

The first *Climate Action Plan* (CAP) (Government of Ireland, 2019), was published in 2019 and outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the

various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a). The plan contains similar elements as the 2019 CAP and aims to set out how Ireland can reduce our greenhouse gas emissions by 51% by 2030 (compared to 2018 levels) which is in line with the EU ambitions, and a longer-term goal of to achieving net-zero emissions no later than 2050. The 2021 CAP outlines that emissions from the Built Environment sector must be reduced to 4 - 5 $MtCO_2e$ by 2030 in order to meet our climate targets. This will require further measures in addition to those committed to in the 2019 CAP. This will include phasing out the use of fossil fuels for the space and water heating of buildings, improving the fabric and energy of our buildings, and promoting the use of lower carbon alternatives in construction.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019 followed by the promulgation of the Climate Action and Low Carbon Development (Amendment) Act 2021 ("the 2021 Climate Action Act")(Government of Ireland, 2021b). The 2021 Climate Action Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Action Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*'. The 2021 Climate Action Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'*. The 2021 Climate Action Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period'*.

The 2021 Climate Action Act refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

Development Plan

The proposed development is located within the 2019 expanded Cork city boundary. From the date of transfer onwards, the Cork County Council Development Plan, Local Area Plans, and Local Economic and Community Plan in force in the relevant area immediately before the transfer day will continue to apply until these plans are next made by Cork City Council. Accordingly, until the adoption of the Cork City Development Plan 2022-2028, the Cork County Development Plan 2014-2020 is the applicable development plan, and contains the following policies and objectives of relevance:

Objective GI 12-1 Air Quality: *"Monitor air quality and air quality trends in accordance with EU policy directives and take appropriate action where required including the provision of additional air quality monitoring infrastructure".*

EPO 7: "*contribute to mitigation of, and adaptation to climate change*"

In addition, for the sake of completeness, the current Cork City Development Plan 2015-2021 includes the following objectives in relation to the protection of air quality and climate:

Objective 12.18 Air Quality: *"To protect and improve air quality in Cork City in accordance with the Air Quality Standards Regulations 2011 and Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)."*

Strategic Goal 6: "*tackle climate change through reducing energy usage, reducing emissions, adapt to climate change and mitigate against flood risk*".

The Plan states that adverse effects to air quality associated with developments, particularly the construction phase of major projects should be mitigated through the planning process and the implementation of planning conditions where appropriate.

Attention has been paid to these plans and objectives when carrying out the air quality and climate assessment for the proposed development and where necessary measures were included to ensure adverse effects to air quality and climate were mitigated.

12.2.2 Construction Phase

12.2.2.1 Air Quality

The current assessment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the proposed development.

Construction phase traffic also has the potential to impact air quality and climate. The UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII (2011) in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The worst-case predicted change in traffic associated with the construction phase of the proposed development is an increase of 1.47% in the AADT at the R617/R579 junction. Therefore, the construction stage traffic does not meet the above scoping criteria as the change in AADT will be less than 1,000 and the change in HDV will be less than 200. As a result, a detailed air quality modelling assessment has been scoped out as there is no potential for significant impacts to air quality during construction as a result of traffic emissions.

12.2.2.2 Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

12.2.3 Operational Phase

12.2.3.1 Air Quality

Operational phase traffic has the potential to impact air quality. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). TII reference the use of the UK Highways Agency and DEFRA guidance and methodology in their

document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes but can be applied to any development that causes a change in traffic. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from TII (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this is a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a "dirtier" fleet, vehicle emissions would be considered to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The 2019 UK Highways Agency DMRB air quality revised guidance *LA 105 Air Quality* states that modelling should be conducted for NO_2 for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM_{10} is only required for the base year to demonstrate that the air quality limit values in relation to PM_{10} are not breached. Where the air quality modelling indicates exceedances of the PM_{10} air quality limits in the base year then PM_{10} should be included in the air quality model in the do minimum and do something scenarios. Modelling of $PM_{2.5}$ is not required as there are currently no issues with compliance with regard to this pollutant. The modelling of PM_{10} can be used to show that the project does not impact on the $PM_{2.5}$ limit value as if compliance with the PM_{10} limit is achieved then compliance with the $PM_{2.5}$ limit will also be achieved. Historically modelling of carbon monoxide (CO) and benzene was required however, this is no longer needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres (EPA, 2020). The key pollutant reviewed in this assessment is NO_2. Concentrations of PM_{10} have been modelled for the base year to indicate that there are no potential compliance issues. Modelling of operational NO_2 concentrations has been conducted for the do nothing and do something scenarios for the opening year (2024) and design year (2039).

The TII guidance (2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK Highways Agency guidance *LA 150* (2019) scoping criteria outlined in Section 12.2.2.1 was used to determine the road links required for inclusion in the modelling assessment. Sensitive receptors within 200m of impacted road links are included within the modelling assessment. Pollutant concentrations are calculated at these sensitive receptor locations to determine the impact of the proposed development in terms of air quality. The guidance states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling (UK Highways Agency, 2019a). The TII guidance (2011) defines sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. A total of two high sensitivity receptors, a residential property (R1) and Cloghroe national school (R2) were included in the modelling assessment and are detailed in Figure 12.1.

The following model inputs are required to complete the assessment using the DMRB spreadsheet tool: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual average traffic speeds and background concentrations. Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptors using generic meteorological data. The DMRB model uses conservative emission factors, the formulae for which are outlined in the DMRB Volume 11 Section 3 Part 1 – HA 207/07 Annexes B3 and B4. These worst-case road contributions are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria have been adopted for the proposed development and are detailed in Appendix 12.2 Table A12.2.1 and Table A12.2.2. The significance criteria are based on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 µg/m³).

Conversion of NOx to NO_2

NO_X (NO + NO_2) is emitted by vehicles exhausts. The majority of emissions are in the form of NO, however, with greater diesel vehicles and some regenerative particle traps on HGV's the proportion of NO_X emitted as NO_2, rather than NO is increasing. With the correct conditions (presence of sunlight and O_3) emissions in the form of NO, have the potential to be converted to NO_2.

Transport Infrastructure Ireland states the recommended method for the conversion of NOx to NO_2 in "*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*" (2011). The TII guidelines recommend the use of DEFRAs NOx to NO_2 calculator (2020) which was originally published in 2009 and is currently on version 8.1. This calculator (which can be downloaded in the form of an excel spreadsheet) 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 calculator includes Local Authorities in Northern Ireland and the TII guidance recommends the use of 'Armagh, Banbridge and Craigavon' as the choice for local authority when using the calculator. The choice of Craigavon provides the most suitable relationship between NO_2 and NOx for Ireland. The "All Other Non-Urban UK Traffic" traffic mix option was used.

Update to NO_2 Projections using DMRB

In 2011 the UK DEFRA published research (Highways England, 2013) on the long term trends in NO_2 and NO_X for roadside monitoring sites in the UK. This study marked a decrease in NO_2 concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO_2 concentrations which UK DEFRA previously published and monitored concentrations. The impact of this 'gap' is that the DMRB screening model can under-predict NO_2 concentrations for predicted future years. Subsequently, the UK Highways Agency published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years. This methodology has been used in the current assessment to predict future concentrations of NO_2 as a result of the proposed development.

Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from MHL Consulting Engineers on 31/08/2021 for the purposes of the operational phase assessment. Data for the Do Nothing and Do Something scenarios for the base year 2021, opening year 2024 and design year 2039 were provided. The traffic data is detailed in Table 12.2 with the %HGV shown in parenthesis below the AADT. Only road links that met the DMRB scoping criteria outlined in Section 12.2.2.1 and that were within 200m of receptors were included in the modelling assessment. Background concentrations have been included as per Section

12.3.2 of this chapter based on available EPA background monitoring data (EPA, 2020). This traffic data has also been used in the operational stage climate impact assessment.

12.2.3.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013*. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 12.3.3). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

There is one road link (R617) that will experience a change in AADT of over 10% and therefore a detailed climate assessment is required. The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of carbon dioxide (CO_2). The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any development that causes a change in traffic. The inputs to the dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 12.2).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Building Lifecycle Report prepared by Aramark in relation to the proposed development has been reviewed and used to inform the operational phase climate assessment (see Appendix 12.4). This report outlines a number of measures in relation to building materials and building services in relation to the proposed development. A number of measures have been incorporated into the overall design of the development which will reduce the impact to climate where possible.

Table 12.2 Traffic Data used in Air and Climate Modelling Assessments

Road Name	Speed (kph)	Base Year 2021	Opening Year 2024		Design Year 2039	
			Do Nothing	Do Something	Do Nothing	Do Something
R617	50	9,614 (5.5%)	10,285 (5.5%)	11,418 (5.5%)	12,210 (5.5%)	13,343 (5.5%)

Figure 12.1 Location of Sensitive Receptors used in Air Quality Assessment

12.3 RECEIVING ENVIRONMENT

12.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Cork Airport meteorological station, which is located approximately 12 km south-east of the site. Cork Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 12.2). For data collated during five representative years (2016 - 2020), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.4 m/s over the period 1981 - 2010 (Met Eireann, 2021).

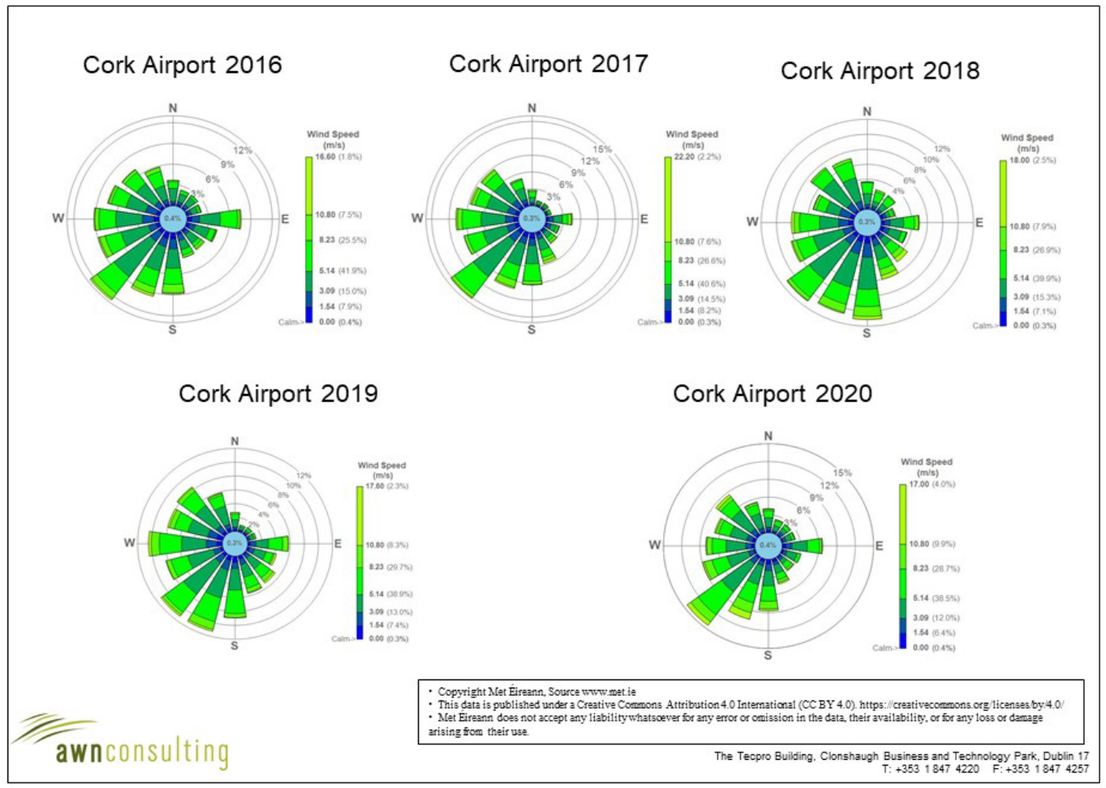

Figure 12.2 Cork Airport Windrose 2016 – 2020 (Met Eireann, 2021)

12.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent EPA published annual report on air quality "Air Quality In Ireland 2019" (EPA 2020) details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes as outlined within the EPA document titled 'Air Quality In Ireland 2019' (EPA 2020). Dublin is defined as Zone A and the Cork City area as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area of the proposed development is categorised as Zone D. However, the site is in close proximity to Zone B and this has been taken into account when determining appropriate background concentrations for the area.

NO_2

Long-term NO_2 monitoring was carried out at the Zone D locations of Castlebar, Kilkitt and Emo for the period 2015 - 2019 (EPA, 2020). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3 for the Zone D locations. Average results range from 2 – 9 µg/m^3. The NO_2 annual average for this five year period suggests an upper average limit of no more than 8 µg/m^3 (Table 12.3) as a background concentration. Based on the above information a conservative estimate of the current background annual mean NO_2 concentration for the region of the proposed development is 9 µg/m^3.

Table 12.3 Background NO_2 Concentrations In Zone D Locations (µg/m^3)

Station	Averaging Period Note 1	Year				
		2015	2016	2017	2018	2019
Castlebar	Annual Mean NO_2 (µg/m^3)	8	9	7	8	8
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	66	60	60	59
Kilkitt	Annual Mean NO_2 (µg/m^3)	2	3	2	3	5
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	26	17	22	42
Emo	Annual Mean NO_2 (µg/m^3)	3	4	3	3	4
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	36	28	42	28

Note 1 Annual average limit value of 40 µg/m^3 and hourly limit value of 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

PM_{10}

Continuous PM_{10} monitoring was carried out at the Zone D locations of Castlebar, Claremorris and Kilkitt from 2015 - 2019. Levels range from 7 – 16 µg/m^3 over the five year period (see Table 12.4) with at most 1 exceedance of the 24-hour limit value of 50 µg/m^3 in Castlebar and Kilkitt in 2019 (35 exceedances are permitted per year) (EPA, 2020). Data from 2015 – 2019 suggests an upper average annual mean value of at most 13 µg/m^3 as a background concentration. Based on the EPA data, a conservative estimate of the current annual mean background PM_{10} concentration in the region of the proposed development is 16 µg/m^3.

Table 12.4 Background PM10 Concentrations In Zone D Locations (mg/m3)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Castlebar	Annual Mean PM_{10} ($\mu g/m^3$)	13	12	11	11	16
	90th %ile 24-hr PM_{10} ($\mu g/m^3$)	22	20	19	20	24
Killkitt	Annual Mean PM_{10} ($\mu g/m^3$)	9	8	8	9	7
	90th %ile 24-hr PM_{10} ($\mu g/m^3$)	18	15	14	15	13
Claremorris	Annual Mean PM_{10} ($\mu g/m^3$)	10	10	11	12	11
	90th %ile 24-hr PM_{10} ($\mu g/m^3$)	17	17	17	20	20

Note 1 Annual average limit value of 40 $\mu g/m^3$ and 24-hour limit value of 50 $\mu g/m^3$ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

$PM_{2.5}$

Monitoring of both PM_{10} and $PM_{2.5}$ takes place at the station in Claremorris which allows for the $PM_{2.5}/PM_{10}$ ratio to be calculated. Average $PM_{2.5}$ levels in Claremorris over the period 2015 - 2019 ranged from 4 - 6 $\mu g/m^3$, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.36 – 0.60 (EPA, 2020). Based on this information, a conservative ratio of 0.65 was used to generate an existing $PM_{2.5}$ concentration in the region of the development of 10.4 $\mu g/m^3$.

12.3.3 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2020 (EPA, 2021a). The data published in 2021 states that Ireland has exceeded its 2020 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.73 Mt. For 2020, total national greenhouse gas emissions are 57.7 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 44.38 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 37.1% of the total, with the transport sector accounting for 17.9% of emissions of CO_2.

GHG emissions for 2020 are 3.6% lower than those recorded in 2019. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq, 6.85 MtCO_2eq and 6.73 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario (EPA, 2021b). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is located at Cloghroe, Tower, Co. Cork. A full description of the development is set out in Chapter 2 of this EIAR.

Impacts to air quality and climate can occur during both the construction and operational stages of the development. During the construction stage, the main source of potential air quality impacts will be as a result of fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate. The primary sources of air and climatic emissions in the operational context are deemed long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development. The following sections describe the primary sources of potential air quality and climate impacts which have been assessed as part of this EIAR.

12.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Phase

12.5.1.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350 m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Cork Airport meteorological data (see Section 12.3.1) indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Cork Airport indicates that on average 204 days per year have rainfall over 0.2 mm (Met Eireann, 2021) and therefore it can be determined that over 50% of the time dust generation will be reduced.

The proposed development can be considered large in scale and therefore there is the potential for significant dust soiling 100 m from the source (TII, 2011) (Table 12.5). There are a number of high sensitivity residential receptors to the direct south and east of the site boundary. In the absence of mitigation there is the potential for significant, negative, short-term impacts to nearby sensitive receptors as a result of dust emissions from the proposed development.

Table 12.5 Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation in Place

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large construction sites with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites with limited use of haul routes	25m	10m	10m

Source: Appendix 8: Assessment of Construction Impacts taken from "Guidelines for the treatment of Air Quality During the Planning & Construction of National Road Schemes" (TII, 2011)

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the DMRB assessment criteria in Section 12.2.2.1. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral and short-term impact on air quality.

12.5.1.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be neutral, imperceptible and short term.

12.5.1.3 Human Health

Dust emissions from the demolition and construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 12.5 significant PM_{10} emissions can occur within 25 m of the site for a development of this scale. There are a number of high sensitivity receptors to the direct south and east of the site a number of which are within 25m of the site boundary. Therefore, in the absence of mitigation there is the potential for slight, negative, short-term impacts to human health as a result of the proposed development.

12.5.2 Operational Phase

12.5.2.1 Air Quality

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of NO_2 emissions for the opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

TII's document Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2024 are shown in Table 12.6 and for design year 2039 are shown in Table 12.7. The annual average concentration is in compliance with the limit value at all worst-case receptors in 2024 and 2039. Concentrations of NO_2 are at most 32% of the annual limit value in 2024 and 2039. In addition, the hourly limit value for NO_2 is 200 $\mu g/m^3$ and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO_2 concentration is not predicted to be exceeded in any modelled year (Table 12.8).

The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to "Do Nothing (DN)" levels. Relative to baseline levels, there are predicted to be a small increase in NO_2 concentrations at receptor R1 and an imperceptible increase in concentrations at receptor R2. Concentrations will increase by at most 0.40 $\mu g/m^3$ in 2024 at worst-case receptor R1 and by 0.46 $\mu g/m^3$ in 2039 at worst-case receptor R1. Using the assessment criteria outlined in Appendix 12.2, Table A12.2.1 and Table A12.2.2 the impact of the proposed development in terms of NO_2 is considered negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term, negative and imperceptible.

Concentrations of PM_{10} were modelled for the baseline year of 2021. The modelling showed that concentrations were in compliance with the annual limit value of 40 $\mu g/m^3$ at all receptors assessed, therefore, further modelling for the opening and design years was not required. Concentrations reached at most 0.6 $\mu g/m^3$. When a background concentration of 16 $\mu g/m^3$ is included, the overall impact is 41% of the annual limit value at the worst case receptor.

The potential impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, negative and imperceptible and therefore, no mitigation is required.

Table 12.6 Predicted Annual Mean NO_2 Concentrations – Opening Year 2024 ($\mu g/m^3$)

Receptor	Opening Year 2024				
	DN	**DS**	**DS-DN**	**Magnitude**	**Description**
R1	12.2	12.6	0.40	Small Increase	Negligible
R2	8.9	8.9	0.01	Imperceptible Increase	Negligible

Table 12.7 Predicted Annual Mean NO_2 Concentrations – Design Year 2039 ($\mu g/m^3$)

Receptor	Design Year 2039				
	DN	**DS**	**DS-DN**	**Magnitude**	**Description**
R1	12.5	13.0	0.46	Small Increase	Negligible
R2	8.5	8.5	0.01	Imperceptible Increase	Negligible

Table 12.8 Predicted 99.8th percentile of Daily Maximum 1-hour NO_2 Concentrations (µg/m³)

Receptor	Opening Year 2024		Design Year 2039	
	DN	DS	DN	DS
R1	43	44	44	45
R2	31	31	30	30

12.5.2.2 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be long-term, localised, neutral and imperceptible.

There is also the potential for increased traffic volumes to impact climate. The predicted concentrations of CO_2 for the future years of 2024 and 2039 are detailed in Table 12.9. These are significantly less than the 2024 and 2030 targets set out under EU legislation. It is predicted that in 2024 the proposed development will increase CO_2 emissions by 0.000020% of the EU 2024 target. Similarly low increases in CO_2 emissions are predicted to occur in 2039 with emissions increasing by 0.000025% of the EU 2030 target (targets post 2030 are not available). Therefore, the potential climate impact of the proposed development is considered negative, long-term and imperceptible.

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Building Lifecycle Report prepared by Aramark (see Appendix 12.4).

The development will be Near Zero Energy Building (NZEB) compliant, in accordance with the 2019 Part L requirements. High quality, durable materials will be chosen for the exterior and interior where possible to reduce maintenance and replacement costs which will overall reduce the embodied carbon footprint of the development in the long-term. Renewable technologies will be installed in the form of PV panels and exhaust air source heat pumps which will reduce the requirement for fossil fuels. LED lighting will be fitted internally and externally which is more energy efficient than traditional light bulbs. Overall these measures will aid in reducing the impact to climate during the operational phase of the proposed development.

Table 12.9 Climate Impact Assessment

Year	Scenario	CO_2 (tonnes/annum)
2024	Do Nothing	74
	Do Something	82
2039	Do Nothing	88
	Do Something	96
Increment in 2024		8.2 Tonnes
Increment in 2039		8.2 Tonnes
Emission Ceiling (kilo Tonnes) 2024		40,113 Note 1
Emission Ceiling (kilo Tonnes) 2030		33,381 Note 1
Impact in 2024 (%)		0.000020 %
Impact in 2039 (%)		0.000025 %

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council

12.5.2.3 Human Health

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 12.1. However, air dispersion modelling of traffic emissions has shown that levels of all pollutants are below the ambient air quality standards set for the protection of human health (see Table 12.1). It can be determined that the impact to human health during the operational stage is long-term, negative and imperceptible and therefore, no mitigation is required.

12.5.3 Do Nothing Scenario

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. Impacts from increased traffic volumes and associated air emissions will also not occur. The Do Nothing scenario in relation to the operational phase traffic has been assessed in Section 12.5.2.1 in relation to air quality and Section 12.5.2.2 in relation to climate. The results of the modelling assessment conclude that current traffic volumes in the area are not contributing to significant emissions of NO_2, PM_{10} and CO_2. Emissions of air pollutants are currently well below the relevant standards and are predicted to remain below these standards in future years without the proposed development in place. The proposed development will not increase emissions significantly. Therefore, this scenario can be considered neutral in terms of both air quality and climate.

12.5.4 Cumulative Impacts

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 6 and EPO 7 as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 are to

> ***EPO 6**: Protect and improve air quality.*
>
> ***EPO 7:** Contribute to mitigation of, and adaptation to, climate change.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPOs 6 and 7.

EPO 6 and EPO 7 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is to

***EPO 6**: Protect and improve air quality.*

***EPO 7:** Contribute to mitigation of, and adaptation to, climate change.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPOs 6 and 7.

12.5.4.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other development within 350m then there is the potential for cumulative construction dust impacts. A review of recent permitted and proposed developments within 350m of the site was conducted. There was found to be one development of relevance (planning reference 21/40620) directly adjacent to the proposed development site. This development has the potential to have construction works that may coincide with that of the proposed development therefore there is the potential for cumulative construction dust impacts to nearby sensitive receptors. However, a high level of dust control will be implemented across the site which will avoid significant dust emissions. Provided these mitigation measures are in place for the duration of the construction phase cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative and imperceptible.

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered neutral.

