

Environmental Impact Assessment Report (EIAR)

Volume 1 Main Statement

Large Scale Residential Development at Ruanbeg, Kildare Town, Co. Kildare

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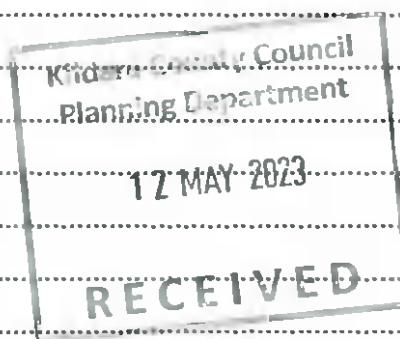
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1. Introduction and Methodology

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of our client MRP Oakland Ltd. to accompany a Large-Scale Residential Development (LRD) application to Kildare County Council for a new residential development on lands at "Ruanbeg" within the townlands of Kildare and Collaghknock Glebe, Kildare Town, Co. Kildare. The development lands are located to the north of the Dublin Road (R445), east/northeast of Heffernan Tyres and Ruanbeg Manor Estate and southeast of Coolaghknock Estate. The application site includes for works along the R445 and at Ruanbeg Park and Ruanbeg Avenue.

This EIAR has been compiled in accordance with all current legislation and best practice guidance. This Chapter describes the methodology by which the Environmental Impact Assessment (EIA) was carried out and the EIAR was completed. The methodology used is broadly consistent across all chapters in order to ensure the EIAR is clear and easy to navigate.

The subject site is located within Kildare Town and is primarily zoned C1 'New Residential' in the current Kildare Town Local Area Plan (LAP) 2012-2018. The objective of C1 zoning is *"to provide and improve new residential areas and for associated local shopping and other services incidental to new residential development."*

A small area of the site falls within the objective H zoning which is for Industrial and Warehousing. The objective for this land is *"To provide for and improve industrial and warehousing development."* The land which falls within this zoning is to be used for landscape buffering with the residential lands.

The subject site is located east of Kildare Town Centre proximate to existing employment, community facilities, retail and public transport.

The proposed development will comprise the construction of 295 no. residential units along with a two storey creche facility measuring c.472.7sqm. The residential units will include:

- 15 no. single storey, semi-detached/terraced houses (12 no. 1-beds and 3 no. 2-beds) provided as "age-friendly housing".
- 206 no. two storey, semi-detached/terraced houses (10 no. 2 beds, 160 no. 3 beds, 36 no. 4 beds).
- 74 no. three storey duplexes/apartments (37 no. 2 beds, 37 no. 3 beds) arranged within 6 no. blocks.

All residential units will be provided with associated private gardens/balconies/ terraces facing to the north/ south/ east/ west.

New vehicular and pedestrian/cyclist accesses will be via Dublin Road (R445) and Ruanbeg Avenue and a pedestrian only access via Ruanbeg Park, with upgrade to existing public road as necessary.

All associated site development works, including 571 no. car parking spaces (including EV parking), 236 no. cycle parking spaces, public and communal open spaces, landscaping, SuDs features, boundary treatments, plant areas, waste management areas/bin stores, and services provision (including ESB substations, pumping station) are also proposed.



An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development.

A detailed description of the proposed development is provided in Chapter 3 of this EIAR.

1.2 Legislative Context

Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from EIA Directive 85/337/EC (as amended by Council Directive 97/11/EC, Directive 2003/35/EC, Directive 2009/31/EC, Directive 2011/92/EU and Directive 2014/52/EU).

The EIA Directives have been transposed into the Irish land use planning consent system by way of the Planning & Development Acts 2000 (as amended) (the "Act"), and the Planning & Development Regulations 2001, (as amended) (the "Planning Regulations").

The most recent amendment to the Regulations - the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) – transposed Directive 2014/52/EU into Irish law.