There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

12.5.4.2 Operational Phase

The traffic data reviewed for the operational stage impacts to air quality and climate includes TII Growth Rate factors which allow for future development within the wider area. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, negative and imperceptible with regards to air quality and climate.

12.6 MITIGATION MEASURES

12.6.4.1 Construction Phase

A detailed dust minimisation plan is outlined in Appendix 12.3. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible.

In summary the measures which will be implemented will include: -

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

12.6.1 Operational Phase

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on air quality and climate.

12.7 RESIDUAL IMPACTS OF THE PROPOSED DEVELOPMENT

12.7.1 Construction Phase

12.7.1.1 Air Quality

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan, which will be incorporated into the construction environmental management plan (CEMP) for the site. In circumstances of effective implementation of the dust minimisation measures outlined in the plan (see Appendix 12.3 and Section 12.6.1), the air quality impacts during the construction phase will be short-term, negative, localised and imperceptible.

12.7.1.2 Climate

According to the IAQM guidance (2014) site traffic and plant are unlikely to make a significant impact on climate during the construction phase. Therefore, the potential impact on climate is considered to be imperceptible and short-term.

12.7.1.3 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short term and imperceptible with respect to human health.

12.7.2 Operational Phase

12.7.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the UK DMRB model. The modelling assessment determined that the change in emissions of NO_2 at nearby sensitive receptors as a result of the proposed development will be imperceptible. Therefore, the operational phase impact to air quality is long-term, localised, negative and imperceptible.

12.7.2.2 Climate

Modelling of operational phase CO_2 emissions as a result of the traffic associated with the proposed development was carried out to determine the impact to climate. It was found that emissions of CO_2 will increase by an imperceptible amount as a result of the proposed development and are significantly below the EU 2024 and 2030 GHG targets. The operational phase impact to climate is long-term, negative and imperceptible.

In addition, the proposed development has been designed to reduce the impact to climate where possible through incorporated design measures. Full details of all measures included are outlined within the Building Lifecycle Report submitted as part of this planning application.

12.7.2.3 Human Health

Emissions of air pollutants are predicted to be significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, negative and imperceptible.

12.8 MONITORING

12.8.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

12.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

12.9 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no difficulties encountered when compiling this assessment.

12.10 INTERACTIONS

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health 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 short-term, negative and imperceptible with respect to the construction phase and long-term, negative and imperceptible with respect to the operational phase in terms of human health impacts.

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.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils and the water environment (hydrology) in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that interactions between air quality and land and soils and hydrology will be short-term and imperceptible.

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised and the effect on biodiversity will be short term, imperceptible and neutral.

12.11 REFERENCES

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CHAPTER THIRTEEN
Population and Human Beings

CHAPTER THIRTEEN
Contents

CHAPTER THIRTEEN

13 Population and Human Beings

13.1 INTRODUCTION

13.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

13.1.2 Chapter Context

The European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017 specifies the following in relation to the assessment of population and human health.

> *"Human health a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

As noted in Figure 13.1 below, there are several inter-related environmental topics such as the potential impacts of the proposed development on air quality and climate, noise and vibration, water, traffic and access, construction and waste management, which are of intrinsic direct and indirect consequence to human health. While the baseline scenario for these environmental topics is not duplicated in this section, in line with the EPA guidance, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur.

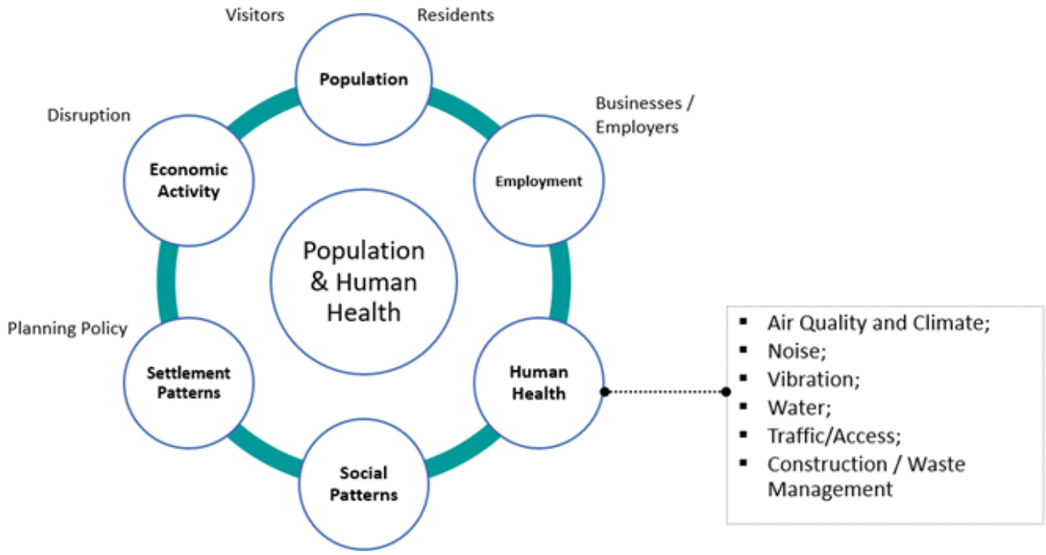

Figure 13.1 Potential Impacts on Population and Human Health

13.1.3 Methodology

This chapter of the EIAR document has been prepared with reference to the Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017, as well as European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' 2017. A desktop study of the following published policy documents and data was undertaken to appraise the location and likely and significant potential impact upon population and human health receptors and to assess population trends in the subject site an in the wider hinterland:

- Central Statistics Office (CSO) Census 2011 & 2016 data.
- Cork County Development Plan 2014.
- Draft Cork City Development Plan 2021.

This assessment is a study of the potential indirect and direct socio-economic impacts of the construction phase and the operational phases of the development. Effects on receptors were assessed in terms of magnitude, quality, significance and duration.

13.2 DESCRIPTION OF EXISTING BASELINE ENVIRONMENT

13.2.1 Demographics

13.2.1.1 Settlement Context

In assessing the demographic trends in the vicinity of the subject site, a focused analysis of the site-specific Electoral Division has been conducted. Located immediately to the west of the CSO census settlement of Tower, the subject site is located in the CSO small area reference 047250010, within the larger Matehy Electoral Division (Ref 47250). The site was formerly located within the administrative area of Cork County Council, however, since the Cork City Boundary Extension in May 2019, the lands are now situated within the functional area of Cork City Council. A number of nested geographics have been selected as the study area for this demographic analysis, with the detailed CSO small area statistics being juxtaposed with the settlement statistics for adjoining village of Tower and the wider statistics for the Matehy Electoral Division (ED), Cork City and Cork County overall. While the subject site is now within the amended Cork City Boundary, the statistics outlined below for Cork City relate to the previous city boundary as the boundary change occurred subsequent to the Census in 2016, and the statistics relate to the previous boundary. The boundaries of these areas are illustrated in Figure 13.2 as shown.

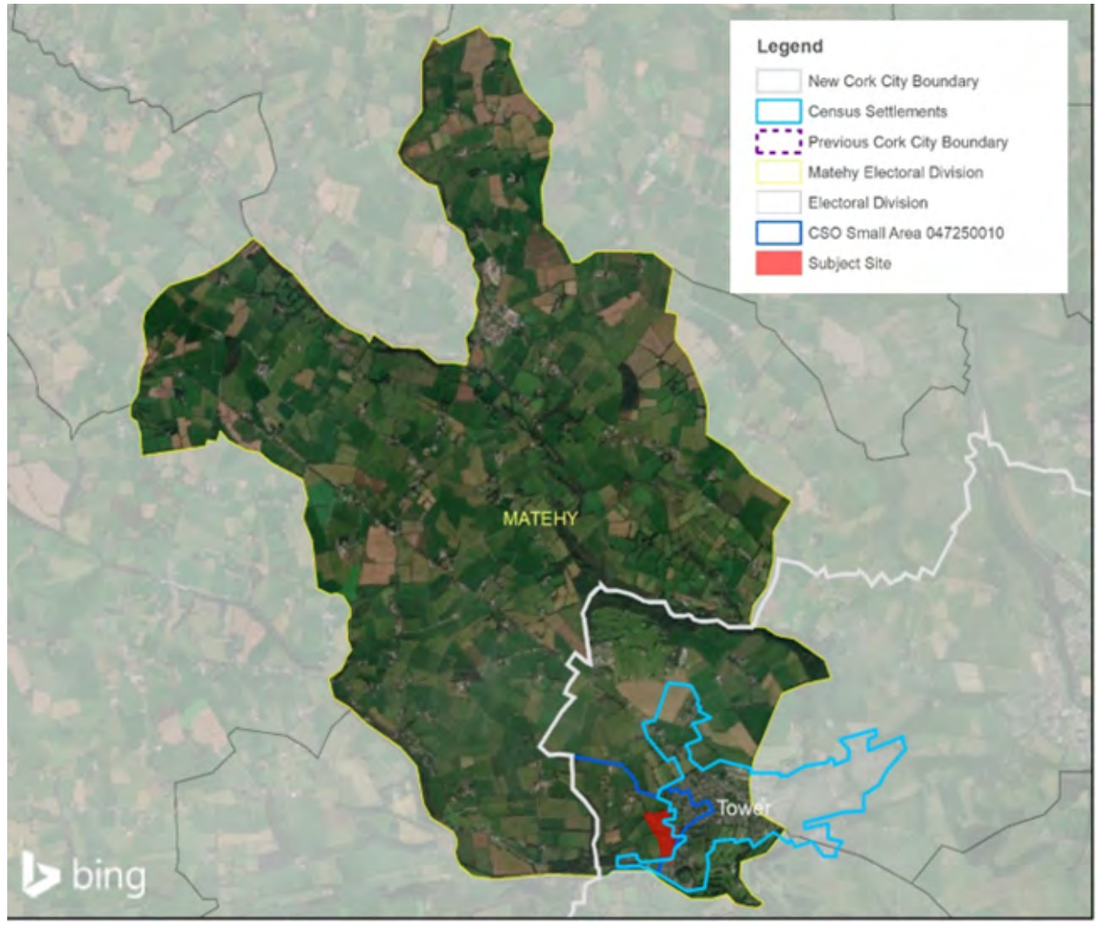

Figure 13.2 Immediate Study Area

13.2.1.2 Population

Small Area Statistics have only been captured by the CSO since 2011 so it is not possible to determine a long-term trend in the population in which the subject site falls beyond noting that the population has been extremely stable between 2011 and 2016 increasing by 1 person to 292 in 2016. By contrast there has been a significant population increase in the settlement of Tower, increasing by 86% between 1991 and 2016. While the majority of this increase occurred between 1996 and 2002, the have been a steady increase across all the intercensal periods. The wider Matehy ED has also experienced substantial growth of 45% since 1991, again primarily between 1996 and 2002, but strong growth also occurred between 2011 and 2016. In this growth trend both the settlement of Tower and the ED of Matehy reflect and exceed the growth patterns of Cork County as a whole and the national trends. Conversely, Cork City experienced a 1% population decline in this period, though the pattern of population decline was reverse in the last intercensal period.

Table 13.1 Population Trends in the Study Area

Area	1991 [1]	1996	2002	2006	2011	2016 [2]	% Change 1991 - 2016
Small Area 047250010	n/a	n/a	n/a	n/a	291	292	-
Tower Settlement	1,402	1,841	3,032	3,102	3,306	3,421	86%
Matehy ED	1,820	2,077	2,593	2,792	2,783	3,017	45%
Cork City	127,253	127,187	123,062	119,418	119,230	125,657	-1%
Cork County	410,369	420,510	447,829	481,295	519,032	542,868	29%
State	3,525,719	3,626,087	3,917,203	4,239,848	4,588,252	4,761,865	31%

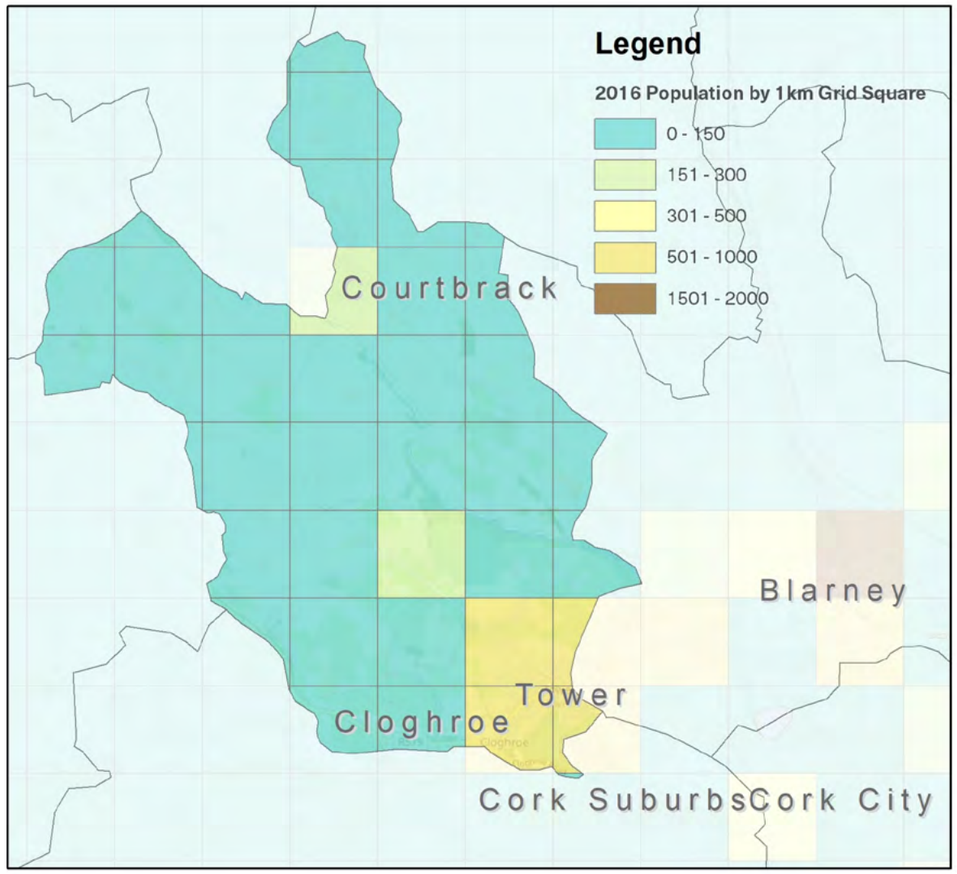

Figure 13.3 2016 Population per 1km Grid Square

[1] based on information from table 4.1 of 2001 Project EIAR
[2] Not withstanding the LEA boundary changes between 2002 and 2019 the figures in Table 1.1 and the boundaries in Figure 1.2 reflect the current 2019 LEA boundaries

Figure 13.3 indicates that the population density of the majority of the ED of Matehy is relatively low with fewer than 150 persons/km^2, this reflects the predominantly agricultural nature of the area. Exceptions to this are in the settlements of Tower and Cloghroe to the south-east of the ED where the population density is between 500 and 1000 persons/km^2, and in the village of Courtbrack to the north of the ED where the population density is between 300 and 500 persons/km^2. The town of Blarney is c. 3.5km to the northeast has a population density of between 1500 and 2000 persons /km^2.

13.2.1.3 Households

The average household size in the surrounding small area is higher than the state, city and county averages, with the average household size of the ED of Matehy and the settlement of Tower being higher again.

Table 13.2 Average Household Size in the Study Area

Area	Number of Households	Population	Average Household Size
Small Area 047250010	102	297	2.91
Tower Settlement	1,134	3,443	3.04
Matehy ED	965	2,927	3.03
Cork City	49,411	120,980	2.45
Cork County	146,442	414,062	2.83
State	1,702,289	4,676,648	2.75

This is accounted for by the relatively high percentage of the household populations in the Tower area with children between pre-school and adolescent family cycle stages. The state average is 54% whereas in Tower this is 59%, with higher than state averages across most family cycle stages. Within the small area where the subject site lies and in Matehy ED, however, the children in general are slightly older, with fewer pre-school and early-school age children and above average numbers of adolescent children. This is a factor of when the estates of Senandale to the south and Dromin to the north were built and occupied.

Table 13.3 - % of Family Member Population by Family Cycle Stage the Study Area

Family Cycle	Small Area	Tower	Matehy ED	State
Pre-school	8%	11%	9%	10%
Early school	8%	15%	10%	14%
Pre-adolescent	12%	15%	16%	15%
Adolescent	23%	18%	17%	16%
Retired	6%	6%	7%	6%

Conversely, the population of Matehy ED has a slightly higher retired populations than either Tower or the State average, reflecting the norm in more rural areas.

13.2.1.4 Travel Patterns

Table 13.4 outlines the travel mode statistics for commuting trips to school, college and work. It is evident that there is a significantly higher number of commuters using private motor vehicles in the area than the state average, with a correspondingly low number of pedestrian, cyclist and public transport commuters.

Table 13.4 Commuting Modes for persons aged 5 and over in the Study Area

Commute Mode	Small Area	Tower	Matehy ED	State	Rural Areas
On-foot or Bicycle	5%	3%	4%	17%	4.4%
Public Transport	4%	7%	4%	13%	2%
Car, Motorbike or Van	85%	86%	85%	63%	85.5%
work from Home	2%	1%	3%	3%	-

These figures are, however, more in line with the rural state averages for commuting as indicated in Table 13.4, reflecting the rural nature of the area, with residents commuting to the nearby settlements of Blarney, Ballincollig and Cork City for schools, colleges and employment.

13.2.1.5 Affluence and Deprivation

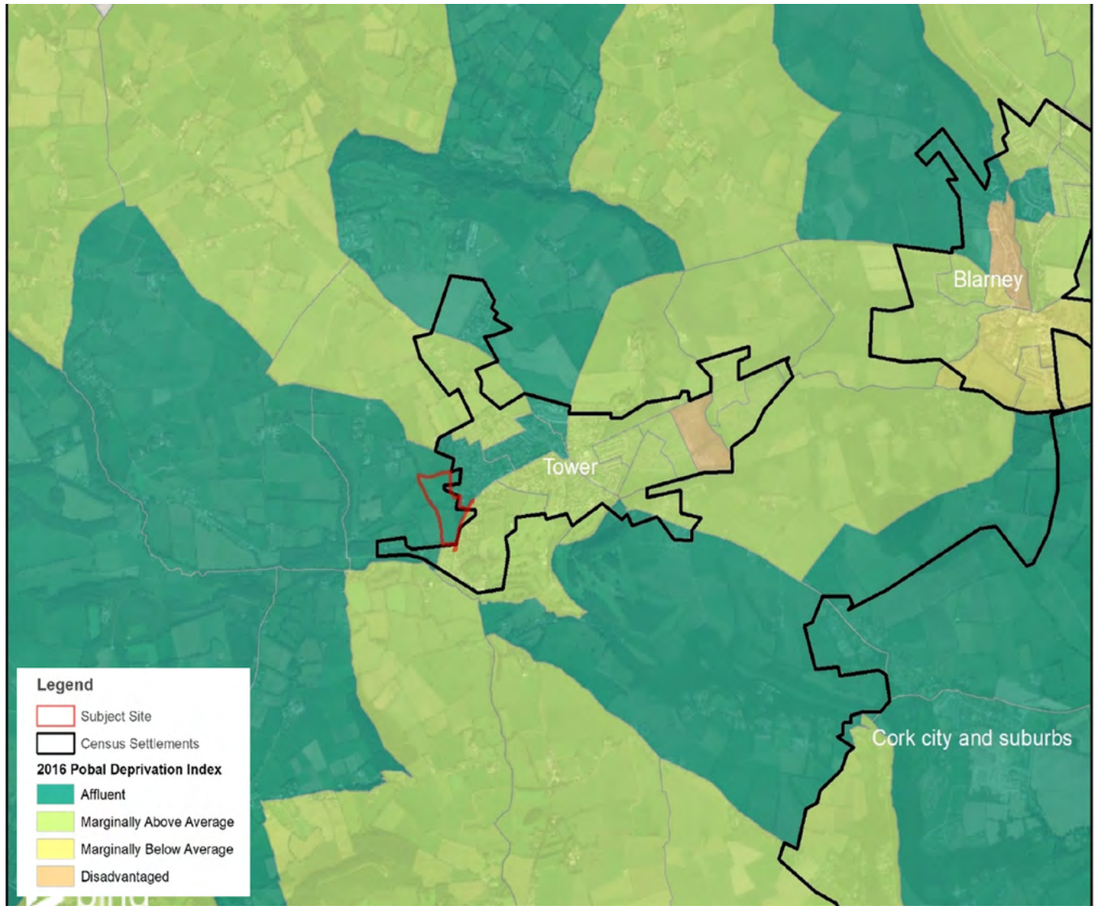

Figure 13.4 2016 Pobal Deprivation Index per Small Area

The Popal Deprivation Index shows the level of overall affluence and deprivation at the level of CSO Small Areas in 2016 based on a number of census indicators, as set out in Figure 13.5.

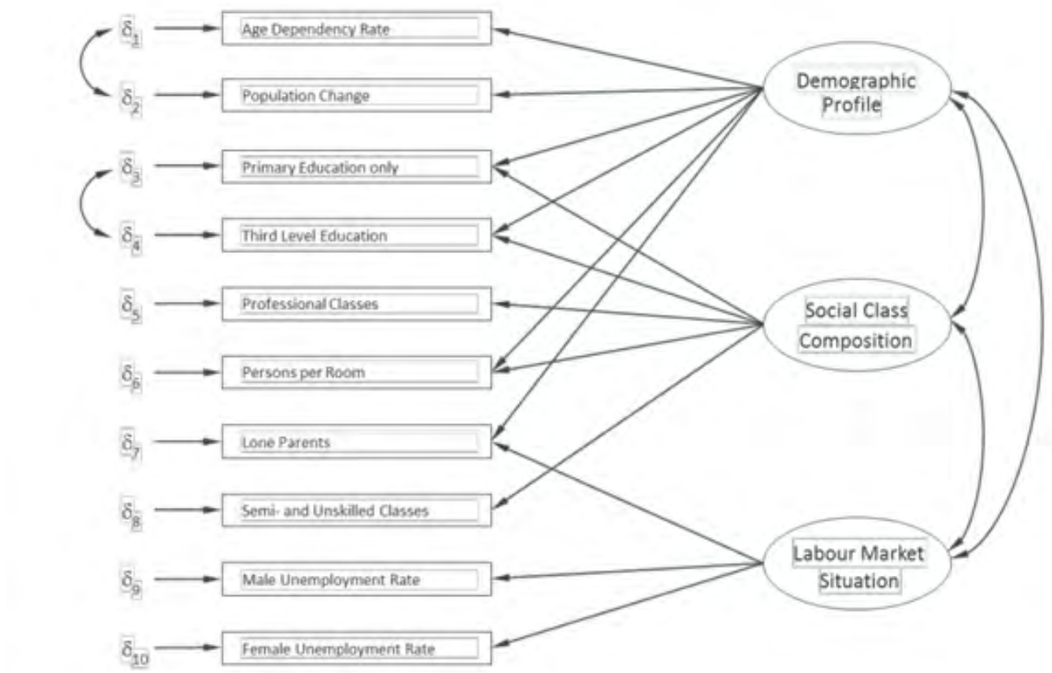

Figure 13.5 Pobal Deprivation Index Indicators

It can be seen from Figure 13.4 that the subject site falls within an 'Affluent' CSO small area, with significant areas in the vicinity similarly classified. However, much of the settlement of Tower is considered to be only 'Marginally Above Average', with an area to the east of the settlement considered 'Disadvantaged'. A significant portion of the town of Blarney is considered to be either 'Marginally Below Average' or Disadvantaged', these correspond with areas of a high percentage of social rented housing.

13.2.1.6 Employment

In the 2016 census, the CSO introduced Workplace Zones, which are an aggregate of CSO Small Areas, and which aim to indicate the spatial distribution of employment. Figure 13.6 indicates the Workplace Zone that includes the subject site. Within this area there were 240 jobs recorded in the 2016 Census and 765 resident workers, giving a job to worker ratio of 0.313, representing an overall outflow of workers. The jobs ratio is slightly higher than that of Tower and significantly lower than the Cork City average as would be expected of a rural/suburban area.

Table 13.5 Jobs Ratio in the Study Area

	Workplace Zone	Tower	Cork City and Suburbs
Labour Force (A)	765	1,472	87,354
Number of Jobs (B)	240	296	102,139
Jobs Ratio (B/A)	0.313	0.201	1.169

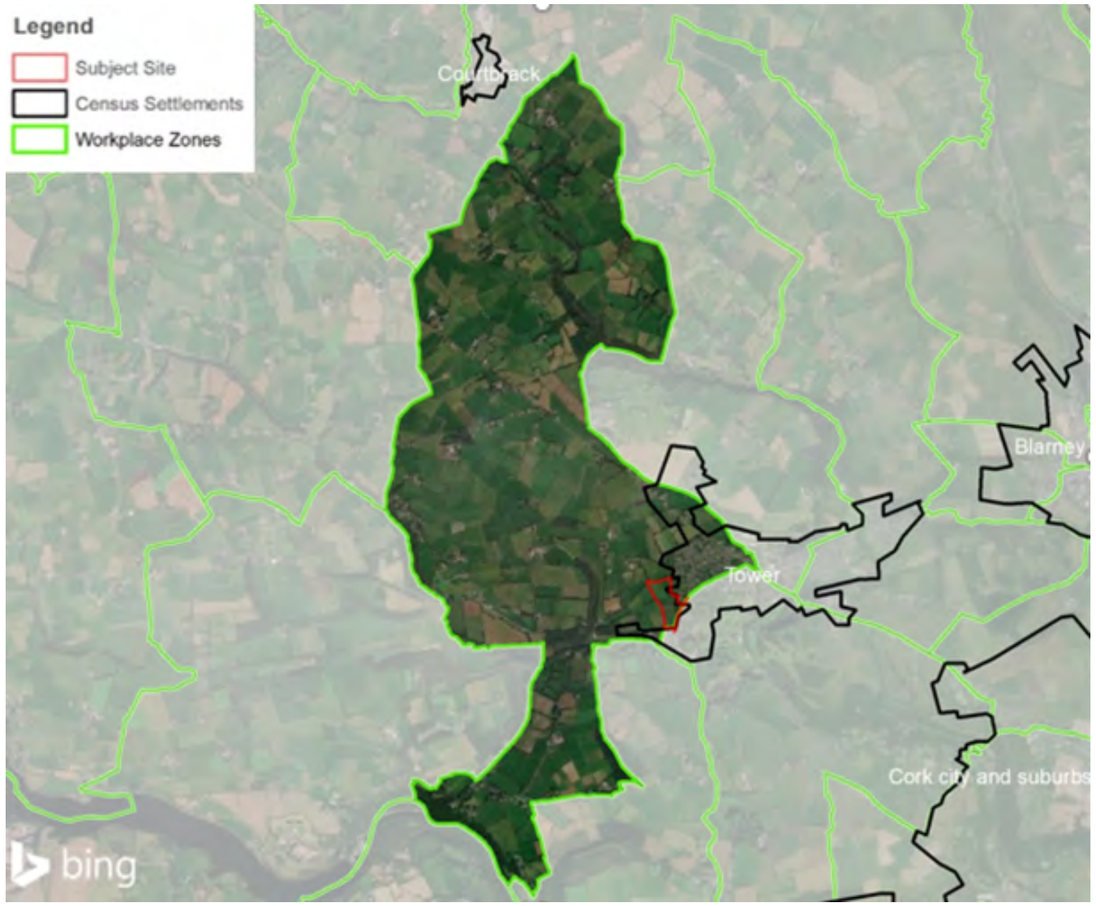

Figure 13.6 CSO Workplace Zone

Table 13.6 Labour Force Statistics

Area	At Work	Looking for First Job	Unemployed	Labour Force	Labour Force Participation Rate
Small Area 047250010	125	1	5	232	56%
Tower Settlement	1,504	13	105	2,563	63%
Matehy ED	1,349	9	67	2,377	60%
Cork City	50,483	919	8,024	107,717	55%
Cork County	179,890	1,827	16,460	321,620	62%
State	2,006,641	31,434	265,962	3,755,313	61 %

Alongside this the 2016 Labour Force Participation Rate (the number of persons in the labour force expressed as a percentage of the total population aged 15 or over) in the Small Area is relatively low at 56% compared to 63% in Tower, 62% for Cork County Council area, and the state average of 61%. The low participation rate in the study area appears to correlate with the fact that this is a long-established residential area with a relatively high number of retirees living in the area.

13.3 LAND USE

The subject lands are situated within the 'development boundary' of Tower as defined in the current Local Area Plan. The site is bounded to the east by the R617 regional road linking Cloghroe to Blarney and to the south by the Senandale residential development. To the north is a mix of open agricultural lands and one-off dwelling houses with further undeveloped agricultural fields to the west. The site is situated proximate to several local services and amenities including, within short walking distance to Cloghroe National School and Cloghroe Church to the southeast of the site. The site is also situated immediately adjacent to an existing bus stop serving as the terminus of the No. 215 Cloghroe – Mahon Point bus route.

13.4 COMMUNITY AND SOCIAL INFRASTRUCTURE

The existing community and social infrastructure assets in the local area has been identified in accordance with the categories outlined in the table 13.7 below.

Table 13.7 Community and Social Infrastructure Categories

Category	Description
Amenity, Open Space and Sports	Parks, Playgrounds, Amenity Walks/Greenways, Pitches, Green Areas, Golf Courses, Sports Pitches, Sports Centres, Swimming Pools, Gyms
Childcare and Education	Childcare, Primary Schools, Post Primary Schools, Special Schools, Third Level Universities, Other Educational Institutions
Community facilities	Community Centres, Religious Facilities, Post Offices, Libraries.
Retail services	Supermarkets, Convenient Shops, Specialty Services, Restaurants/Take-aways, ATM, Petrol Station
Health	Hospitals, Health Centres, Clinics, Pharmacies, Addiction Services, GPs, Mental Health Services
Emergency	Fire Station, Garda Station
Public Transport	Bus and Train Routes

For the purposes of assessing the community and social infrastructure serving the settlement of Tower, it has been concluded to provide for a 5km radius of the settlement, including the nearby settlements of Blarney and Ballincollig. Tower is closely linked to both settlements geographically and in the provision of services.

13.4.1 Amenity, Open Space and Sports

Tower/Cloghroe and its surrounding areas are well served by a variety of recreational, amenity and sporting facilities in the village and within the defined study area. Within the settlement itself Tower provides for Muskerry Golf Club, a fitness studio in the Cloghroe Neighbourhood Centre, Blarney United FC grounds, a community playground at Seanacloc and an AstroTurf football pitch to the rear of Cloghroe National School.

Inniscarra Community Centre, situated approximately 3.7 kilometres west of the site, serves as a centralised community and sporting hub for the wider area including the settlement of Tower/Cloghroe. At the Community Centre are the grounds of the local Inniscarra GAA Club, Muskerry Rugby Football Club, Strand United Football Club, Inniscarra Camogie Club, Inniscarra Pitch and Putt Club. Cork Kenpo Karate Club, Inniscarra Bocce/Special Olympics club in addition to a large community centre with outdoor playground and amenity walkway. Within the wider Cloghroe/Tower area there are a variety of other sport clubs and outlets including the Blarney Golf Resort, Rocklodge Pitch and Putt club and Cork Golf Centre.

The neighbouring settlements of Blarney, Ballincollig and Kerry Pike are also within the defined study area and provide for a further diversification of sporting, amenity and open space opportunities. Blarney, which is situated on the 215 no. bus route provides for a village green recreational area, Blarney Castle and gardens, Castleview running trail and Clogheenmilcon Sanctuary Walk to the east of the settlement.

Due to its strategic function a 'Metropolitan Town' in the settlement hierarchy of the 2014 Cork County Development Plan, Ballincollig provides for a wide range of existing community and social infrastructure assets which will serve existing and future residents of Tower/Cloghroe. This includes amenity, open space and sports facilities including Ballincollig Regional Park, playgrounds and additional GAA, soccer and rugby clubs a variety of gyms and a swimming pool at the Oriel House hotel.

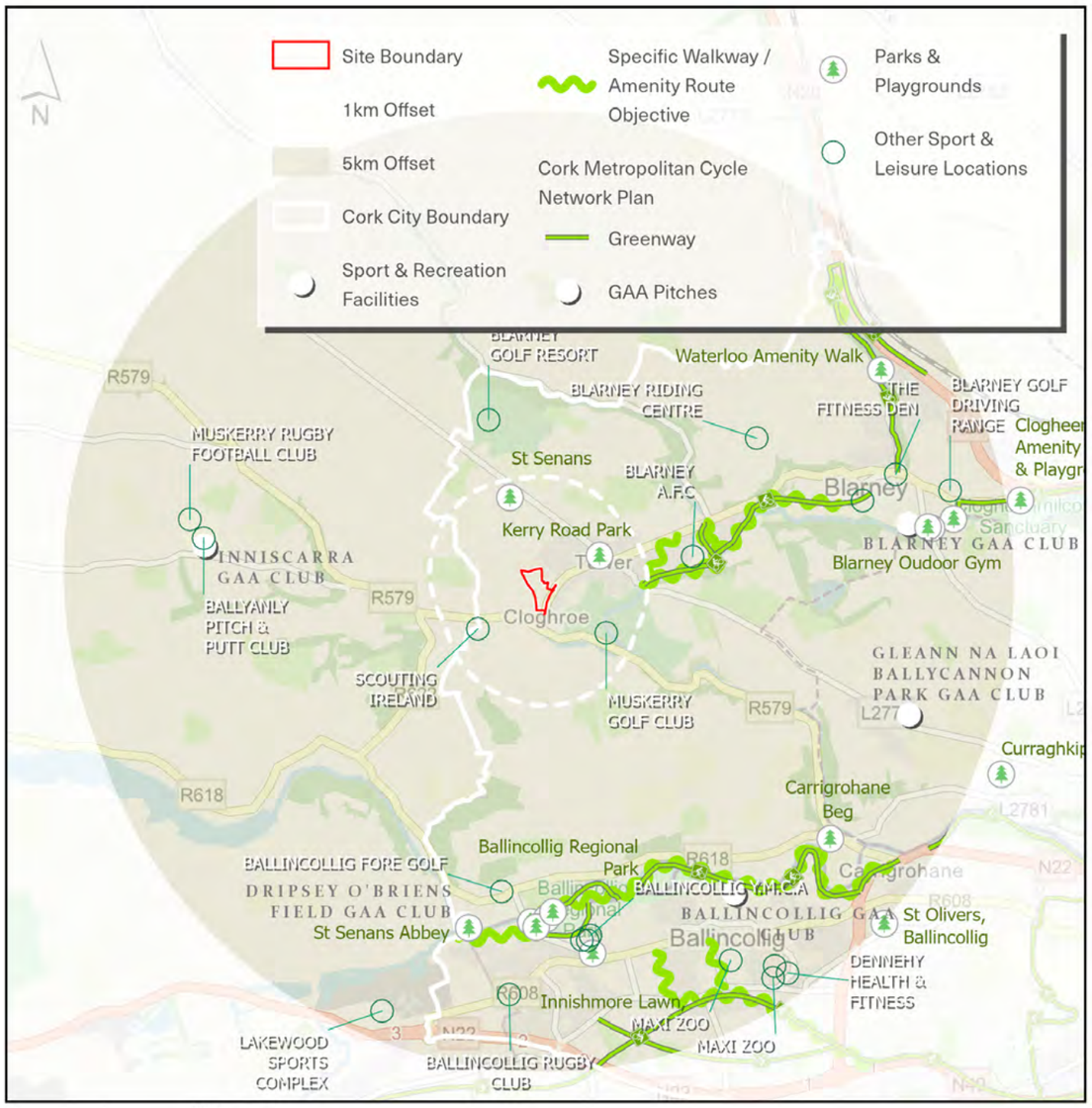

Figure 13.7 Details of Amenity, Open Space and Sports Facilities in study area.

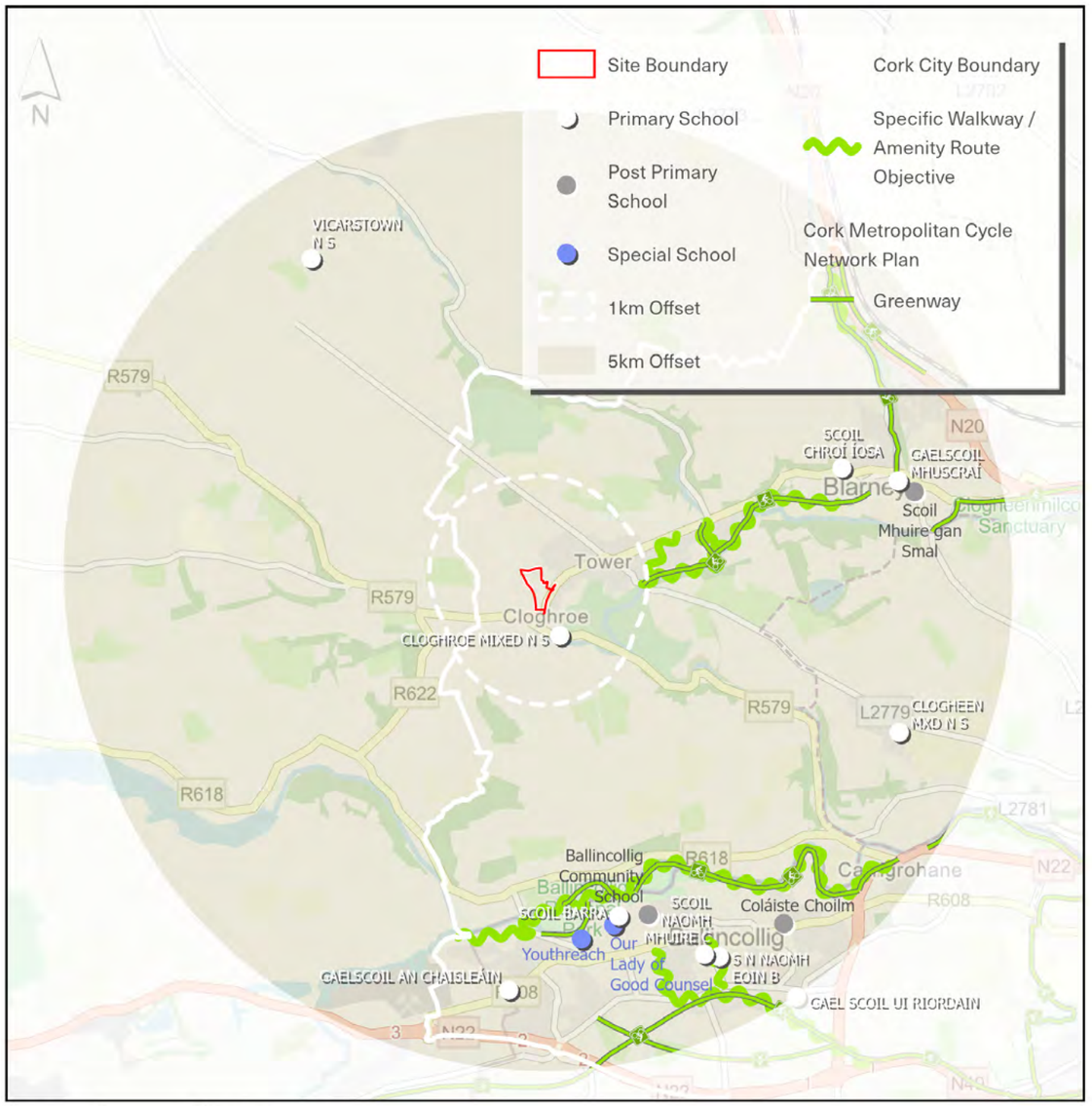

Figure 13.8 Details of Existing Schools in study area

13.4.2 Education and Childcare

The study area, which includes the settlements of Tower/Cloghroe, Kerry Pike, Blarney and Ballincollig contains 10 no. primary schools, 3 no. secondary schools and 1 no. special school.

Education & Schools

The population of Tower/ Cloghroe is served by Cloghroe National School to the east of the subject lands. Other primary schools in the study area include Vicarstown Primary School and additional schools in Kerry Pike, Ballincollig and Blarney. An overview of the primary schools within the study area is provided in table 13.8 as shown. The information in table 13.8 was obtained from a review of the '*Data on Individual Schools'* 2020/2021 database of the Department of Education [3].

Table 13.8 Summary of Existing Primary Schools in Study Area

Settlement	Primary School	Type	Capacity
Cloghroe	Cloghroe National School, Cloghroe, Co. Cork, T23 AH2R	Mixed	531
Vicarstown	Vicarstown National School, Gilcagh, Co. Cork. P32 DX40	Mixed	133
Blarney	Scoil Chroí Íosa, St Ann's Rd, Blarney, Co. Cork, T23 E722	Mixed	327
Blarney	Gaelscoil Mhuscraí, Shean Lower, Blarney, Co. Cork, T23 EA29	Mixed	167
Kerry Pike	Clogheen Kerry Pike National School, Kerry Pike, Cork, T23 A406	Mixed	147
Ballincollig	Gaelscoil Uí Ríordáin, Carriganarra, Ballincollig, Co. Cork, P31V242	Mixed	766
Ballincollig	Scoil Eoin Buachailli, Station Road, Ballincollig, Co. Cork, P31XW21	Boys Only	439
Ballincollig	Scoil Mhuire, Pine Walk, Ballincollig, Co. Cork, P31 N265	Girls Only	439
Ballincollig	Scoil Barra, Innishmore, Ballincollig, Co. Cork, P31H578	Mixed	500
Ballincollig	Gaelscoil an Chaisleain, Tanner Park, Coolroe, Ballincollig, Co. Cork, P31 DA38	Mixed	89

In total there are 531 no. primary school places in the settlement of Cloghroe/Tower and a further 3,007 no. spaces across the remainder of the study area.

Existing Post-Primary/Secondary Schools

Post-primary schools by their nature are generally of a larger scale and catchment area. Due to Towers location within Metropolitan Cork and proximity to larger service settlements of Blarney and Ballincollig and high frequency public transport link to the City Centre, existing residents of the settlement have a greater selection of post-primary schools than other comparably sized settlements. This is further evident as students at this age are more capable of availing of public transport and sustainable modes of transport, without adult supervision. However, for consistency and the purposes of this assessment, only the post-primary schools within the defined study area have been assessed.

There are currently no post-primary schools in Tower. There are 3 no. post-primary schools in the study area with a combined capacity of 3,047 no. places. An overview of the post-primary schools within the study area is provided in table 13.9 as shown. This information was obtained from a review of the '*Data on Individual Schools'* 2020/2021 database of the Department of Education [4] .

[3] https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/
[4] https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/

Table 13.9 Summary of Existing Secondary Schools in Study Area

Settlement	Post-Primary School	Type	Capacity
Blarney	Scoil Mhuire Gan Smal, T23WP23	Mixed	847
Ballincollig	Colaiste Choilm, Carrigrohane, Ballincollig, Co. Cork P31 NY77	Mixed	1,347
Ballincollig	Ballincollig, Community School, P31 E030	Mixed	853

Third Level Institutions

There are no third level institutions such as colleges or universities with the study area. Towers location at the western environs of Cork City results that both University College Cork (UCC) and Munster Technological University (MTU) (formerly Cork Institute of Technology) are both within approximately 15-20 minutes' drive from the settlement. The 235 no. Cork - Rylane Bus route provides both a morning and evening service which directly serves UCC.

Special Schools

Our Lady of Good Connsel School at Innishmore Drive, Ballincollig, P31FH22 with a capacity for 68 no. students is a Special School within the study area according to the Data on Individual Schools' 2020/2021 database. Youthreach which is operated by the Cork Education Training Board at the Great Island Enterprise Park, Ballincollig, P31 FT02 also offers young people between the ages of 15 and 21 years who are no longer engaged in mainstream education, the option of engaging in a full-time, structured programme with progression routes to further education, training or employment. There are also a number of special schools and specialised education facilities in Cork City that are served by public transport links with Tower.

Childcare

According to 2016 Census Figures, the average household size in Tower is 3.0 persons per household. This is slightly higher than the average across Cork City and suburbs at 2.6 persons per household. In 2016, 7.6% of Towers resident population of 3,421 people were of pre-school age.

At present there are 4 no. existing childcare facilities in Tower area, namely:

- Tiny Toes Pre-School, Cloghphilip, Kerry Road, Tower, T23 RR02. (Tusla Reference: TU2015CC428) with a current capacity of 25 no. children.
- Shournagh Childcare, Elmgrove, Shournagh Road, Tower, T23 W291 (Tusla Reference: TU2015CC365) with a capacity of 77 no. children,
- Stepping-Stones Pre School, 6 Muskerry Heights, Tower, T23 C9VK.
- Vicarstown Playschool, Kileen, Vicarstown, P32 KX33 (Tusla Reference TU2015CC457) with a capacity of 20 no. children.
- As well as a further 4 no. childcare facilities in Blarney.

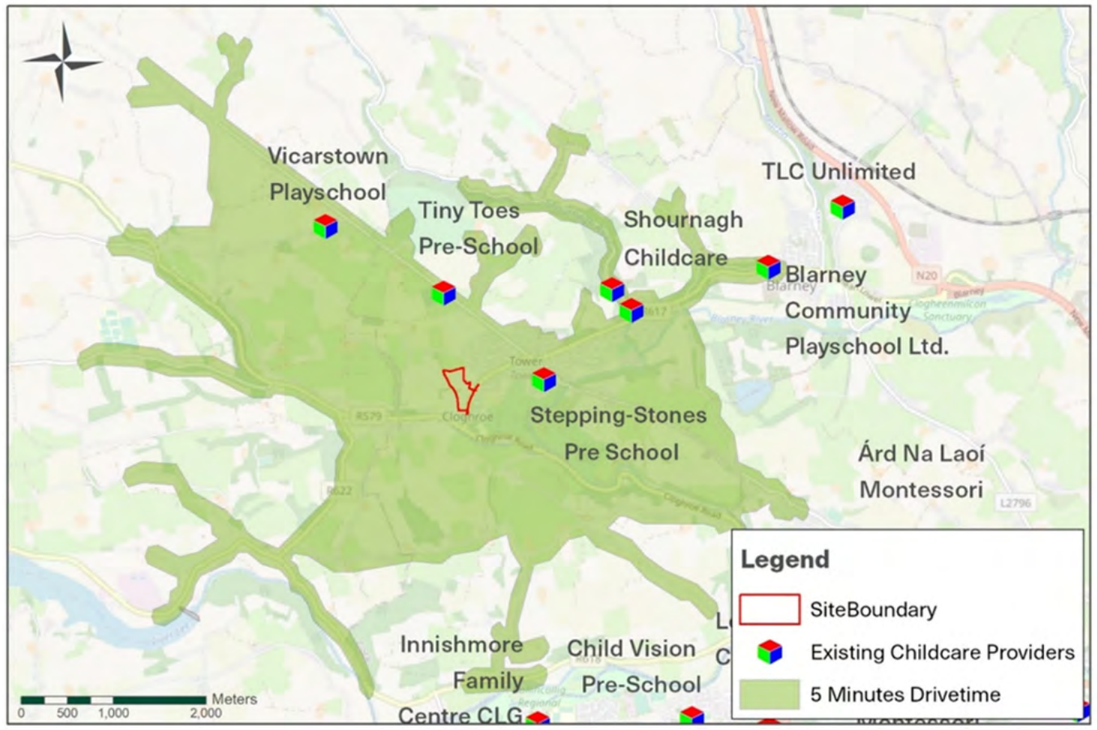

Figure 13.9 Local Distribution of existing Childcare Facilities

13.4.3 Community Facilities & Emergency Services

Due to its traditional village function, Tower contains a number of community-oriented facilities. This includes Cloghroe post office and Cloghroe Catholic Church to the southeast of the site and Tower Community Hall in the Model Village to the north of the subject lands (Eircode T23 R722). The previously referenced Inniscarra Community Centre provides for a larger parish hall capable of accommodating larger events.

The settlements of Blarney and Ballincollig provide a wide range of additional community facilities including Ballincollig library, additional churches Credit Unions, banks and community spaces. The previously referenced local sports clubs and schools form focal points of the local community and serve as key community assets. Blarney and Ballincollig Garda Stations are both within the 5km radius study area as is Ballincollig Fire Station.

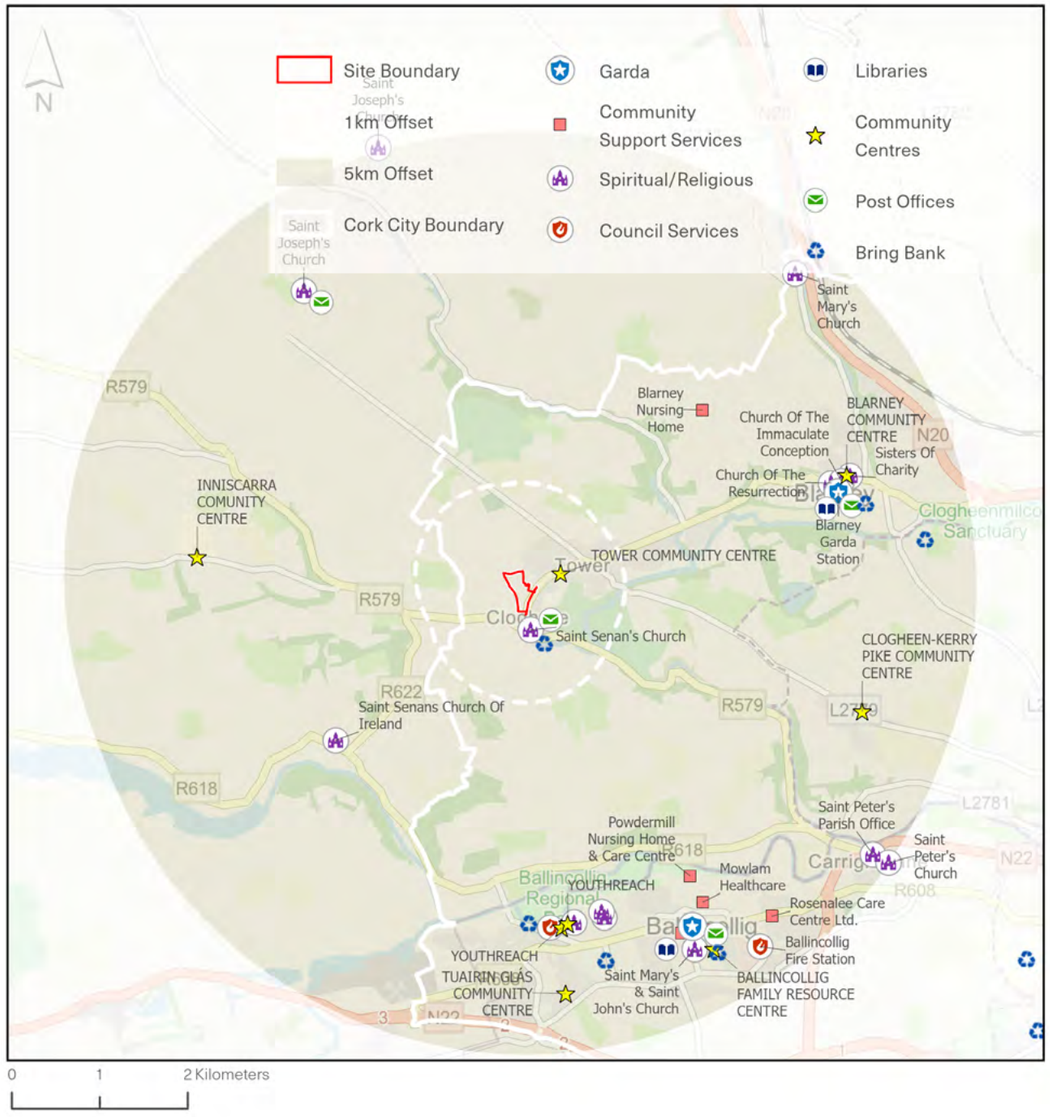

Figure 13.10 Details of Existing Community facilities in study area

13.4.4 Retail

13.4.4.1 Existing Retail Catchment

A Retail Impact Assessment (RIA) prepared by HW Planning accompanies this SHD application and is attached in Appendix 13-1 of this EIAR.

The retail catchment defined in the RIA, does not include Blarney or Ballincollig. As detailed in the RIA, the retail catchment of was established by a desktop approach, using Census 2016 small area data and based on existing and expected consumer behaviour. The catchment was validated by site visits and visual inspections. The starting point for catchment definition was a 5 minute drivetime of the proposed development site, this area was then modified to exclude areas within 5 minutes drivetime of Blarney, with the exception of those areas within Tower, which are more likely to be served by the settlement itself. The catchment was also reduced to the south in areas which would naturally be served by Ballincollig. Conversely, the catchment was expanded to the west and north to a 15 minute drivetime, to reflect the absence of other convenience retail stores in these areas. It is considered that Tower serves as the most convenient location for household retail shopping for the rural areas such as Matehy, Inniscarra, Donoughmore, Berrings, Dripsey, Firmount, Kerry Pike, New Tipperary, Stuake and Courtbrack.

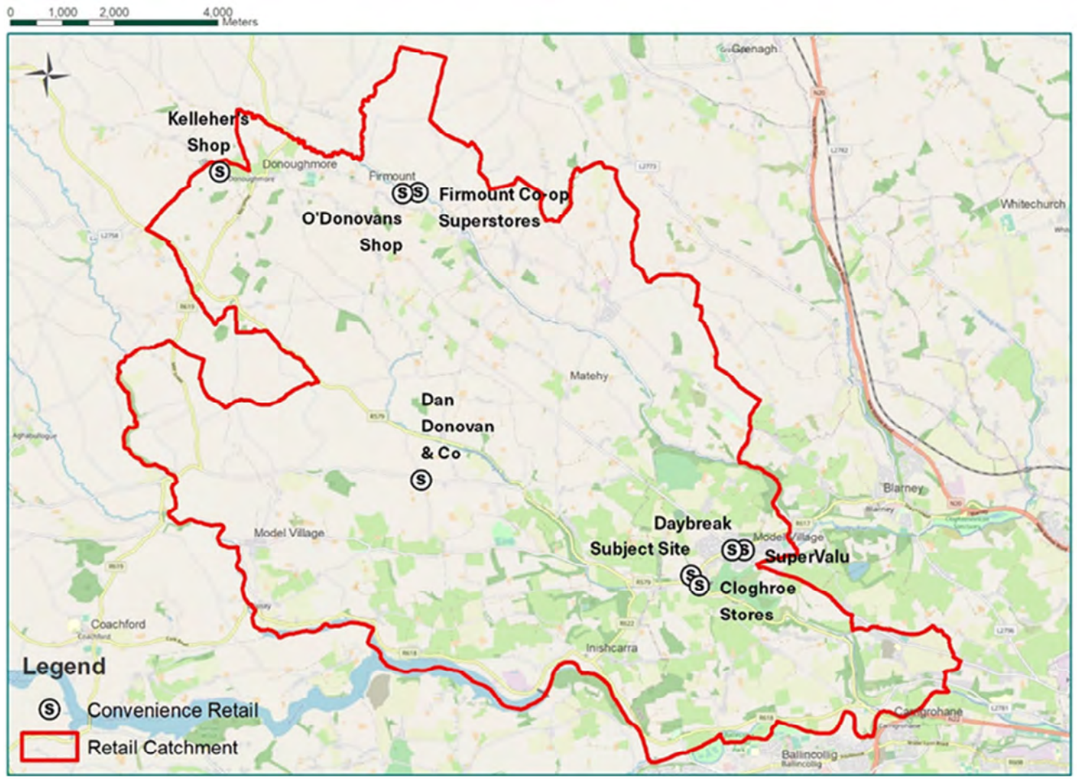

Figure 13.11 Retail Catchment as defined in Retail Impact Assessment

At present there are two local neighbourhood centres in the settlement of Tower/Cloghroe. An existing Super Valu supermarket is situated in Tower, with florist, physiotherapists, beauty salon pharmacy also provided. A Daybreak/Circle K service station is located near the junction of the R617 and L-2752 roads. There is a separate neighbourhood centre in Cloghroe to the south of the settlement. Within this neighbourhood centre a local convenience shop (Cloghroe Stores), post office, pharmacy, fitness studio and hairdressers are located immediately adjacent to Cloghroe Church and Cloghroe National School.

Figure 13.12 Super Valu - Tower (Eircode T23 W968)

Figure 13.13 Circle K/Daybreak- Tower (Eircode T23 HY50)

Figure 13.14 Cloghroe Stores & Post Office (Eircode T23 E446)

The 3 no. current convenience retail outlets all serve differing purposes with Cloghroe Stores serving as a newsagent as well as the local post office while the Daybreak/Circle K functions primarily as the local service station and also acting as a newsagent. O'Learys SuperValu is a larger supermarket more suited to household grocery shopping.

As referenced previously, due to Towers location, the settlement provides retail and local services for a large rural hinterland and is the most convenient location for household retail shopping for rural areas to the north and west such as Cloghroe, Matehy, Inniscarra, Donoughmore, Berrings, Dripsey and Courtbrack. The importance of this role is increased due to the limited retail provision in Blarney which contains a number smaller to medium sized retail outlets, however no significantly sized supermarket is currently provided for in the settlement.

13.4.4.2 Retail Catchment Analysis

An analysis of the defined retail catchment identifies 11 no. other smaller settlements within Towers wider retail catchment. Field visits at these locations were carried out on 05/12/2020 /during the late morning to early afternoon to establish the existing quantum of convenience retail in the area. The results of these site visits are presented in Table 13.10 as shown. The extent of existing convenience retail within the catchment was found to be minimal and with the exception of the Cloghroe/Tower settlement and to some extent Berrings. Retail provision in the catchment generally consists of privately run corner shops in units of less than 50 m^2.

Several settlements within the catchment area have no retail offer, while others have vacant retail premises which appear to have been closed for some time. A conservative estimate of total existing convenience floorspace within the identified catchment, is approximately 1,752 m^2.

Table 13.10 Convenience Retail Premises in Settlement within Catchment

Settlement	Description	Approx. Size in m^2
Cloghroe/Tower	O'Leary's Super Valu Cloghroe Stores & Post Office. O'Learys Daybreak /Circle K	1,232 150 150
Kerry Pike	No retail outlet in settlement	n/a
Matehy	No retail outlet in settlement	n/a
Berrings	Dan Donovan & Co. Ltd. (P12 R820) – Filling Station, some everyday household supplies. Primarily sells hardware & agricultural products.	70
Courtbrack	No retail outlet in settlement.	
Firmount/ Fournaght	Firmount Co-op Superstores (P32 FH59) - Co-op outlet selling hardware and agricultural products. O'Donovan's Shop (P32 YX88) - Small local shop selling household items.	50 50
Cloghroe Village	No retail outlet in settlement.	n/a
New Tipperary	No retail outlet in settlement	n/a
Donoughmore	No retail outlet in settlement	n/a
Stuake	Donoughmore Post Office & Kelleher's Shop (P32 XF82) -Post office and local convenience shop	50

13.4.5 Healthcare

There are currently 2 no. pharmacies in the settlement of Tower/Cloghroe, specifically, Hollands Pharmacy in the Cloghroe Neighbourhood Centre and Pharmacy First in Super Valu Tower. Tower Medical Centre, located near the junction of the Kerry Road and R617 provides General Practitioner services for the settlement. Cork Therapy Centre located in the Tower Shopping Centre also provides a local physiotherapy clinic.

The neighbouring settlement of Blarney provides for additional healthcare services in the form of 'Cryo Cork' cryotherapy clinic, Blarney Dental, Blarney Veterinary Clinic, Abbeyville Veterinary Clinic and Blarney Medical Centre. Ballincollig contains a further range of healthcare facilities including various pharmacies, doctors' surgeries, denialists, opticians, orthodontists and the Cork Hearing Clinic. The Ballincollig Primary Care Centre is also currently under construction. 'Full Potential Counselling', Ballincollig Health Centre and Cork Hypnosis Clinic all situated in Ballincollig provide mental health support services.

There are also a number of nursing homes/community hospitals in the study area according to HIQA's records [5], specifically.

- Grange Con Nursing Home, Cloghroe, T12 H271 with capacity for 24 no. occupants.
- Blarney Nursing and Retirement Home, Killowen, Blarney, T23 X084 with capacity for 26 no. occupants.
- Ballincollig Community Nursing Unit, Murphy's Barracks Road, Ballincollig, P31 PT10 with capacity for 100 no. occupants.
- Powdermill Nursing Home & Care Centre, Gunpowdermills, Ballincollig, P31 XV25 with capacity for 40 no. occupants.
- Rosenalee Care Centre, Poulavone, Ballincollig, P31 HE98 with capacity for 66 no. occupants.

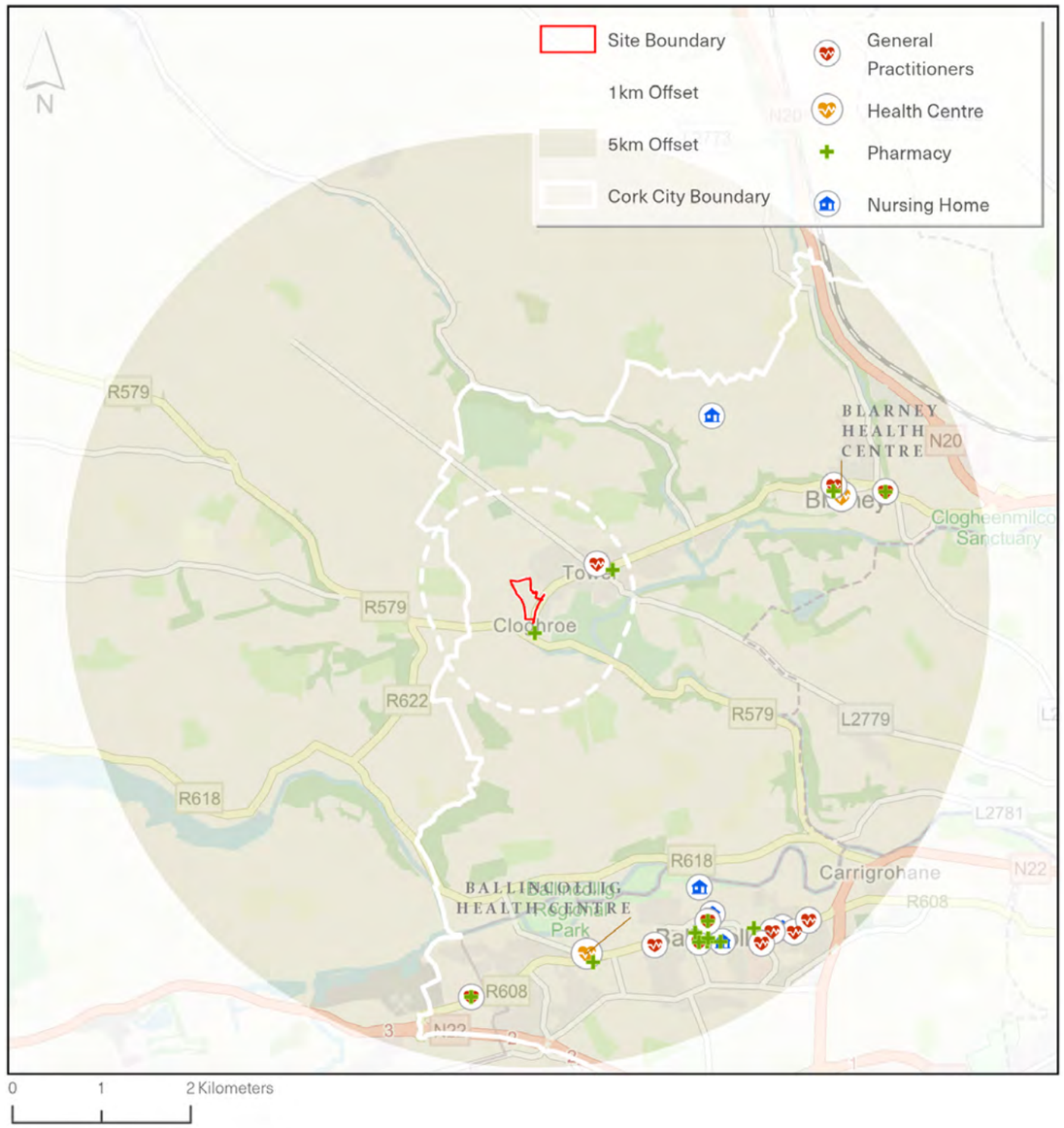

Figure 13.15 Details of Existing Healthcare facilities in study area

[5] https://www.hiqa.ie/find-a-centre

13.4.6 Public Transport

Tower is served by the 215 no. Cloghroe – Jacobs Island bus route which serves the larger urban centres of Blarney, Blackpool, City Centre (via Cork Bus Station) and Mahon Point. The service operates on a half hourly basis with the first service operating at 6.30am and last service at circa 11.30pm on weekdays.

As Cloghroe serves as the terminus of the 215 no. Cloghroe – Jacobs Island route, it likely empty once stationed at the Coolflugh (Cloghroe) bus stop. In advance of preparation of this application, the National Transport Authority (NTA) were contacted regarding the capacity of the existing 215 no. route. As detailed in the accompanying email correspondence with the NTA (Appendix 1-2 of this EIAR), the 215 no. route is currently served by a bus service, which has a normal capacity of 76 no. seated passengers and 15 no. standing passengers. As the 215 no. route operates 2 no. services every hour, approximately 180 no. bus spaces are available from the settlement per hour to employment and service centres such as Blarney, Blackpool, City Centre and Mahon.

The settlement is also served by the 235 no. Cork-Rylane bus route with one service daily in each direction.

Tower is identified as a settlement which is to benefit from the future Bus Connects scheme identified in CMATS with the 215 no. Cloghroe Jacobs Island route identified on the 'Core Radial Bus Network'. A significant improvement in the frequency of bus services on these radial routes is also proposed, with most routes expected to operate at a frequency of 15 minutes or better.

Draft BusConnects identifies the following potential bus routes of varying frequencies, which may serve Tower in the future..

- - Cloghroe – Cork Bus Station (Draft BusConnects Reference: 16)
- - Ballincollig to Cork Bus Station via Blarney (Draft BusConnects Reference: 16L)
- - Blarney to Cork Bus Station via Kerry Pike (Draft BusConnects Reference: 53)

Figure 13.16 Public Transport provision Tower

13.5 IMPACT ASSESSMENT

13.5.1 Do-Nothing Scenario

In the 'do nothing' scenario, the subject lands will remain undeveloped would remain in its existing undeveloped, agricultural and woodland use and inaccessible to the public. The proposed upgrades to the R617 would not take place, resulting in the existing situation remaining, whereby the existing bus stop is difficult to access and there is substandard pedestrian crossing points across the R617. The R617 would continue to represent a barrier to efficient pedestrian and cycle connectivity in the settlement in the 'do nothing' scenario, discouraging an uptake of walking, cycling and public transport as viable modes of transport.

The 'do nothing' scenario would also result that the existing food risk will continue in the absence of appropriate drainage/ flood defence works.

The 'do nothing' scenario, would also result in a continuing leakage of economic and retail activity from the settlement, reflective of current trends in the settlement. This trend is likely to increase further into the future given the strong recent performance in terms of population and housing growth, evidenced from the number of dwellings which have received permission and have been constructed in the settlement, since the adoption of the 2017 Local Area Plan.

Over time it is considered the do-nothing scenario will result in an inefficient use of serviced lands, which will have convenient access to public transport opportunities and local amenities and will negatively impact many aspects relating to population and human health.

13.5.2 Impacts on Existing Population and Human Health

13.5.2.1 Construction Phase

Construction works are likely to take place over a c. 48 no. month period (c. 4 no. years). The construction methods employed, and the hours of construction proposed will be designed to minimise potential impacts to nearby residents. Construction of the proposed development will be implemented in accordance with the CEMP ad CTMP prepared by MHL & Associates which are included in Appendices 2-2 and 2-3 of this EIAR. These documents describe a suite of mitigation measures to be strictly implemented and monitored during the construction phase of the development.

It is expected that the construction workers will travel from their existing residence rather than taking temporary accommodation in the local area. Impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. The proposed upgrades to the R617, including the implementation of a footpath, cycle lanes, pedestrian crossing and relocation of the exiting bus stop may result in additional traffic congestion for a short period. The mitigation measures identified in the CEMP and CTMP, seek to minimise traffic and transportation impacts on the locality and minimise the numbers of HGV's and construction related vehicles accessing the site.

As described in Chapter 4 of this EIAR (Landscape and Visual), the construction phase of the development will require site clearance works/bulk excavation, tree and vegetation removal. The proposed construction phase will result in temporary negative impacts to the local landscape/visual context which will impact the local populations enjoyment of the existing landscape. The adoption of the proposed mitigation measures including the tree protection measures and the phasing of vegetation removal will mitigate these temporary negative impacts.

Chapter 6 of the EIAR, refers to potential impacts on human health relating to the implementation of services and utilities. Potential slight and temporary negative impacts on existing services such as water, communications, electrical infrastructure resultant from connections, may occur from the proposed development to existing local services. The implementation of the proposed surface water/foul sewer upgrades to serve the development may result in some temporary disruption to the operations of the R617 and local road network.

As detailed in EIAR Chapter 7 (Land, Soils & Geology), in the absence of appropriate mitigation measures, potential moderate negative construction related impacts affecting human health include contamination of soils through construction activity from spillages. However, with the mitigation measures proposed being enforced to reduce and/or avoid these potential impacts, and to address any potential waste soil management issues.

As detailed in EIAR Chapter 8 'Water (Hydrology & Hydrogeology)', with the proposed mitigation and monitoring measures adopted, it is predicted that any impacts on sensitive hydrological features/water quality, impacting human health, arising from the construction works will be 'slight and neutral.'

Chapter 10 of this EIAR prepared by AWN Consulting assesses the potential impacts of noise and vibration during construction phase and confirms that the main source of noise and vibration will be due to the operation of various plant machinery and HGV movements to, from and around the site. It is concluded that the nearest noise-sensitive locations from the site are the residential properties at Senandale to the south and existing residential dwellings to the northeast of the site. In the worst-case scenario, there is potential for temporary, negative and moderate – significant impacts noise/ vibration impacts on neighbouring areas. However, the proposed mitigation measures contained within Chapter 10 and CEMP, which will be adopted during construction, the significance of these impact will be reduced.

As predicted in Chapter 12 of the EIAR, during construction with the proposed mitigation measures in place, cumulative dust related impacts to nearby sensitive receptors impacting human health, are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative and imperceptible. Due to the short-term duration of the construction phase and the low potential for significant CO2 and N20 emissions cumulative impacts to climate are considered neutral. There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

13.5.2.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term positive impacts for the local population including.

- The proposed development will result in providing a diverse range of housing and apartments which will serve all aspects of the current housing and rental markets and address the current accommodation shortage in the Metropolitan Cork Area.
- The proposed compensatory flood storage, headwall with non-return valve at southern boundary land drain, and attenuated surface water drainage system will remove the risk of flooding occurring within the site. The proposed flood defence system will also represent an improvement from the do-nothing' scenario, by protecting properties within the Senandale residential development to the south, from future flood events generated from the existing western boundary stream.
- The proposed development will result in the consolidation of the Cloghroe Neighbourhood Centre as an important local service centre. The proposed retail unit and café unit will represent an expansion of the existing neighbourhood entre which contains a local newsagent, post office, pharmacy, beauticians, fitness studio, church and school and create additional employment and economic opportunities for local residents.

- The relocation of the bus stop and proposed public realm works, including the introduction of bicycle lanes/footpaths will all positively contribute to sustainable mobility and traffic safety in the settlement. Cloghroe/Tower by its nature is a relatively compact settlement, with Tower village centre to the northeast a confluence point of the R617, L-2752 (referred to locally as the 'Kerry Road') and the Kerry Pike Road. The improvement of pedestrian/cyclist infrastructure, in tandem with potential future public transport links identified in CMATS/BusConnects will enhance opportunities for pedestrian and cyclist connectivity in the area, with most of the settlement within a 5-15 minute walking distance of the site.
- The proposed development will result in the evolution and urbanisation of the streetscape along the R617 Cloghroe-Blarney Road. The Landscape & Visual Impact Assessment prepared by Forestbird Design, concludes that the proposed development will positively contribute to the landscape character of the area and will complement the existing built form of the settlement.

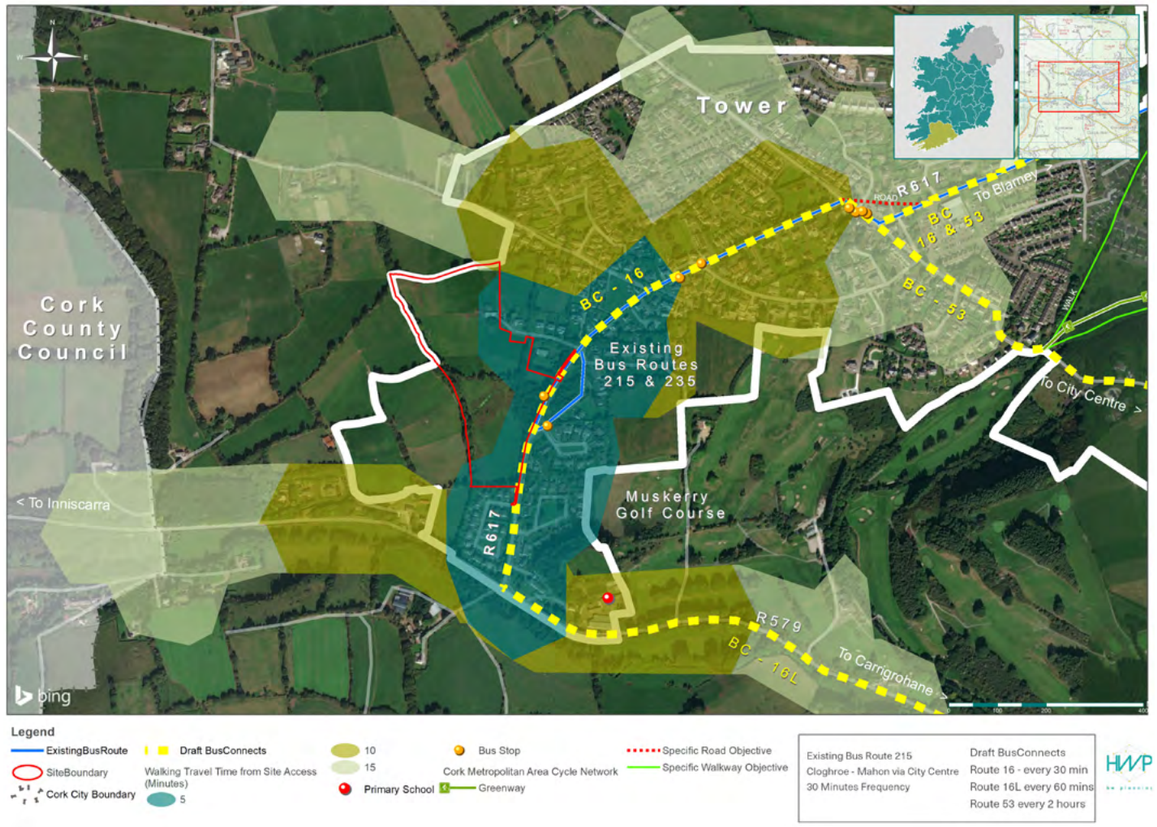

Figure 13.17a Connectivity Map - Walking Times & Bus Services

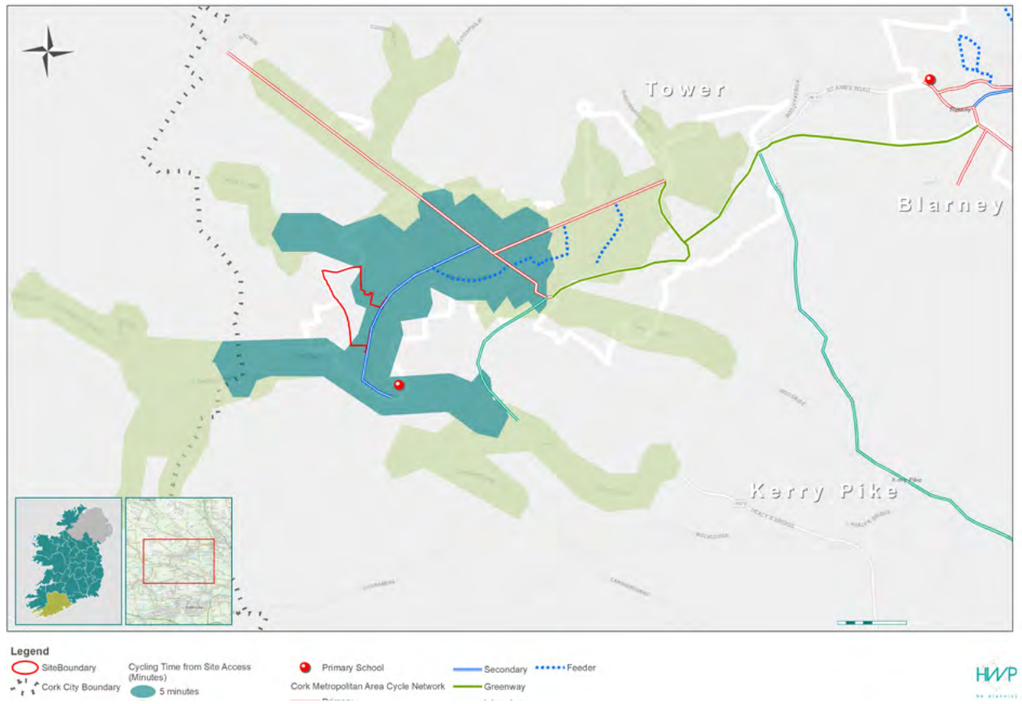

Figure 13.17b Connectivity Map - Cycle Times

The proposed development will result in an increase in traffic volumes in the vicinity of the site during the operational phase, impacting the local population. The Traffic & Transport Assessment (TTA) (Appendix 5-1 of this EIAR) concludes that following a review of the existing roads network and collision data in the vicinity of the site, that there will be no significant impacts on road safety resultant from the proposed development. Traffic modelling results conclude that the junction of the R617/R579 will reach capacity in the design year 2024 and will likely degrade, both with and without development traffic, up to design year 2039. As detailed in the TTA, there are several remedial measures that can be implemented to address these future issues such as the addition of right turn lanes on the various approaches, and potentially the signalisation of the junction. An assessment of the signalisation of this junction shows that it can operate within capacity up to and including the design year 2039.

As detailed in EIAR Chapter 6, (Material Assets – Services, Infrastructure & Utilities), during the operational phase, the proposed development will result in additional demand for local water and services infrastructure. However, with the adoption of the proposed mitigation measures, it is predicted that the residual impacts impacting the local population will be slight during the operational phase.

Chapter 8 (Water (Hydrology & Hydrogeology)) of this EIAR, predicts there will no adverse impacts associated with the development impacting population and human beings. It is anticipated that any long-term impact on flood risk arising from the development will be 'moderate positive' benefiting human health in the site's immediate vicinity.

As detailed in EIAR Chapter 10 (Noise & Vibration), the main potential sources of outward noise from the development during the operational phase will be mechanical and electrical plant used to service the buildings, additional traffic on surrounding roads, deliveries and waste collections and childcare facilities. It is not considered that there will be any significant impacts regarding noise and vibrations generated from the operational phase impacting population and human health.

Chapter 12 (Air Quality & Climate) predicts that the primary sources of air and climatic emissions during the operational phase of project will be increased traffic levels/congestion in the vicinity of the site. Air dispersion modelling of traffic emissions demonstrates that levels of all pollutants are below the ambient air quality standards set for the protection of human health set out in Table 12.1 of this EIAR. It Is predicted that the impact to human health during the operational stage is long-term, negative and imperceptible and therefore, no mitigation is required.

13.5.3 Impacts on Local Economy and Retail

13.5.3.1 Construction Phase

The duration of the construction phase is likely to result in moderate short term positive impacts to the local economy. Construction workers will avail of local retail outlets and food establishments for refreshments in mornings and lunchtimes in particular. Supplies and materials for proposed construction works may also be supplied locally further resulting in positive impacts on the local economy. The construction phase will also provide for both direct and indirect construction related employment opportunities.

13.5.3.2 Operational Phase

The proposed development will result in significant permanent positive impacts on the local economy. The 2016 Census confirms that the average household size of Tower is just over 3 no. persons per household. The proposed development of 198 no. dwellings translates to an approximate uplift of approximately 600 no. persons. The projected increase in population of Tower will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will result in providing a diverse range of housing and apartments which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area.

The location of the proposed retail component to the south of the site will result in the expansion of Cloghroe Neighbourhood Centre, catering for the needs of the towns growing population and sizeable local catchment. The proposed development provides for a 'one project approach' resulting in new residential development and the expansion of the towns retail offering being delivered in tandem.

Once operational, the proposed development will provide for a retail food store of 1,315 m2 (net floor area) and café of 155.5 m2. The findings of the RIA predict that, based on a modest population growth scenario of 1% by 2022, there will be spare capacity within the retail catchment to support additional convenience floorspace of 1,990 m2. Given the population underestimate inherent in these calculations as referred in the RIA, a growth figure of 1% is considered to be conservative. If a 2% population growth scenario is realised the spare capacity within the retail catchment to support additional convenience floorspace rises to 2,416m2. By the year 2031 it is envisaged that the 1% growth scenario will support 2,724m2 of additional convenience floorspace and the 2% growth scenario would support 4,196 m2. In this context there is adequate capacity within the catchment to support the proposed retail food store which would result in an increase of 1,315 m2 to the existing net sales area.

Based on the findings and desk and field research conducted in the RIA, it is considered that the proposed development will result in significant long-term positive impacts to the local economy and retail provision for the settlement and its large rural catchment. The proposed retail development and population growth generated from the proposed residential development will stimulate competitiveness and variety in the local retail market.

13.5.4 Impacts on Amenity, Open Space and Sports

13.5.4.1 Construction Phase

It is predicted that the proposed development will result in slight, negative short-term impacts on amenity, open space or sports facilities during the construction phase. The subject lands are in private agricultural use and are not publicly accessible. As detailed in the CEMP prepared by MHL & Associates, bulk excavation works will occur in construction phase 1 which will necessitate the removal of a number of existing trees from the site, resulting in some potential slight short-term negative visual impacts. The prepared Arboricultural Impact Assessment and landscape details prepared by Forestbird Design confirm that the majority of existing trees to be removed are lower-quality and non-native trees with higher order trees not impacted.

13.5.4.2 Operational Phase

Once operational, the projected uplift in population may result in some short-term slight negative impacts relating to an additional demand for the use of local amenities, open spaces and sports facilities. However, as described previously in this chapter, Tower and the defined study area is already well equipped for these facilities to serve the existing population. Local sports clubs such as Inniscarra GAA Club, Muskerry Rugby Club, Blarney United FC and Inniscarra Camogie Club will likely benefit from increased volunteers and participation resulting in increased membership and financial/social benefits.

The proposed development provides for replacement and additional tree planting in addition to the provision of a public accessible amenity parkland, urban plaza and public open spaces which will result in significant permanent and positive impacts to the visual and amenity context of the settlement. The public realm upgrades including the proposed pedestrian crossing, footpaths and cycle paths will all positively contribute to walking and cycling in the settlement. It is concluded that the proposed mixed-use development will result in significant long-term positive impacts on amenity, open space and sports provision in the area.

13.5.5 Impacts on Childcare and Education

13.5.5.1 Construction Phase

In the absence of appropriate traffic management and mitigation measures, the construction phase may result in some short-term negative impacts for Cloghroe National School. Potential includes include additional traffic congestion at drop-off/collection times, noise and dust emissions. The CEMP prepared by MHL & Associates details a suite of construction management and mitigation measures including procedures for the co-ordination of deliveries to ensure that vehicular movements occur at off-peak times and consider drop-off and collection times of the school. It is concluded that the impacts of proposed construction phase will be neutral and will not significantly negatively impact the operations of Cloghroe National School or any existing childcare facility in the area subject the specified mitigation measures as described in the CEMP (Appendix 2.2) being implemented.

13.5.5.2 Operational Phase

Childcare

The proposed development provides or the construction of a two storey 405 sqm childcare facility of with capacity for 42 no. children to serve the proposed development consisting of.

- 27 no. 1/2 bedroom stepdown apartment units.
- 20 no. 1 bedroom apartment units.
- 30 no. 2 bedroom duplex/apartment units.
- 22 no. 2 bedroom townhouses
- 4 no. 3 bedroom duplex/apartment units.
- 38 no. 3 bedroom townhouse/semi-detached dwelling houses
- 57 no. 4 bedroom townhouse/semi-detached and detached dwelling houses.

The proposed creche will result in a significant positive long-term impact as the proposed creche will not only cater for the childcare needs of the proposed development but also strengthening the Cloghroe Neighbourhood Centre and contribute to a transition between the commercial/retail uses to the south of the site and the residential areas to the north.

Of the proposed residential units, 99 no. are 1- or 2-bedroom units representing 50% of the total number of units on site. The proposed apartment block to the north of the proposed retail unit containing 27 no. 1 and 2-bedroom apartment units, has been specifically designed as a stepdown apartment building for elderly occupants. It is not envisaged that these stepdown units will require any childcare provision.

Schools

Of the 171-no. conventional apartment/dwelling houses (non-stepdown units), 72 no. are 1- and 2-bedroom units and are less likely to generate as much demand or school places as remaining 99 no. 3 and 4-bedroom dwellings within the development.

It is also acknowledged that it takes a time period of multiple years for residential developments to become established and that the development will initially be occupied by younger couples, young professionals and empty nesters. Due to this, it is envisaged that demand initially will be primarily for childcare services and as the development becomes more established demand for primary and secondary will increase.

However, for the purposes of this assessment, the 'worst case scenario' has been assessed. According to 2016 Census figures, 15.2% of Towers resident population is of primary school age (4-12 years) with approximately 10% of the population of secondary school age (13-18 years).

Census 2016: Population aged 0 - 19 by sex and year of age, population aged 20+ by sex and age group

Age Group	Male	Female	Total
0	23	19	42
1	29	28	57
2	25	28	53
3	28	24	52
4	25	31	56
5	36	32	68
6	26	24	50
7	30	34	64
8	27	30	57
9	22	30	52
10	30	26	56
11	31	21	52
12	38	29	67
13	34	35	69
14	29	34	63
15	24	26	50
16	25	25	50
17	26	32	58
18	25	27	52
19	26	23	49
20-24	97	88	185
25-29	66	73	139
30-34	119	127	246
35-39	133	151	284
40-44	124	134	258
45-49	135	162	297
50-54	141	131	272
55-59	75	90	165
60-64	70	78	148
65-69	51	61	112
70-74	41	49	90
75-79	32	26	58
80-84	13	17	30
85+	5	15	20
Total	1,661	1,760	3,421

Figure 13.18 Population Breakdown of Tower according to 2016 Census

Given the average household size in Tower is approximately 3.0 persons per household, the population uplift generated from the proposed 171 no. conventional dwelling houses/apartments (not including the 27-no. stepdown units) would be circa 500-520 no. people in the 'worst case' scenario. This reflects that the proposed development would result in an additional circa 70-80 no. children (15.2%) of primary school age and 45-55 no. children of secondary school age in

future years in the 'worst case' scenario

Projections from the Department of Education and Skills estimate that enrolment levels in schools will decrease in the coming years, initially in primary schools and subsequently in post-primary schools. The Department of Education published the 'Projections of Full-Time Enrolment Primary and Second Level 2018-2036' (2018) which outlines various scenarios of future intake for both primary and post-primary schools. The report demonstrates that primary school enrolment peaked in 2018 and a continuous decline in new enrolments is expected until 2036.

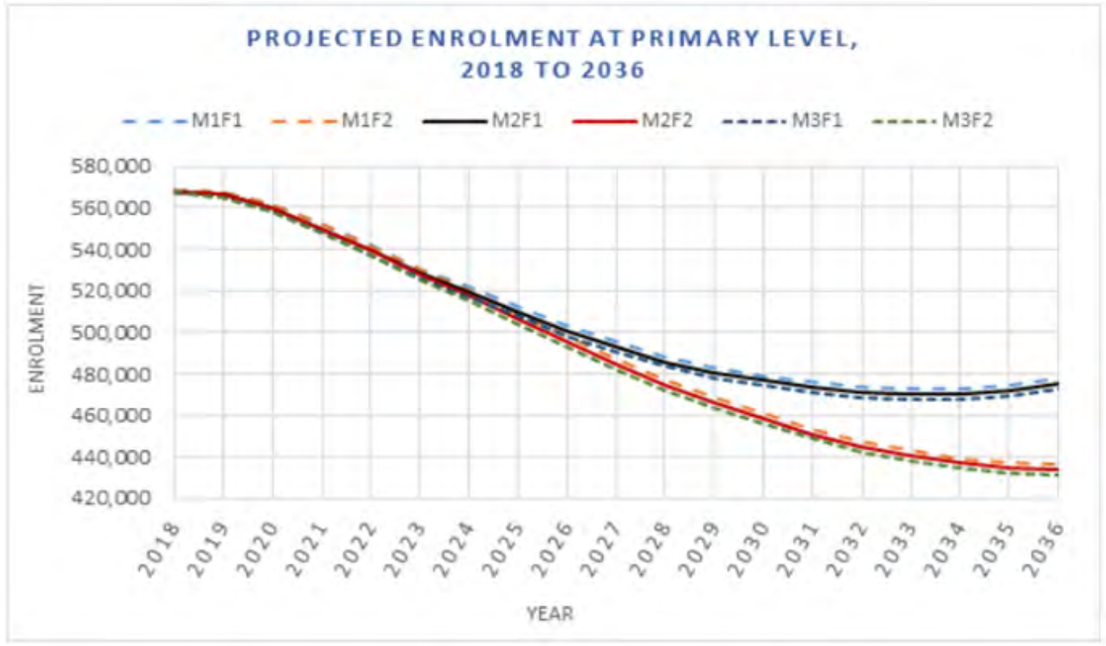

Figure 13.19 Projections of Enrolment at Primary Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)

Post-primary school enrolment is not envisaged to peak until 2024/2025. Similar to trends for primary schools, a continuous decline in post-primary enrolment is then expected until 2036.

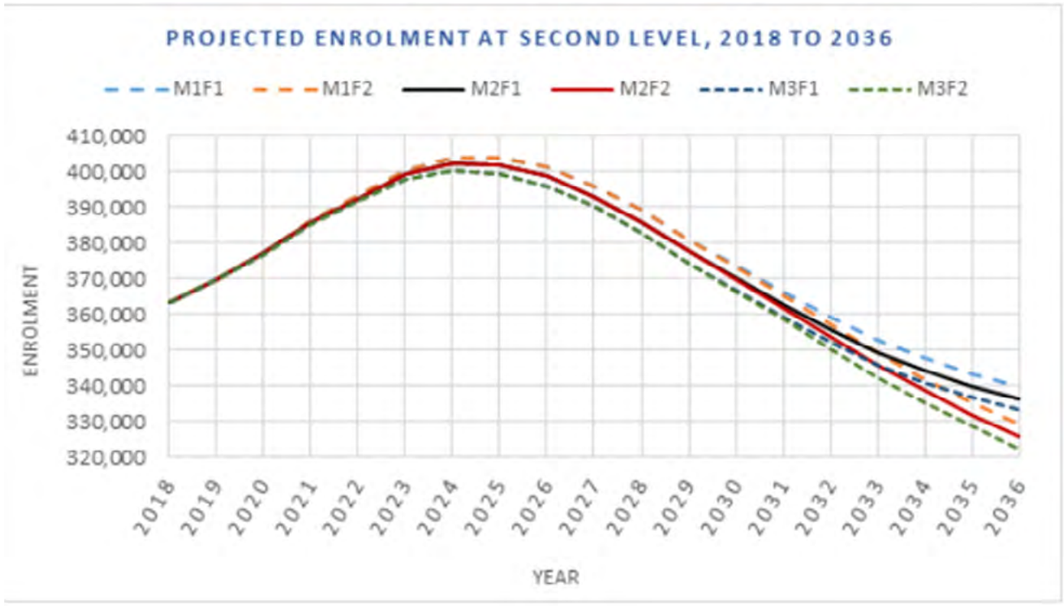

Figure 13.20 Projections of Enrolment at Second Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)

In advance of preparation of this SHD and EIAR, HWP Planning contacted the 'Forward Planning' section at the Department of Education to query the current excess capacity of the schools within the defined study area [6]. At the time of preparation of this EIAR, no response was provided by the Department of Education and Skills. Given the predicted demographics of the proposed scheme and the enrolment projections set out by the Department of Education and Skills, it is considered that the development will have a neutral impact on the primary and post-primary schools in Cloghroe/Tower and the wider area.

13.5.6 Impacts on Community Facilities

13.5.6.1 Construction Phase

Without appropriate mitigation measures, some noise/dust pollution and traffic congestion may occur, which could result in some slight negative impacts on local community uses. Due to the nature of the uses/operations of the neighbouring community uses (post office, church, Tower community hall) and the effective implementation of suite of mitigation measures proposed in the CEMP, any impacts will be imperceptible.

13.5.6.2 Operational Phase

The proposed development provides for communal open spaces in the form of a central amenity parkland and urban plaza which will not only benefit the future residents of the scheme, but the existing population of Tower. At present there is a notable lack of communal public open spaces in the settlement. Once operational, the proposed development will result in a significant positive long-term impact in terms of the provision of formal and informal community and public open spaces.

[6] Refer to Appendix 1-1 for email correspondence.

13.5.7 Impacts on Health Services

13.5.7.1 Construction Phase

The most proximate healthcare facility is the existing pharmacy at Cloghroe Neighbourhood Centre to the east of the site. It is envisaged that the construction phase will have no significant impacts on local health services and outlets, subject to the construction mitigation measures outlined in the CEMP being implemented.

13.5.7.2 Operational Phase

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services. At present there are 2 no. pharmacies, 1 no. doctors' surgery and 1 no. physiotherapy clinic in the settlement with further medical and therapy practices of various forms in the neighbouring settlements of Blarney and Ballincollig. Given the wide variety of medical facilities in the study area and the predicted demographics of the proposed scheme it is considered that the proposed development will result in imperceptible impacts.

13.5.8 Impacts on Emergency Services

13.5.8.1 Construction Phase

There are no emergency services in the settlement of Tower or in the site's immediate vicinity. The construction phase will result in imperceptible impacts for local emergency services.

13.5.8.2 Operational Phase

Tower is well served by emergency services within its wider catchment with a Garda station in Blarney, approximately, 4 km northeast of the site and a further Garda station and fire station at Ballincollig within the study area. The closest hospitals to Tower include Cork University Hospital, Mercy Hospital and Bons Secours Hospital in Cork City. Due to the scale and nature of the prosed development in addition to the availability of emergency services in the area, it is envisaged the proposed development will result in no significant impacts on emergency service provision.

13.5.9 Impacts on Public Transport

13.5.9.1 Construction Phase

During construction, the proposed development may result in some temporary disruption and slight negative short-term impacts to local public transport services. These include the proposed relocation of the existing bus stop and the installation of public realm upgrades such as footpaths, cycle lanes and signalised pedestrian crossing. These works will be conducted in accordance with the accompanying CEMP and confined to specific working hours. Construction stage will also result in increased traffic levels on the surrounding road network and an increase in the take-up of public transport services with construction workers accessing the site from surrounding areas.

13.5.9.2 Operational Phase

Once operational, the proposed development will result in very significant positive impacts to the local population in terms of public transport provision. At present, the existing bus stop to the west of the R617 which serves the 215-no. route is not served by a shelter, footpath or cycle lane.

Figure 13.21 Existing Bus Stop

The proposed development includes the provision of.

- traffic calming measures including the provision of a signalised toucan crossing to improve connectivity with Tower to the north;
- relocation of existing bus stop and provision of bus shelter;
- provision of 2 metre footpath, 1 metre verge and 2 metre cycle lane in accordance with the guidance provided in the National Cycle Manual;
- future provision for 3.25m bus lane to form part of BusConnects network. In the interim this will form part of the hard and soft landscaping proposal to the R617.

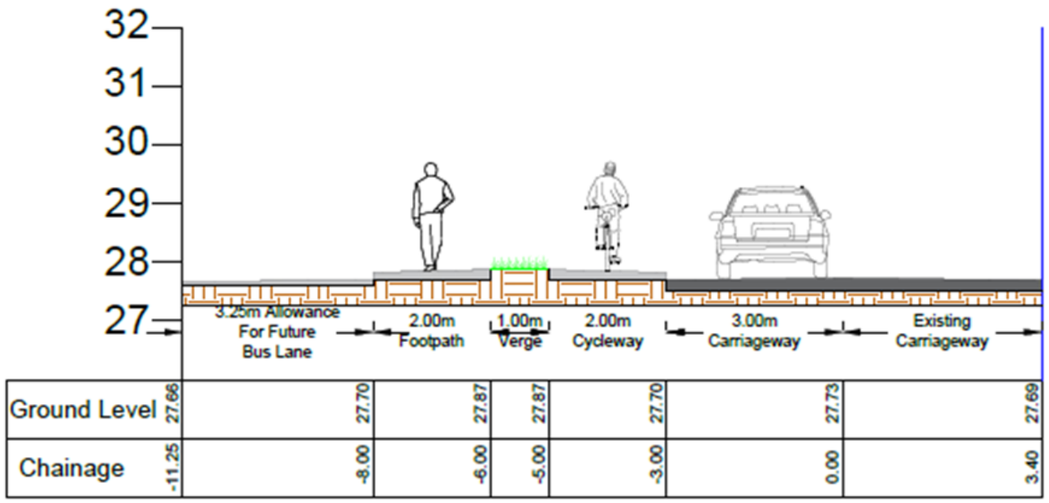

Figure 13.22 Proposed Cross Section of R617

Figure 13.23 Proposed Upgraded Bus Stop with Shelter on the R617

The scope of these works has been identified in advance of preparation of this SHD/EIAR and will result in a significant improvement in terms of access to public transport opportunities from the existing 'do nothing' scenario.

The proposed mixed-use development will result in an uplift in the quantum of people wishing to utilise public transport services to and from the settlement. Tower is identified as a settlement which is to benefit from the future Bus Connects scheme identified in CMATS with the 215 no. Cloghroe – Jacobs Island route identified on the 'Core Radial Bus Network'. A significant improvement in the frequency of bus services (Bus Connects) on these radial routes is also proposed, with most routes expected to operate at a frequency of 15 minutes or better.

As evidenced by 2016 census information, despite its location on a suburban bus route with a service every 30 minutes, Tower exhibits high levels of car dependency and a low take up of public transport indicating that despite a significant population in the settlement, there are few employment opportunities locally. The expansion of the retail sector within the town serviced by regular public transport links provides an opportunity to enhance the economy and employment opportunities in the settlement and promote sustainable commuting patterns and reduce car dependency, resulting in significant positive long-term impacts on sustainable modes of travel and public transport.

13.6 MITIGATION MEASURES & MONITORING

13.6.1 Mitigation & Monitoring

Full details of all mitigation and monitoring procedures during construction phase are described in the CEMP which accompanies this SHD (Appendix 2.2). Please also refer to the Construction Traffic Management Plan prepared by MHL & Associates (Appendix 2.3). The CEMP has been specifically designed and will be monitored to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised through mitigation measures which include.

- The CEMP has been developed in accordance with health and safety provisions contained in the Safety Health and Welfare at Work (Construction) Regulations 2013, as amended, which transpose into Irish law obligations under Directive 92/57/ EEC.
- The construction phase will be carried out in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- Environmental Incidents/Complaints procedures being implemented.
- Construction phase will proceed on a phased basis as outlined in the CEMP.
- Biosecurity protocols shall be implemented during the proposed project to prevent the introduction of invasive species, in particular those listed on the 3rd Schedule of the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), to site and the further spread of diseases.
- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods.
- Use of precast/prefabricated materials where possible.
- The site layout responds to the site's topography and the evolving development context in Tower/Cloghroe. The proposed landscape and planting strategy will assist in mitigating the tree loss required to accommodate the proposed development.

The pedestrian/cyclist path and signalised pedestrian crossing on the R617 will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the settlement. The crossing will be taken in charge by Cork City Council. The proposed development will not only benefit future residents of the scheme but ensure enhanced road safety and promote the usage of public transport as a viable means of commuting to nearby urban centres. The proposed public open spaces, creche, commercial and community uses will all significantly positively and permanently contribute to the communal and public facilities in Tower.

13.7 RESIDUAL IMPACTS

Residual impacts refer to those impacts that remain following the implementation of mitigation measures. It is considered that subject to the mitigation measures outlined in the CEMP and EIAR being implemented the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in Cloghroe/Tower, orientated around public transport opportunities which can promote sustainable commuting patterns to nearby urban and employment centres.
- The delivery of a new retail outlet, café, and creche will all assist in consolidating the Cloghroe Neighbourhood Centre as an important local centre. As demonstrated in this EIAR and supporting documentation, there is a need for these uses in the settlement to support the existing and future population of the settlement with the development positively contributing to Cloghroe's retail, childcare and economic outlets.
- The relocation of the existing bus stop/delivery of the bus shelter and public realm upgrades will ensure that the existing bus stop at Cloghroe will be more accessible and useable than the existing scenario.
- The proposed compensatory flood storage, headwall with non-return valve at southern boundary land drain, and attenuated surface water drainage system will remove the risk of flooding occurring within the site. The proposed flood defence system will also represent an improvement from the do-nothing scenario by protecting the properties within the Senandale residential development to the south from future flood events generated from the existing western boundary stream.w
- The proposed central parkland, amenity walk areas and urban plaza to the front of the café unit will provide high quality public amenity and communal spaces promoting human interactions. The proposed layout provides for high quality public open spaces promoting outdoor activities and exercise which will benefit existing and future residents of the settlement.

13.8 CUMULATIVE IMPACTS

13.8.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on the construction schedules of the permitted developments in the area identified in Chapter 1. For the purposes of this assessment of impacts a 'worst case' scenario has been assessed based on the projects stated in Chapter 1.

The subject site is not situated immediately adjacent to any of the other permitted developments referenced in Chapter 1. The most proximate site is the development permitted by Cork County Council reference 18/6802 for the construction of a new surface car park to the south of Cloghroe National School (approximately 300 metres southeast of the site). An application for the construction of 73 no. dwellings, flood mitigation works, landscaping, amenity areas and all associated site works is currently being assessed by Cork City Council. Cork City Council Planning Application reference 21/40620 refers.

As referenced in the CEMP, the construction phase of the proposed development will be subject to strict mitigation and monitoring procedures. It is predicted that subject to the implementation of mitigation measures proposed, that the proposed development will result in no significant impacts relating to air quality, noise, vibration or traffic. Any negative impacts or nuisances experienced from construction activities which affect human health will be temporary/short term in nature.

The potential cumulative impact of the relevant Plans for the area were assessed and these are considered to be the 2014 Cork County Development Plan and the 2017 Blarney Macroom Municipal District Local Area Plan.

The assessment of the potential impacts on the environment of the Cork County Development Plan was undertaken utilising the Environmental Protection Objectives (EPOs), which are detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014. The potential cumulative impacts of the Plan were assessed having regard to these EPOs.

Volume Two of the 2017 Blarney Macroom Local Area Plan contains the Strategic Environmental Assessment (SEA) for the Plan. Chapter 4 highlights that the scope for considering alternatives was very limited as the key parameters have already been determined by the higher level plans (2014 Cork County Development Plan). The potential impact on the environment of the Blarney Macroom Municipal District Local Area Plan 2017-2023 was assessed for cumulative impact and considered in the preparation of this EIAR, having regard to the EPOs detailed in Table 4-1, Volume Two 2017 Blarney Macroom Local Area Plan.

EPO 1, Population as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *To ensure the sustainable development of Cork County so the people of Cork have the opportunity to live in communities with high quality residential, working and recreational environments with sustainable travel patterns.*

EPO 2, Human Health as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is to

> *To protect and enhance human health and manage hazards or nuisances arising from tra c & incompatible land uses.*

Table 4-2 of Volume Three of the Cork County Development Plan 2014 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 2 and Section 4.5.1 indicates that the preferred scenario will result in the most positive interaction for most of the population with EPO 1.

EPO 1 as detailed in Table 4-1 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 is also to

> *To ensure the sustainable development of Cork County so the people of Cork have the opportunity to live in communities with high quality residential, working and recreational environments with sustainable travel patterns.*

EPO 2, Human Health as detailed in Table 4-1 of Volume Three of the Cork County Development Plan 2014 is also to

> *To protect and enhance human health and manage hazards or nuisances arising from tra c & incompatible land uses.*

Table 4-2 of Volume Two of the Blarney Macroom Municipal District Local Area Plan 2017-2023 indicates that the 'Preferred Scenario' has a positive interaction with the status of EPO 1 and EPO 2.

13.8.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, landscape and visual, water quality, noise and vibration will be not significant.

In the context of profound benefits in terms of the delivery of a new retail development, café, creche, public realm upgrades and flood defence works that the development will result in profound benefits in terms of wider human health considerations.

13.9 DIFFICULTIES IN COMPILING INFORMATION

In preparation of this Chapter, the following difficulties were encountered.

- The census data which informed this chapter's analysis are from 2016 and may be considered out of date.
- This EIAR has been prepared during the Covid-19 pandemic.

Despite a request from the Department of Education and Skills, 'Forward Planning' section in respect of local school's spare capacity data, at the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Notwithstanding the above, we consider that the data collected, and analyses outlined reflects an accurate representation of the population and human health considerations with respect of the proposed development.

13.10 REFERENCES

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https://www.transportforireland.ie/timetables/

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Draft Cork County Development Plan 2021.

Draft Cork City Development Plan 2021

Cork County Councils Planning Enquiry System.

Cork City Councils Planning Enquiry System.

CHAPTER FOURTEEN

Interaction of Impacts

CHAPTER FOURTEEN

Contents

CHAPTER FOURTEEN

14 Interaction of Impacts

14.1 CHAPTER AUTHOR

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

14.2 CHAPTER CONTEXT

Article 3(1) of the EIA Directive states.

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)."

Annex IV of the amended Directive states that a description of impacts should include:

"...the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project"

Table 14.1 as shown summarises the relevant interactions and interdependencies between specific environmental aspects.

14.3 DESCRIPTION OF SIGNIFICANT INTERACTIONS

14.3.1 Landscape and Visual

14.3.1.1 Construction Phase

Chapter 4 of this EIAR assesses landscape and visual impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with landscape and visual impacts.

Population and Human Beings - Potential temporary impacts to visual amenity in the area as a result from construction works, include the necessary removal of existing trees, construction traffic and earthworks. The construction phase of the development provides for mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover.

Biodiversity - The removal of existing tree cover, hedgerows and grassland habitat during the construction phase will result in interactions with biodiversity considerations and potential short term negative impacts on local flora/fauna species and the displacement of habitats.

Material Assets – Services /Water– The necessary earthworks/excavations to facilitate the proposed development including the proposed flood storage/attenuation strategy will result in the permanent loss of the existing landscape of the site, representing an interaction between landscape/visual and material assets impacts during the construction phase. Visual impacts will be mitigated through appropriate site management measures and work practices including the fencing off, of trees being retained and the phasing of construction activities being staggered.

Land and Soils – Bulk excavations will be required for the installation of foundations, service trenching and proposed landscaping measures. This will result in a permanent relocation of soil and subsoil. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

14.3.1.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Beings –The proposed development will result in the evolution and urbanisation of the streetscape along the R617 Cloghroe-Blarney Road. The Landscape and Visual Impact Assessment prepared by Forestbird Design, concludes that the proposed development will positively contribute to the landscape character of the area and complement the existing built form of the settlement.

Biodiversity – The permanent loss of existing habitats may result in negative impacts on local flora/fauna species and the displacement of habitats. As detailed in Chapter 9 it is predicted that with the proposed mitigation measures in place, the residual impacts of the proposed development relating to ecology/biodiversity are likely to be slight negative impact at a site level and of short-term duration. In the short to medium term (i.e. Medium term – seven to fifteen years) as vegetation on site mature, the residual impact would increase to slight positive impact at a local level.

Material Assets – Traffic and Transportation – The proposed urbanisation of the streetscape along the R617 including the delivery of an urban plaza and public realm/road upgrades will result in an altered landscape and visual context. It is predicted that these interventions are positive and will benefit the landscape and visual character of the area.

Material Assets – Services /Water/Land and Soils – The proposed landscape strategy seeks to capitalise on the site-specific context by utilising the western boundary watercourse as a visual amenity. The landscape strategy for the site

also includes the provision of the central parkland which facilitates Sustainable Urban Drainage (SUDs) principles and reflects a natural amenity area within the scheme.

Potential impacts of landscape have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.2 Material Assets – Traffic and Transportation

14.3.2.1 Construction Phase

Chapter 5 of this EIAR assesses traffic impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with traffic/transportation impacts.

Population and Human Beings – Construction traffic has potential to result in temporary negative impacts on local residents, businesses, Cloghroe National School and other uses in area by way of traffic volumes. The proposed upgrades to the R617, including the implementation of a footpath, cycle lanes and pedestrian crossing may result in additional traffic congestion for a short period.

Noise and vibration - Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents and businesses.

Air Quality and Climate - Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills and other pollutants, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Land and Soils – Site excavations and earthworks will require HGV's, heavy machinery and vehicles to access the site during the construction phase. Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. In the absence of appropriate construction management mitigation procedures, the regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes. However, with the mitigation measures and traffic management measures proposed in the CEMP and CTMP prepared by MHL & Associates, it is predicted that any interactions will not be significant, with any negative interactions being slight and short term.

Biodiversity – Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP, which will prioritise the minimisation of any potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities.

14.3.2.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Beings – Once operational the proposed development will result in increased traffic volumes accessing the site and on the surrounding road network. The proposed works to the R617 will narrow the public carriageway resulting in a likely slow-down of traffic speed. Users of the local road network may experience increased delays in car journeys. However, it is considered that the proposed pedestrian crossing on the R617 and public realm upgrades including the provision of bicycle/cycle lanes as well as accommodating future bus lanes will accommodate improved walking/cycling public transport access, benefiting the local population.

Noise and Vibration – The proposed mixed-use development may result in some instances of local noise and vibration effecting the amenity of neighbouring properties.

Air Quality and Climate - Regarding Air Quality, EIAR Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that any impacts on ambient air quality will be long-term, localised, negative and imperceptible. The increase in traffic volumes in the area resultant from the proposed development will impact the local climate. However, the predicted overall magnitude of the changes on climate will not be significant.

Water (Hydrology and Hydrogeology) - Increased traffic and parking at the site may give rise to hydrocarbon spills from vehicles. The proposed flood storage tank is located underneath the surface car park of the proposed retail development.

Landscape and Visual – The proposed upgrades to the R617 will result in interactions between landscape and traffic and transport impacts. As detailed in EIAR Chapter 4, the evolution of the landscape to reflect more village centre development is predicted to be a significant positive impact.

Potential impacts of Material Assets – Traffic have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.3 Material Assets – Services, Infrastructure and Utilities

14.3.3.1 Construction Phase

Chapter 6 of this EIAR assesses servicing impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Material Assets – Services, Infrastructure and Utilities' impacts.

Population and Human Beings – Potential impacts on existing services such as water, communications, electrical infrastructure resultant from connections from the proposed development to existing local services. However, with the proposed mitigation measures outlined, it is not expected that these impacts will be significant.

Material Assets – Traffic and Transportation - During construction, interactions between Material Assets and traffic /transportation include necessary periods of road openings to deliver utilities. During these times minor local traffic management resulting in slight temporary negative impacts. As referenced previously, the CEMP and CTMP detail the management of construction traffic matters. Due to the nature of the proposed development and that the majority of the utilises/service infrastructure is being delivered within the development site, it is not considered that there will be significant inconveniences caused or interactions between Material Assets and traffic /transportation considerations.

Water (Hydrology and Hydrogeology) - Works to provide connections to utilities and services, such as foul and surface water sewer, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Stockpiling of materials or works may to drainage system may lead to temporary localised flooding if drains become blocked.

Landscape/Land and Soils - The necessary earthworks/excavations to facilitate the proposed development including the proposed flood storage/attenuation strategy will result in the permanent change of the existing landscape setting. Visual impacts during the construction will be mitigated through appropriate site management measures and work practices including the fencing off, of trees being retained and the phasing of construction activities being staggered to minimise negative impacts.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including vegetation removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats, flora/fauna species and European sites (Cork Harbour SPA and Great Island Channel SAC). As detailed in EIAR Chapter 9 prepared by Atkins, with the proposed mitigation measures in place, any negative impacts will be localised and restricted to the development site during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (appended to Chapter 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. The mitigation measures stated in the CEMP and EIAR Chapter 10, including the erection of noise barriers where necessary, will mitigate any potential negative impacts relating the noise and vibration interactions during construction.

Air Quality and Climate - In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections may result in temporary nuisances such as dust emissions which would negatively impact on air quality. However, with the proposed suite of mitigation and monitoring measures enforced, it is predicted that any negative impacts/interactions relating to air quality/climate will not be significant and temporary in nature.

14.3.3.2 Operational Phase

During the operational phase of the development potential interactions are.

Water (Hydrology and Hydrogeology) – Due to the increase in population generated from the proposed development and mixed-uses including the creche and community/commercial units, there will be increased demand for local water services. As referenced previously, Irish Water have confirmed via a Statement of Design Acceptance, that there will be capacity in the local water network to facilitate the proposed development. EIAR Chapter 8 predicts that the implementation of the proposed flood defence/drainage strategy will result in 'moderate positive effects' relating to the existing flooding context, with dwellings in Senandale being protected from future flooding events resultant from the proposed western boundary stream.

Biodiversity– During the operational phase, in the absence of appropriate mitigation measures, potential negative interactions may occur including the potential disturbance to bats arising from artificial light spillage from the proposed public lighting scheme. Other potential interactions include impacts with European designated sites, resultant from the service/water infrastructure proposed and the permeant displacement, deterioration or destruction of habitats. It is predicted in EIAR Chapter 9, that the proposed development/servicing proposals will result in no significant negative impacts relating to biodiversity. A Natura Impact Assessment has been prepared with respect of the proposed development (appended to Chapter 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Landscape and Visual – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/vegetation planting having an interdependency. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the development. The landscape strategy for the site also includes the provision of the central parkland which facilitates SUDs principles.

Population and Human Health – Interactions between population and human health and material assets during the operational phase of the development will include the generation of effluent and sanitary waste and result in the increase in water demand and service infrastructure including telecommunications. Irish Water have confirmed, via a Confirmation of Design Acceptance, that there will be sufficient capacity to accommodate the proposed development. It is predicted that the proposed drainage/flood defence strategy will result in 'moderate positive effects' with existing residential properties at Senandale being protected from any potential future flooding events from the western boundary stream.

Noise and Vibration – Potential noise and vibration sources during the operational phase include mechanical and electrical plant used to service the buildings. As stated in the mitigation measures outlined in EIAR Chapter 10, based on the assessments carried out, the cumulative plant noise from mechanical plant associated with the development will not exceed 30 dB LAeq, 15min and will not contain audible tones at any noise sensitive locations. The predicted change in noise level associated with additional traffic due to the proposed development will have a negligible effect.

Potential impacts of Material Assets – Services have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.4 Land, Soils and Geology

14.3.4.1 Construction Phase

Chapter 7 of this EIAR assesses 'Land and Soils' impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with 'Land and Soils' impacts.

Population and Human Beings – In the absence of appropriate mitigation measures, construction activities including construction traffic, demolition and site clearance/excavations may result in increased dust and noise levels in the locality as well as potential soil contamination interacting with population and human beings. Hydrocarbons will be used onsite during construction.

Water (Hydrology and Hydrogeology) - Construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. In the absence of any mitigation measures potential impacts on soil/geology would be likely be moderate negative impacts on receiving soils with any impacts short-term and localised. However, the mitigation measures outlined, being implemented will reduce and/or avoid these potential impacts and address any potential waste soil management matters.

Biodiversity - The proposed development provides for site clearance, rock breaking excavations, earthworks and tree/hedgerow removal which may result in disturbance/displacement of existing habitats/flora during the construction phase.

Cultural Heritage and Archaeology - There may be an impact to Cultural Heritage and Archaeology if previously undiscovered sub-surface remains are damaged or destroyed during site clearance and/or construction.

Material Assets – Traffic and Transportation – Site excavations and earthworks will require HGV's and other heavier machinery and vehicles to access the site during construction.

Landscape and Visual - The necessary earthworks/excavations to facilitate the proposed development will result in permanent changes to the existing landscape setting of the site. Soil and bedrock excavations will be required for site levelling, the installation of foundations, service trenching and proposed landscaping measures reflecting interactions between both areas. This will result in a permanent relocation of soil and subsoil at most excavation locations. The CEMP describes a suite of mitigation measures including stripped topsoil being re-used and incorporated within the landscaping strategy and features of the development to be delivered during the construction phase.

Material Assets – Services, Infrastructure and Utilities – To accommodate in the installation of utilities and service infrastructure during construction land excavations, site clearance/excavations. However with the proposed mitigation measures to be enforced, it is not predicated that there will be significant negative interactions.

14.3.4.2 Operational Phase

During the operational phase of the development potential interactions are.

Landscape and Visual - The proposed landscape strategy responds to the sites topography, with cut and fill generated from the site utilised elsewhere in the development where possible, and incorporated into the landscape strategy for the site. The proposed landscape strategy seeks to respond to the site-specific context including by utilising appropriate areas for public open space and incorporating Sustainable Urban Drainage (SUDs) where appropriate.

Population and Human Health – It is not considered that there will be significant interactions between population/ human health and land and soils during the operational phase**.**

Potential impacts of Land and Soils have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.5 Water (Hydrology and Hydrogeology)

14.3.5.1 Construction Phase

Chapter 8 of this EIAR assesses Water (Hydrology and Hydrogeology) impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Water (Hydrology and Hydrogeology) impacts.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, works to provide connections to utilities and services such as foul and surface water, may have negative impacts on groundwater if spills of fuels or other contaminants occur.

Biodiversity – Any negative impacts affecting water quality during construction activities may result in negative impacts on local biodiversity and wildlife. These include potential surface water run-off/discharge, wastewater/foul effluent from construction activities impacting the Cork Harbour SPA and Great Island Channel SAC and local watercourses. Chapter 9 of the EIAR (Biodiversity), predicts that with the proposed mitigation and monitoring measures in place, that there will be no significant negative interactions between biodiversity/ecology and Water (Hydrology & Hydrogeology) impacts.

Population and Human Beings – In the absence of appropriate mitigation measures, any negative impacts or contamination affecting local watercourses or water supply could result in negative impacts relating to human health. Other potential health effects are associated with flooding. The proposed site design and mitigation measures ensures that the potential for impacts on the water environment is not significant.

Land and Soils – Any contamination of local watercourses/water supply may result in negative geological impacts. The necessary earthworks to facilitate the flood storage/attenuation system will require the alteration of the existing soil/land profile. In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP and this EIAR that there will be no significant interactions.

14.3.5.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Beings – Increased demand for local water services. The implementation of the proposed flood defence/drainage strategy will result in an improvement on the wider surface water/flood defence situation with dwellings at Senandale being protected from future flooding events resultant from the proposed western boundary stream.

Biodiversity – Any potential contamination of the western boundary watercourse and other watercourses in the area may result in negative effects on local biodiversity and wildlife.

Land and Soils/Landscape/Material Assets-Services – The proposed development provides for Sustainable Urban Drainage Systems (SUDS) which also is reflects in the wider landscape strategy for the site.

Air Quality & and Climate – Chapter 8 of the EIAR states that the proposed development is unlikely to have any appreciable impact on the climate. The surface water drainage network has been designed to accommodate a 20% increase in rainfall intensity to allow for climate change. The flood risk assessment also allows for a 20% increase in peak flood values and additionally assesses the development proposals for the more extreme 0.1%AEPCC event.

Potential impacts of Water (Hydrology) have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.6 Biodiversity

14.3.6.1 Construction Phase

Chapter 9 of this EIAR assesses Biodiversity impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Biodiversity impacts.

Material Assets – Services/Water – Any negative impact on water quality arising from accidental spillages may impact local biodiversity.

Material Assets – Traffic and Transportation –. Any vehicular spillages or incidents resultant from refuelling on site would result in negative impacts on biodiversity. However, with the suite of mitigation and construction management measures identified in the CEMP which prioritises the minimisation of potential negative impacts on existing ecology, it is not considered likely that there will be any significant interactions between biodiversity and traffic and transportation impacts during the construction phase.

Land and Soils/Landscape – The proposed site excavations/groundworks and removal of existing trees/grassland will result in the disturbance of existing habitats.

Noise and Vibration – Noise and vibration resultant from the construction phase may result in the disturbance of local habitats.

Air Quality and Climate – As detailed in EIAR Chapter 10, demolition and earthworks during construction phase present a risk of ecological impacts prior to mitigation measures being adopted. The dust emission magnitude from construction associated with the proposed development works can be classified as large. It is predicted that the proposed mitigation measures identified in the CEMP including a Dust Management Plan will mitigate any significant negative interactions during construction.

14.3.6.2 Operational Phase

During the operational phase of the development potential interactions are.

Material Assets – Services/Water – In the absence of appropriate mitigation measures, the proposed development may result in negative impacts on local flora/fauna/habitats.

Potential impacts of Biodiversity have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted. Mitigation measures include the provision of appropriate public lighting conducive with bats in the vicinity of the site.

14.3.7 Noise and Vibration

14.3.7.1 Construction Phase

Chapter 10 of this EIAR assesses Noise and Vibration impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Noise and Vibration impacts.

Population and Human Beings - Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents.

Material Assets – Services, Infrastructure & Utilities – The installation of utilities and services during construction may result in some interactions with noise and vibration emissions. However, with the proposed mitigation measures enforced it is not predicted that any significant interactions will take place during construction.

Material Assets – Traffic and Transportation –Noise and vibration generated from plant machinery and HGV movements may give rise to nuisances impacting the amenities of residents and businesses. It is predicted that with the proposed suite of mitigation measures, including the Construction Traffic Management Plan and CEMP, that the interactions between construction traffic and noise and vibration will not be significant and short term in nature.

Air Quality and Climate – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Biodiversity – Noise and Vibration during construction may result in disturbance of flora/fauna and existing habitats during construction working hours.

14.3.7.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Beings - Once the proposed mixed-use development is fully operational increased levels of noise due to increased traffic and activity may result in negative impacts to the amenity of local residents.

Material Assets – Traffic and Transportation – As detailed in EIAR Chapter 10, the main potential sources of outward noise from the development during the operational phase is from additional traffic on surrounding roads, deliveries and waste collections.

Potential impacts of Noise & Vibration have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.8 Cultural Heritage

14.3.8.1 Construction Phase

Chapter 11 of this EIAR assesses Cultural Heritage impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Cultural Heritage impacts.

Land & Soils/Landscape – In the event an archaeological discovery is found during construction phase, archaeological investigations will take place which may have knock on effects relating the proposed land use/landscape of the scheme.

14.3.8.2 Operational Phase

Potential impacts of cultural heritage and archaeology have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.9 Air Quality and Climate

14.3.9.1 Construction Phase

Chapter 12 of this EIAR assesses Air Quality and Climate impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Air Quality and Climate impacts.

Population and Human Beings - Construction phase of the project may result in a negative impact on local air quality resultant from increased dust and emissions resultant from construction machinery and vehicular movements.

Biodiversity – There is potential for interactions flora/fauna and air quality/climate during the construction phase. A reduction in air quality resultant from construction activities may result in some temporary negative impacts on existing habitats in the area.

Material Assets – Traffic – Emissions and dust from vehicular traffic resultant from the construction phase may potentially result in temporary negative impacts on the local microclimate.

Noise and Vibration – Emissions such as dust and other nuisances may arise as a result of noise and vibration occurrences during construction, negatively impacting the local air quality and microclimate. However, it is not predicted that these interactions will result in any significant impacts given the mitigation measures proposed during construction regarding these areas.

Land and Soils – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation/monitoring measures enforced as identified in the CEMP, it is predicted that there will be no significant interactions between air quality and land and soils

14.3.9.2 Operational Phase

During the operational phase of the development potential interactions are.

Population and Human Beings /Material Assets – Traffic – The operational phase of the development will result additional vehicular traffic in the area potentially resulting in an increase in emissions and negative impact on local air quality.

Potential impacts on Air Quality and Climate have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

14.3.10 Population and Human Beings

14.3.10.1 Construction Phase

Chapter 13 of this EIAR assesses Population and Human Beings impacts resultant from the proposed development. During the construction phase of the proposed development, in the absence of the effective implementation of appropriate mitigation measures, the following aspects may give rise to potential interactions with Population and Human Beings impacts.

Air Quality and Climate/Noise and Vibration – In the absence of appropriate mitigation measures the construction phase of the proposed development may result in some temporary negative impacts on air quality and microclimate including noise, vibrations, dust and emissions from construction vehicles. It is considered that the proposed mitigation measures detailed in this EIAR and the project CEMP will ensure that these impacts will not be significant.

Landscape and Visual – The construction phase of the project will result in the evolution of the local landscape and the existing visual character of the area.

Material Assets – Traffic and Transportation – Construction traffic has potential to result in temporary negative impacts on local residents, businesses, Cloghroe National School and other uses in area by way of traffic volumes. The proposed upgrades to the R617, including the implementation of a footpath, cycle lanes and pedestrian crossing may result in additional traffic congestion for a short period.

Material Assets – Services - Potential slight and temporary negative impacts on existing services such as water, communications, electrical infrastructure resultant from connections, may occur from the proposed development to existing local services. The implementation of the proposed surface water/foul sewer upgrades to serve the development may result in some temporary disruption to the operations of the R617 and local road network.

Land and Soils - In the absence of appropriate mitigation measures, potential moderate negative construction related impacts affecting human health include contamination of soils through construction activity from spillages. However, with the mitigation measures proposed being enforced to reduce and/or avoid these potential impacts, and to address any potential waste soil management issues.

Water (Hydrology and Hydrogeology) – In the absence of appropriate mitigation measures, any negative impacts or contamination affecting local watercourses or water supply could result in negative impacts relating to human health. Other potential health effects are associated with flooding.

14.3.10.2 Operational Phase

During the operational phase of the development potential interactions are.

Air Quality and Climate/Noise and Vibration – During the operational phase the proposed residential, retail, café and creche uses may result in impacts on local noise and air quality resultant from matters including additional traffic in the area and an increase of population. Due to the sites location within the defined boundary of the administrative settlement of Tower and the variety of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement.

Landscape and Visual – The proposed development will alter the existing visual appearance of the site from surrounding areas. The proposed development includes a variety of public open spaces and a central parkland which will be accessible to the public resulting in positive impacts to the locality.

Material Assets – Traffic and Transportation - The proposed mixed-use development will result in increased vehicular trips accessing the site. The accompanying Traffic and Transport Assessment confirms that there is capacity in the local road network to accommodate the development. The proposed public realm upgrades will facilitate enhanced public transport/pedestrian and cyclist opportunities in the settlement.

Water (Hydrology and Hydrogeology) - Chapter 8, predicts there will no adverse impacts associated with the development impacting population and human beings. As predicted in Chapter 8 of this EIAR, the protection of existing properties to the south from potential future flooding events will be 'moderate positive' benefiting human health in the site's immediate vicinity.

Material Assets – Services– Services, Infrastructure & Utilities The proposed development will result in additional demand for local water and services infrastructure. However, with the adoption of the proposed mitigation measures, it is predicted that the residual impacts impacting the local population will be slight during the operational phase.

Noise and Vibration – During the operational phase the proposed residential, commercial, community and creche uses will result in impacts on local noise and air quality resultant from matters including additional traffic in the area and an increase of population. Due to the sites, location within the defined boundary of the administrative settlement of Tower and the nature of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement

Potential impacts on Population and Human Health have been assessed and considered within each chapter/discipline of this EIAR. With the proposed mitigation measures in place, no significant residual negative impacts are predicted.

Interaction	Landscape & Visual	Material Assets – Traffic & Transport	Material Assets – Services, Infrastructure & Utilities	Land, Soils & Geology	Water (Hydrology & Hydrogeology)	Biodiversity	Noise & -Vibration	Cultural Heritage	Air Quality & Climate	Population & Human Beings
Landscape & Visual		Op	Con & Op	Con & Op	Op	Con	-	Con	-	Con & Op
Material Assets – Traffic & Transport	Op		Con	Con	-	Con	Con & Op	-	Con & Op	Con & Op
Material Assets – Services, Infrastructure & Utilities	Con & Op	Con		-	Con & Op	Con & Op	Con		-	Con & Op
Land, Soils & Geology	Con & Op	Con	Con		Con & Op	Con	-	Con	Con	Con
Water (Hydrology & Hydrogeology)	Con & Op	Con & Op	Con & Op	Con		Con & Op	-	-	-	Con & Op
Biodiversity	Con & Op	Con	Con & Op	Con	Con & Op		Con & Op	-	Con	-
Noise & Vibration	-	Con & Op	Con & Op	-	-	Con		-	Con	Con & Op
Cultural Heritage	-	-	-	Con	-	-	-		-	-
Air Quality and Climate	-	Con & Op	Con	-	Op	Con	Con	-		Con & Op
Population and Human Beings	Con & Op	Con & Op	Con & Op	Con & Op	Con & Op	-	Con & Op	-	Con & Op	

Table 14.1: Potential Interaction of Effects Matrix (Con = Construction, Op= Operational. If there is considered to be no potential for an effect, the box is left blank.)

CHAPTER FIFTEEN

Summary of Mitigation Measures

CHAPTER FIFTEEN
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CHAPTER FIFTEEN

15 Summary of Mitigation Measures

15.1 INTRODUCTION

15.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning.

15.1.2 Chapter Context

The 2017 Draft EPA Guidelines regarding information to be contained in EIAR's identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance usually refers to strategic issues, such as site selection, site configuration or selection of process technology. This may be the fastest, cheapest and most effective form of effect mitigation. In some cases mitigation by avoidance may also be considered as part of the "consideration of alternatives".

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. This is regarded as a less sustainable, though still effective, approach, implemented through reducing the effect and/or reducing exposure to the effects.

Mitigation by Remedy/Offsetting: This is a strategy used for dealing with adverse effects which cannot be prevented or reduced. Remedy is compensating for or counteracting adverse effects. Examples include increased planting of specific trees/shrubs to replace unavoidable loss of vegetation, or provision of a new amenity area to compensate for the unavoidable loss of access to the grounds of an old house. Examples of Offsetting include reinstating buildings, walls or features, or the introduction of tunnels to enable wildlife to access other comparable habitats.

15.2 MITIGATION MEASURES PROPOSED

15.2.1 Landscape and Visual

15.2.1.1 Design Stage - Mitigation Measures

- A vegetated buffer has been retained or constructed at the northern part of the R617 to ensure that a green transition between Cloghroe and Tower is clearly evident.
- Proposed development has been designed to protect the existing Oak trees at the southeast corner, to ensure their continued visual and habitat value.
- The existing Poplar trees and lone Oak along the northeast boundary of the R617 will be retained for their visual contribution to the streetscape.
- The urban frontage to the R617 will include large canopy tree planting at offsets no greater than 12m, to visually soften and filter proposed buildings.
- Paving and landscape furniture to the R617 commercial frontage will reflect town centre materials, to enhance the character and definition of the village.
- All trees within 5m of the stream will be retained, for habitat benefit and visual framework.
- The central east/west hedgerow and associated sod and stone ditch will be retained, in particular protecting the Oak and Hawthorn trees. This is to ensure the long-term character of traditional field parcelling is maintained and for the habitat benefit of the hedgerow as a commuting corridor.
- Proposed development will be offset from the southern boundary to enable an additional layer of tree planting between the existing hedgerow and edge of development, for the visual benefit of neighbouring houses.
- To minimise visual impact, roofing material to any structures will be non-reflective with a dark colour tone.
- Planting within 10m of the stream will consist solely of native plant species, for the benefit of natural systems.

15.2.1.2 Construction Phase - Mitigation Measures

- Trees to be retained shall be fenced off at the commencement of construction to avoid inadvertent felling or use of the ground under canopies for construction purposes.
- The mixed broadleaf woodland adjacent to the R617 shall only be felled when the stormwater tank is to be installed, to stagger the visual and environmental impact of felling (the tree lines south of the woodland will be felled first).
- The central attenuation basin will be constructed during the first phase of construction and planted minimum 6 months prior to its use as stormwater attenuation, to ensure soil settlement and vegetation establishment.
- Salvaged topsoil will not be stored more than 6 months if kept in piles more than 1m high. Rotate stockpiling to fit this time period, to ensure healthy aerated soil for use in the completed development.

15.2.2 Material Assets – Traffic and Transportation

15.2.2.1 Construction Phase - Mitigation Measures

- The re-use of excavated materials generated on-site will reduce the total volume of imported material thereby reducing traffic generation.
- Adequate storage space on site will be provided to accommodate all cut material.
- Defining delivery times to site will avoid background traffic peak periods. Trucks will be equipped with dust covers when carrying dust producing materials to reduce the environmental impact of this activity.
- Construction stage site staff starting at 07:00 and ending at 18:00 will avoid the recorded peak periods.
- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems will be put in place.
- Specific haulage routes will be identified and agreed with the Local Authority prior to commencement of construction.
- Public realm works will involve the temporary relocation of the existing bus stop. The temporary location will be agreed with Bus Eireann and Cork City Council prior to it being put into use. A Road Safety Audit of all temporary works will be carried out and the audit's recommendations implemented in full.
- Warning Signs and Advanced Warning Signs will be installed at appropriate locations in advance of the construction works.
- All site staff parking will be accommodated on-site within the designated site compound. No parking of site vehicles will be facilitated on the public road.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will be suitable for vulnerable users including mobility impaired persons.
- All site vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site.

As detailed in the CEMP.

- All public roads, accesses, drains, ditches and grips will be kept clear of all dirt, mud and material arising from the execution and completion of the Works and suitable clearing equipment and labour will be provided for this purpose. Any dirt or mud adhering to the tyres or chassis of any vehicles will be thoroughly cleaned off before the vehicle is permitted to leave the Site. In the case of delivery to the Site, vehicles will be thoroughly cleaned before they leave the point of collection.
- An automatic wheel-washing unit shall be installed and maintained at the entrance to the site (Refer to Site Compound Layout). This will be available for use at all times. Maintenance will include for cleaning out of the equipment and disposal of any material gathered within.
- Deliveries will be co-ordinated to prevent queuing of vehicles which could adversely affect traffic flow and to minimise disruption to local traffic. Deliveries will be timed and coordinated to avoid conflict with collection of waste, other deliveries and rush hour traffic (AM & PM peak hours as identified in the Traffic & Transportation report). Large deliveries will be scheduled outside peak hours to minimise disruption.
- Special consideration will be given to the busy drop off and collection times at St. Senan's Cloghroe National School. The school day begins at 8:50am, ending at 1:30pm for Junior/Senior infants and 2:30pm for classes I to VI.
- Measures identified in the Construction Traffic Management Plan will be implemented.

Road Safety

The following actions will help be taken to keep pedestrians and vehicles apart:

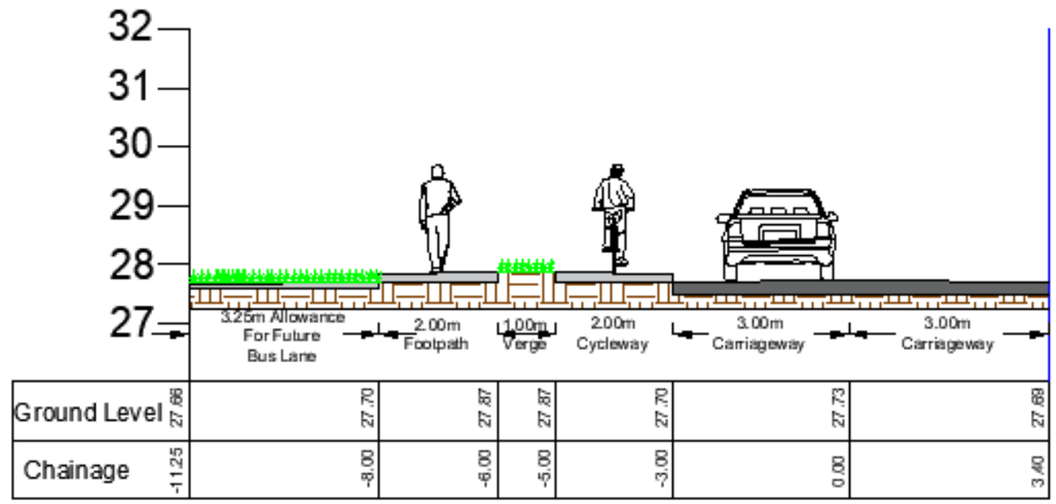
- Entrances and exits - separate entry and exit gateways for pedestrians and vehicles shall be provided with a gate man in attendance to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Walkways - firm, level, well-drained pedestrian walkways will be provided.
- Crossings - where walkways cross roadways, a clearly signed and lit crossing point shall be provided where drivers and pedestrians can see each other clearly;
- Visibility - drivers driving out onto public roads will be required to be able to see both ways along the footway before they move on to it;
- Obstructions - walkways shall be kept free of construction vehicle obstruction
- All workers shall be competent to operate the vehicles, machines and attachments they use on site.
- Personnel directing vehicle movements will be trained and authorized to do so. Access to vehicles will be managed and people alerted to the risk.

The following shall be provided on site during the construction phase:

- Aids for drivers - Mirrors, CCTV cameras or reversing alarms will be provided that can help drivers see movement all-round the vehicle;
- Banksmen will be appointed to control manoeuvres and who are trained in the task;
- Lighting – The site will be properly lit so that drivers and pedestrians on shared routes can see each other easily. Lighting may be needed after sunset or in bad weather;
- Clothing - Pedestrians on site will wear high visibility clothing.
- Signs and instructions
- All construction personnel, drivers and pedestrians shall be informed of the routes and traffic rules on site. Use standard road signs where appropriate.
- Induction training shall be provided for drivers, workers and visitors and send instructions out to visitors before their visit.
- All the construction vehicle drivers and supply chain personnel shall be competent and have relevant training and certification appropriate for their job.

15.2.2.2 Operational Phase - Mitigation Measures

- The R617 will be upgraded to include a 2.0m cycle track, a 1.0m planted verge, a 2.0m pedestrian footpath and a reservation of 3.25m for a future Bus Lane as part of Bus Connects. The following cross section details the proposed cross section. In the interim the bus reservation area will be grassed as an inner verge.
- In-line with the proposed upgrade works on the R671, the existing 215 Bus Stop will be upgraded with the provision of a Bus Shelter and a colour contrasted paved stop area. The developed scheme proposes universal footpath access to the bus stop as well as more direct stepped access. The provision of the controlled pedestrian crossing to the north of the bus stop will facilitate safe and controlled access for existing residents in the area.



Ground Level	27.66	27.70	27.87	27.87	27.70	27.73	27.68
Chainage	-11.25	-8.00	-6.00	-5.00	-3.00	0.00	3.40

Figure 15.1 Proposed Cross Section on the R617

Figure 15.2 Proposed Upgraded Bus Stop with Shelter on the R617

15.2.3 Material Assets – Services, Infrastructure & Utilities

15.2.3.1 Construction Phase - Mitigation Measures

A CEMP, prepared by MHL & Associates, has been appended to this EIAR. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, in addition to all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP.

Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP. For ease of reference, the principal mitigation proposed in relation to the type of construction activities to facilitate the development of material assets on the site include:

- Surface water shall be directed to settlement ponds where topographically feasible. Where this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated waste-water treatment plant if excessive build-up of surface water on site occurs;
- Protection of surface water gullies or drains using silt fences

- Use on-site bund structures (including incorporating existing ditches) on site to retain surface waters on site and to prevent runoff from the site;
- Minimal and short-term storage and the removal of excess materials (soil, stones, and construction wastes) off site in an efficient manner;
- Daily checks of surface water regime on site and logging of same;
- Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather;
- Drainage channels beside construction roadways to direct surface water to settlement areas and allow for natural percolation to ground;
- Ensure good site management is maintained at all times during the construction phase including regular site clean-ups and use of appropriate bins;
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and plant is re-fuelled via delivery trucks in specific bunded re-fuelling areas, rather than the storage of large quantities of fuel on site in a designated bunded area;
- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a controlled and isolated manner, preventing the possibility of any pathway to a surface water source.

The construction compound (the location and features of which are identified in the CEMP) will be adequately served regarding foul drainage and water supply for construction staff. Foul effluent and sanitary waste generated during construction will be removed off-site to a licensed facility until a connection to the public foul water network is completed.

The connection of all proposed utilities to existing infrastructure shall be in accordance with the relevant code of practice as listed below and coordinated by the relevant utility provider. Where the standards and codes below refer to or rely on additional codes, then these additional codes are deemed to apply to these works where they are relevant to the matter under consideration.

- Irish Water Watermain: “Code of Practice for Water Infrastructure”, Doc No. IW-CDS-5020-03, July 2020.
- Irish Water Wastewater: “Code of Practice for Wastewater Infrastructure”, Doc No. IW-CDS-5030-03, July 2020.
- ESB Networks: “National Code of Practice for the Customer Interface”, Doc No. DOC-030303-AEN, April 2021.

Connection work shall be carried out by approved contractors only.

Construction waste generated during the construction phase shall be managed in line with Chapter 4 of the CEMP “Construction & Demolition Waste Arising & Management”.

15.2.3.2 Construction Phase – Monitoring Measures

- Regular site audits will be undertaken during the construction phase to visually monitor the works and ensure compliance with all measures as set out in the CEMP.
- Daily checks of the surface water regime put in place during the construction phase will be undertaken with detailed logs maintained.
- Communications with utility providers will be maintained during construction. Supervision of work by the respective utility operator as required will be accommodated during the works.

15.2.3.3 Operational Phase - Mitigation Measures

All installed pipelines, to include watermain, foul, and storm, will be pressure tested and surveyed prior to being made operational. The purpose of this will be to identify any possible defects. Uncovered defects will be made good prior to operation.

Waste generated by the development during operation will be removed by licensed waste contractors only.

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply.

The storm water network has been designed to control the flow of storm water from the development. When the overall site area is included, the resulting reduction in runoff used in the design goes from the greenfield rate of 25.3 l/s down to 20.8 l/s. All positive storm drainage within the site is being redirected to an existing storm sewer in the R617 where it will ultimately outfall to the Owennagearagh River downstream of the Currabeha Bridge, ensuring that current peak fluvial flows from the site entering the western boundary stream have in large been removed.

Flood waters which would have previously occupied the southern part of the development lands, will now be redirected into the proposed underground flood storage chambers. The accompanying flood water barrier wall and non-return valve will ensure that flood waters entering the development lands do not get redirected into adjacent properties instead of the storage chambers.

15.2.3.4 Operational Phase – Monitoring Measures

Water usage within the proposed development will be monitored by Irish Water utilising water meters. The monitored water usage will be utilised to locate and isolate any leaks which may develop over time are present within the network.

The relevant service providers regarding power supply and telecommunications will be responsible for monitoring their respective services.

15.2.4 Land, Soils & Geology

15.2.4.1 Construction Phase - Mitigation Measures

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas. Topsoil stockpiles will be protected for the duration of the works and will be located so as not to necessitate double handling. Topsoil will be retained for use on site.

The design of road levels and finished floor levels has been carried out in such a way as to minimise cut/fill type earthworks operations. The duration that subsoil layers are exposed to the effects of weather will be minimised. Disturbed subsoil layers will be stabilised as soon as practicable (e.g., backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

The excavation of material will be minimised as much as possible to reduce the impact on soils and geology. Any surplus material, or materials which are deemed not suitable for onsite reuse will be classified in accordance with the EPA Guidance Document ‘Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-Hazardous’ (2015). All waste soils shall be classified correctly and managed, transported and disposed of offsite in accordance with the requirements of the Waste Management Acts. An Outline Construction and Demolition Waste Management Plan has been

generated for the Site, and all of the mitigation measures identified will be fully implemented onsite for the duration of the project.

Further mitigation measures for the prevention of soil / bedrock contamination during construction are set out below. Mitigation measures outlined in Chapter 8 - Water are also applicable to the protection of soils and geology during the construction phase:

- In advance of commencement of the Construction Stage, all onsite monitoring wells will be fully decommissioned by an experienced borehole specialist in accordance with relevant guidelines, 'Good practice for decommissioning redundant boreholes and wells' (UK Environment Agency, 2012).
- Earthworks / piling plant and vehicles delivering construction materials to Site will be confined to predetermined haul routes around the Site for each phase of the proposed development.
- The need for vehicle wheel wash facilities will be assessed depending on the phasing of works and onsite activity and will be installed as needed, near any Site entrances and road sweeping implemented as necessary to maintain the road network in the immediate vicinity of the Site.
- Dust suppression measures (e.g., dampening down) will be implemented as necessary during dry periods.
- All excavated materials / piling arisings will be stored away from the excavations / immediate works area, in an appropriate manner at a safe and stable location. The maximum height of temporary stockpiles will be 3m.
- A comprehensive monitoring and supervisory regime including monitoring of all excavations and stability assessments as required will be put in place to ensure that the proposed construction works do not constitute a risk to the stability of the Site.
- The employment of good construction management practices will serve to minimise the risk of pollution from construction activities at the proposed development in line with the Construction Industry Research and Information Association (CIRIA) publication entitled, Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA - C532 (2001) which are also detailed in Chapter 8 – Water; and,

Specifically, regarding pollution control measures, the following will be adhered to;

- Fuels, lubricants and hydraulic fluids for equipment used on the construction Site, as well as any solvents, oils, and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the proposed development for disposal or re-cycling.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the proposed development and properly disposed of.
- All Site vehicles used will be refuelled in bunded and adequately sealed and covered areas in the construction compound area.
- All plant and machinery will be serviced before being mobilised to site.
- No plant maintenance will be completed on Site, any broken-down plant will be removed from Site to be fixed.
- Refuelling will be completed in a controlled manner using drip trays at all times.
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water.
- Fuel containers will be stored within a secondary containment system, e.g., bunds for static tanks or a drip tray for mobile stores.
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored.
- Ancillary equipment such as hoses and pipes will be contained within the bund.
- Taps, nozzles or valves will be fitted with a lock system.
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage.
- Drip-trays will be used for fixed or mobile plant such as pumps and generators to retain oil leaks and spills.
- Only designated trained operators will be authorised to refuel plant on Site.
- Procedures and contingency plans will be set up to deal with emergency accidents or spills.
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.
- 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. This will minimise the risk of soils and bedrock becoming contaminated through Site activity; and,
- The 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 agreed for the Site to ensure that they are operating safely and effectively.

15.2.4.2 Construction Phase - Mitigation Measures

Spillage and leaks of oil from cars and trucks parked in the development during the operational phase is unavoidable. To reduce the potential impacts, oil interceptors will be incorporated into the site drainage design. The parking areas will also be paved, so impacts of soils and geology are unlikely.

15.2.5 Water (Hydrology & Hydrogeology)

15.2.5.1 Construction Phase - Mitigation Measures

- Surface water shall be directed to settlement ponds where topographically feasible. When this is not practicable the surface water shall be allowed to percolate to ground and/or be removed by tanker to a designated wastewater treatment plant if excessive build-up of surface water on site occurs;
- Bund structures (including/incorporating existing ditches) will be used on site to retain surface waters and to prevent runoff from the site. Bunds will be made up of adequately compacted material and visibly inspected during site audits to ensure they remain intact and functional;
- Daily checks of the surface water regime will be conducted and these will be logged and documented;
- Weather conditions and seasonal weather variations will be considered when planning the works. Works associated with excavations or earth moving not to be undertaken in periods of forecasted bad weather;
- Drainage channels beside construction roadways to direct surface water to settlement areas and also allow for natural percolation to ground;
- Surface water gullies and drains shall be protected by silt fences;
- There will be minimal and short-term on site storage. Excess materials (soil, stones, and construction wastes) removed off site in an efficient manner;
- Chemicals or fuel/oils shall be stored in temporary bunded storage areas and construction plant re-fuelled via delivery trucks in specific bunded re-fuelling areas. Bunds will be made up of adequately compacted material with impermeable membrane and visibly inspected during site audits to ensure they remain intact and functional;

- The pouring of concrete, application of chemicals, painting or any other activity that has the possibility of being toxic to aquatic life shall be undertaken in a control and isolated manner, preventing the possibility of any pathway to a surface water source.

15.2.5.2 Construction Phase – Monitoring Measures

- Adherence to the 'Construction and Environmental Management Plan';
- Monitoring of run-off from the site including pumping / dewatering activities;
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection, silt fences etc.);
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content);
- Implementation of a dust management programme during the construction phase of the development;
- Monitoring the cleanliness of adjacent road network and vehicle wheel wash facilities.

15.2.5.3 Operational Phase – Mitigation Measures

- The development proposals include storm water attenuation, hydrocarbon interception and flood water management. Parking areas and driveways will be paved. All new pipe infrastructures will be installed, pressure tested and CCTV inspected to the relevant codes of practice and guidelines. No likely significant impacts to sensitive water features have been identified.
- The flood water storage and management system will be ensured as part of the overall maintenance program for the development. Inlet and outlet and flow structures will be designed and constructed to ensure that blockages do not occur, and waters can free flow at all times.

15.2.5.4 Operational Phase – Monitoring Measures

- Once the development is complete the foul drainage system and potable water system will be vested to Irish Water who will then operate and maintain the network. Monitoring is not considered necessary.
- The storm water drainage system will be taken in charge by the City Council. Ongoing monitoring is not considered necessary.
- The flood water storage, control structures and adjacent stream channel will be maintained as part of the overall maintenance program for the development. Inspection of the stream channel for debris build-up or siltation will be conducted at regular intervals.

15.2.6 Biodiversity

15.2.6.1 Construction Phase – Mitigation Measures

Protection of Sites Designated for Nature Conservation

A detailed Construction and Environmental Management Plan (MHL, 2021) has been appended to the EIAR. For ease of reference, the general pollution prevention measures which will be implemented during the construction phase are outlined below.

Mitigation of habitat loss/damage during construction

- The accompanying Landscape documentation illustrates which hedgerows and wooded areas are to be retained on-site; these will be protected from any accidental damage during construction through use of measures such as fencing (see Chapter 4.0 - Landscape). Measures will be implemented to ensure that trees and hedges being retained are incorporated into the development without being impacted upon. Protective fencing will be provided around trees and hedge vegetation being retained and this will enclose their Root Protection Areas (RPAs). The fencing will be at least 2.3m. Similarly, a buffer is to be maintained between site and neighbouring stream and riparian margin. (Refer in particular to the Landscape Masterplan; Drawing L108 which accompanies this application).
- To mitigate against for the loss of hedgerow and partial removal of woodland, substantial native tree and hedgerow planting will occur on the site. Large areas of open space will be maintained on the site, along with areas of wet and wildflower meadow. This will reduce the impact of the proposed development upon habitats in the area and there will be no significant operational impact upon habitats due to the provision of substantial native and pollinator friendly habitats proposed for the site.

Bats

- Loss of commuting and foraging habitat at the site will be mitigated by the landscaping proposals, which include retention of hedgerows and wooded areas on-site; these will be protected from any accidental damage during construction through use of measures such as fencing. Measures will be implemented to ensure that trees and hedges being retained are incorporated into the development without being impacted upon. Protective fencing will be provided around trees and hedge vegetation being retained and this will enclose their Root Protection Areas (RPAs). The fencing will be at least 2.3m. Similarly, a buffer is to be maintained between site and neighbouring stream and riparian margin.
- To compensate for the loss of hedgerow and partial removal of woodland, substantial native tree and hedgerow planting will be established on the site. Large areas of open space will be maintained on the site, along with areas of wet and wildflower meadow.
- The planting schemes shall ensure connectivity to linear/ woodland habitats in the wider landscape. Trees that are being retained at the site shall be protected during clearance and construction works in line with current guidelines e.g. British Standard 5837:2012 and National Roads Authority 2006a.
- To minimise disturbance to bats and other fauna that are roosting/resting or active at night, construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from all hedgerow / treeline habitats to be retained. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside) to prevent overspill. This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
- Lighting within the proposed development site shall be installed with sensitivity for local wildlife while still providing the necessary lighting for human usage. This is particularly important for bat foraging/commuting habitat at the edge of the Dromin Stream and retained hedgerows, treelines and woodland habitats at the site (refer to accompanying Lighting Report).

Construction and Environmental Management Plan

EMP1 - Fuel & Oil Management Procedure – Refuelling

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Plant nappies or absorbent mats will be placed under refuelling points during all refuelling to absorb drips.

- Mobile bowsers, tanks and drums shall be stored in secure, impermeable storage area, away from drains and open water.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required.
- Potential leaks from delivery vehicles will be reduced by visually inspecting all vehicles for major leaks.
- In the unlikely event of an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. The Environmental Manager will inspect nearby drains for the presence of oil and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound, and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the extremely unlikely event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

EMP1 - Fuel & Oil Management Procedure – Oil storage

- Oil storage will take place in the proposed site compound (as set out in Figure 3.1 and 3.2 of the accompanying CEMP).
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements.
- Leakages of oil from oil stores will be prevented by storing these oils in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system.
- The volume of leakages will be prevented through monitoring oil storage tanks/drums for leaks and signs of damage. This will be carried out daily by the Environmental Manager.
- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re- cycling by an approved service provider.

EMP1 - Fuel & Oil Management Procedure – Environmental Controls

- Environmental control measures will be stored in the proposed site compound (as set out in Figure 3.1 and 3.2 of the accompanying CEMP).
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water.
- Fuel containers will be stored within a Secondary Containment System, e.g. bund for static tanks or a drip tray for mobile stores.
- Ancillary equipment such as hoses, pipes shall be contained within the bund.
- Taps, nozzles or valves must be fitted with a Lock System.
- Fuel and Oil Stores including tanks and drums shall be regularly inspected for leaks and signs of damage.
- Only designated Trained Operators who are authorized to refuel plant on site and emergency spill kits will be present at equipment for all refuelling events.
- Procedures and contingency plans will be set up to deal with emergency accidents or spills.
- Suitable spill response materials and emergency instruction shall be available on site and staff shall have been adequately trained.

EMP6 - Site Environmental Training & Awareness

- Environmental awareness and training shall be achieved by:
  - Site induction, including relevant environmental issues.
  - Environmental posters and site notices.
  - Method statement and risk assessment briefings.
  - Toolbox talks, including instruction on incident response procedures.
  - Key project specific environmental issues briefings.
- All managers and supervisors will be briefed on the content and effective implementation of the measures identified in the CEMP.
- Method Statements will be prepared for specific activities prior to the works commencing and will include all environmental protection and mitigation measures identified in the planning application documentation and emergency preparedness appropriate to the activity covered. The Construction Environmental Manager will review key Method Statements prior to their issue.
- Method Statement briefings will be given before personnel carry out key activities for the first time.
- Environmental Training Records are to be retained in the Site Office.
- Environmental Controls: Site staff shall be competent to perform tasks that have the potential to cause a significant environmental impact. Competence is defined in terms of appropriate education, training and experience.
- EMP7 sets out the Environmental Emergency Response Plan; EMP8 sets out the Monitoring and Auditing Procedure while EMP9 sets out the Environmental Accidents, Incidents & Corrective Action Procedures and EMP10 sets out the Environmental Complaints Procedure (see CEMP; MHL, 2021b). EMP12 sets out the Lighting Pollution Control measures.

EMP13 - Surface Water Management and runoff control measures

Where applicable the following measures will be implemented

- Implement erosion control measures to prevent runoff flowing across exposed ground and become polluted by sediments.
- Intercept and divert clean water runoff away from construction site runoff to avoid cross-contamination of clean water with soiled water.
- Implement the erosion and sediment controls before starting site clearance/construction works.
- Minimise area of exposed ground by maintaining existing vegetation that would otherwise be subject to erosion in the vicinity of the development and keeping excavated areas to a minimum.

- Install a series of silt fences (or other appropriate silt retention measures where there is a risk of erosion runoff to watercourses from construction related activity particularly if working during prolonged wet weather period or if working during intense rainfall event.
- Implement sediment control measures that includes for the prevention of runoff from adjacent intact ground that is for the separation of clean and 'dirty' water.
- Install appropriate silt control measures such as silt-traps, check dams and sedimentation ponds.
- Washout from concrete trucks and plant will not be permitted on site.
- Provide public road cleaning where needed particularly in the vicinity of drains.
- Controls need to be regularly inspected and maintained otherwise a failure may result, such as a build-up of silt or tear in a fence, which will lead to water pollution so controls must work well until the vegetation has re-established; inspection and maintenance is critical after prolonged or intense rainfall.
- Develop checklists for weekly Site Audits, which must be finalised by the Appointed Contractor and the relevant Personnel informed of their duties.

Biosecurity Protocols

Biosecurity protocols shall be implemented during the proposed project to prevent the introduction of invasive species, in particular those listed on the third schedule of the 2011 Regulations, to site and the further spread of diseases. The following measures will be adopted:

- All equipment intended to be used at the site shall be:
  - power steam washed at a suitably high temperature or at least 65 degrees, or
  - disinfected with an approved disinfectant, e.g. Virkon or an iodine-based product. The manufacturer's instructions shall be followed and, if required, the correct contact times allowed for during the disinfection process. Items that are difficult to soak shall be sprayed or wiped down with disinfectant.
- During the duration of the proposed development, if equipment is removed off-site to be used elsewhere, the said equipment shall be cleaned and disinfected prior to being brought back to the works area.
- Appropriate facilities shall be used for the containment, collection and disposal of material and/or water resulting from washing facilities of vehicles, equipment and personnel.
- Importation of materials shall comply with Regulation 49 of the EC (Birds and Natural Habitats) Regulations 2011.

Potential Disturbance of Faunal Species Mitigation

- Removal of vegetation such as grassland, woodland and hedgerow will be carried out outside the breeding bird season from 1st March to 31st August inclusive.
- No mitigation is necessary for terrestrial mammals using the site.

15.2.6.2 Operational Phase – Mitigation Measures

- Lighting design has considered the presence of protected species. Appropriate lighting will be used within the proposed development and adjacent areas with sensitive lighting regimes deployed in wildlife sensitive areas. Stanchion height will be 6m. The proposed lighting report/layout is appended to this EIAR which sets out details of horizontal illuminance (in lux) for each lamp post.
- Dark buffer zones will be used to separate habitats or features from lighting by forming a dark perimeter around them. This shall be used for habitat features noted as foraging areas for bats.
- Buffer zones will be used to protect dark buffer zones and shall ensure that light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. For key bat habitat, such as watercourses and treelines, there shall be an absence of artificial illumination. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected, as further outlined below.

Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).

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

15.2.6.3 Monitoring Measures

Monitoring will be carried out in accordance with the methodologies set out in the CEMP (MHL, 2021b). During construction, the application of pollution prevention measures as set out within the CEMP will be checked regularly. The mitigation measures to protect hedgerows during construction shall be monitored to ensure its effectiveness.

Once operational, the implementation of the landscape plan and additional habitat (such as wild flower meadows and additional planting) shall be inspected to ensure effective implementation.

15.2.7 Noise & Vibration

15.2.7.1 Construction Phase – Mitigation Measures

Mitigation measures that will be employed in order to control construction noise at its source include the following:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Minimise drop height of materials;

- Start up plant and vehicles sequentially rather than all together;
- The normal operating hours of the site will be adhered to. This also applies to the movement of plant onto and around the site;
- The plant and activities chosen to carry out the construction work will be the quietest available means of achieving the required purpose;
- Modifications will be made to plant and equipment, if appropriate, for noise attenuation purposes, provided the manufacturer has been consulted. For example, a more effective exhaust silencer may be fitted to a diesel engine
- As far as is reasonably practicable, sources of significant noise will be enclosed provided that ventilation and potential hazards to operators have been considered;
- Plant and noisy activities will be located away from noise-sensitive areas where practicable and sources of directional noise shall be oriented away from noise-sensitive areas;
- All plant and equipment will be regularly maintained (increases in plant noise are often indicative of future mechanical failure).

Mitigation measures that will be employed in order to control the range of construction noise include the following:

- The distance between noise sources and noise-sensitive areas will be increased as much as is reasonably practicable;
- Where noise control at source is insufficient and the distance between source and receiver is restricted, screening will be implemented. The location of barriers providing screening is an important consideration. Barriers will be located either close to the source of noise (as with stationary plant) or close to the receptor. The height of the barrier must also be considered. BS 5228-1 states that an approximate attenuation of 5 dB is achieved when the top of the plant is just visible to the receiver over the noise barrier, while an attenuation of 10 dB is achieved when the noise screen completely hides the sources from the receiver. A barrier height will be chosen so as to completely hide the source at least along the boundaries adjacent to the commercial premises. Furthermore, where the noise source is 1 m from the façade of a building, an allowance of +3 dB will be made for reflection.

Mitigation measures that will be employed in order to control vibration from construction works, with reference to BS 5228-2, include the following:

- The plant and activities chosen to carry out the construction work will be chosen to cause as little vibration as possible while achieving the required purpose;
- All plant and equipment will be regularly maintained to reduce unnecessary vibration;
- Activities causing significant vibration will be located away from sensitive areas and/or isolated using resilient mountings where practicable.

15.2.7.2 Operational Phase – Mitigation Measures

Building Services Plant

- Where ventilation is required for plant rooms, acoustic louvers or attenuated acoustic vents will be implemented, where required and appropriate, to reduce noise breakout;
- Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment;
- The use of perimeter plant screens will be used, where required, for roof-top plant areas to screen noise sources;
- The use of attenuators or silencers will be installed on external air-handling plant;
- All mechanical plant items, e.g. fans, pumps etc., shall be regularly maintained to ensure that excessive noise generated by worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document;
- Installed plant will have no tonal or impulsive characteristics when in operation.

Childcare Facilities

- The play area surface shall be a soft, porous rubber to provide some additional sound absorption;
- Vegetation shall be retained along the boundaries to discourage children from playing in the closest areas to the residential units.

Additional Traffic on Surrounding Roads

- It is considered that the changes to traffic flows will not result in a significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case.

Deliveries and Waste Collections

- It is not expected that deliveries and waste collections are likely to cause a significant impact. Therefore, no mitigation measures are necessary in this case.

15.2.8 Cultural Heritage

Archaeology – Mitigation Measures

Given the scale and extent of the proposed development works within an undeveloped greenfield area, a programme of confirmatory archaeological investigations will be carried out prior to the commencement of the construction phase. The presence of vegetation overgrowth and areas of waterlogging within the proposed development site will act as a constraint on geophysical surveying but will not hinder the excavation of archaeological test trenching within any of the fields. A thorough advance programme of archaeological test trenching within the proposed development site will, therefore, be carried out by a suitably qualified archaeologist under a licence issued by the National Monuments Service. In the event that any sub-surface archaeological deposits, features or artefacts are identified during the test trenching investigations then their surfaces will be manually cleaned, recorded and left to remain in situ while the Planning Authority and the National Monuments Service are consulted to determine further appropriate mitigation measures, which may involve preservation in situ (avoidance) or preservation by record (archaeological excavation).

Designated Architectural Heritage Structures – Mitigation Measures

There are no designated architectural heritage buildings located within the proposed development site or within 600m of its boundary and it is not located in an Architectural Conservation Area. It is, therefore, concluded that no mitigation measures for the designated architectural heritage resource are required.

Undesignated Cultural Heritage Features – Mitigation Measures

The only undesignated cultural heritage feature identified within the proposed development site is the stream which forms the boundary Coolflugh and Dromin townlands and extends along the western side of the landholding. The proposed development will not result in any interventions or impacts on this watercourse, and it is concluded that no mitigation measures for this townland boundary are required.

15.2.9 Air Quality & Climate

15.2.9.1 Construction Phase – Mitigation Measures

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.
- Strict implementation and monitoring of the Dust Management Plan identified in the CEMP.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Operational Phase – Mitigation Measures

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on air quality and climate.

15.2.10 Population & Human Health

15.2.10.1 Construction Phase – Mitigation Measures

- The CEMP has been developed in accordance with health and safety provisions contained in the Safety Health and Welfare at Work (Construction) Regulations 2013, as amended, which transpose into Irish law obligations under Directive 92/57/ EEC.
- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- Environmental Incidents/Complaints procedures being implemented.
- Construction phase will proceed on a phased basis as outlined in the CEMP.
- Biosecurity protocols shall be implemented during the proposed project to prevent the introduction of invasive species, in particular those listed on the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), to site and the further spread of diseases.
- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods.
- Use of precast/prefabricated materials where possible.
- Enforcement of the Construction Traffic Management Plan to mitigate the potential construction traffic impacts. (Refer to section 15.2.2.1 above).
- Adoption of all dust management and noise/vibration mitigation measures outlined previously in this chapter.

15.2.10.2 Operational Phase – Mitigation Measures

The site layout responds to the site's topography and the evolving development context in Tower/Cloghroe. The proposed landscape and planting strategy will assist in mitigating the tree loss required to accommodate the proposed development.

The pedestrian/cyclist path, signalised pedestrian crossing on the R617 and relocated bus stop will result in increased accessibility to public transport, walking and cycling opportunities, mitigating the increased levels of traffic in the area during the operational phase. The increased accessibility to more sustainable modes of transport will promote sustainable mobility in the settlement with the aim of reducing car dependency. The proposed road upgrades will also ensure ensure enhanced road safety.

The proposed retail element to the scheme will address the current trends exhibited in the settlement of a leakage of retail and economic activity from the settlement and create local employment opportunities.

The proposed flood defence/drainage strategy will benefit existing will increase the volume of flood storage available by 500m^3 and eliminate the risk of flooding of dwellings in Senandale from the potential future flooding events resultant from the western boundary stream.