Complementary to the legislation is a range of guidelines produced by the EU and government agencies to inform the carrying out of EIA:

- EU Guidance on EIA Screening (DG Environment 2001).
- Guidance on EIA Scoping (DG Environment 2001).
- EIA Review Checklist (DG Environment 2001).
- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union 2013)
- Environmental Assessments of Plans, Programmes and Projects – Rulings of the Court of Justice of the European Union (European Union 2020)
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Development Management Guidelines (DoEHLG, 2007).
- 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).
- Circular letter PL 1/2017 — Advice on Administrative Provisions in Advance of Transposition (Department of Housing, Planning and Local Government, 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 Screening (European Commission 2017)



- Environmental Impact Assessment of Projects – Guidance on Scoping (European Commission 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022)
- Environmental Impact Assessment Screening Practice Note 2021 (Office of the Planning Regulator)

1.3 Legislative Definition of EIA

Article 1(1)(g) of the EIA Directive, defines “Environmental Impact Assessment” (EIA) as a “process” consisting of:

- (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.’*

Article 171A of the Act defines ‘environmental impact assessment’ as “... 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;

1.4 EIA Screening

Section 176A of the Act defines 'screening for environmental impact assessment' as

".. a determination—

- (a) as to whether a proposed development would be likely to have significant effects on the environment, and
- (b) if the development would be likely to have such effects, that an environmental impact assessment is required."

Section 172 of the Act states that an EIA shall be carried out in respect of an application for consent for proposed development where either of the following are relevant:

- (a) the proposed development would be of a class specified in—
 - (i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—
 - I) such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part, or
 - II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

- (ii) Part 2 (other than subparagraph (a) of paragraph 2) of Schedule 5 of the Planning and Development Regulations 2001 and either—
 - I) such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part, or
 - II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

- (b) (i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not equal or exceed, as the case may be, the relevant quantity, area or other limit specified in that Part, and
it is concluded, determined or decided, as the case may be,

(I) by a planning authority, in exercise of the powers conferred on it by this Act or the Planning and Development Regulations 2001 (S.I. No. 600 of 2001),

(II) by the Board, in exercise of the powers conferred on it by this Act or those regulations,

(III) by a local authority in exercise of the powers conferred on it by regulation 120 of those regulations,

(IV) by a State authority, in exercise of the powers conferred on it by regulation 123A of those regulations,

(V) in accordance with section 13A of the Foreshore Act, by the appropriate Minister (within the meaning of that Act), or

(VI) by the Minister for Communications, Climate Action and Environment, in exercise of the powers conferred on him or her by section 8A of the Minerals Development Act 1940,

that the proposed development is likely to have a significant effect on the environment.

The subject site does not fall within any development classes set out in Part 1 of Schedule 5.

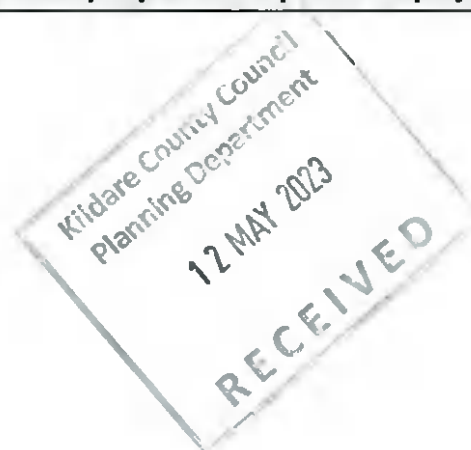
The following development classes set out in Part 2 of Schedule 5 are noted:

- 10(b)(i) Construction of more than 500 dwellings
- 10(b)(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.
(In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)

The gross area of the application site is c. 10.3 gross (and 8.8 ha net), which is above the 10ha threshold for a built-up area.

The proposed development is for 295 no. residential units along with a creche, which is below the 500 no. unit threshold.

Based on the gross site area alone, an EIA is deemed automatically required in respect of the project.



1.5 EIA Scoping

Section 173(2) (a) of the Planning and Development Act 2000 (as amended) provides that a formal request for scoping may be submitted to the planning authority. However, the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022), confirm that this is not mandatory.

The EIAR team carried out a scoping exercise to identify the key issues that may be considered likely to have a significant effect on the environment.

In accordance with the EPA Guidelines (2022), those issues that do not meet the threshold of significance have been 'scoped out'. The following issues have been identified in the context of the proposed development:

- Population & Human Health
- Biodiversity
- Lands, Soils & Geology
- Hydrology & Water Services
- Noise & Vibration
- Air & Climate
- Landscape & Visual
- Traffic & Transportation
- Material Assets
- Waste Management
- Cultural Heritage



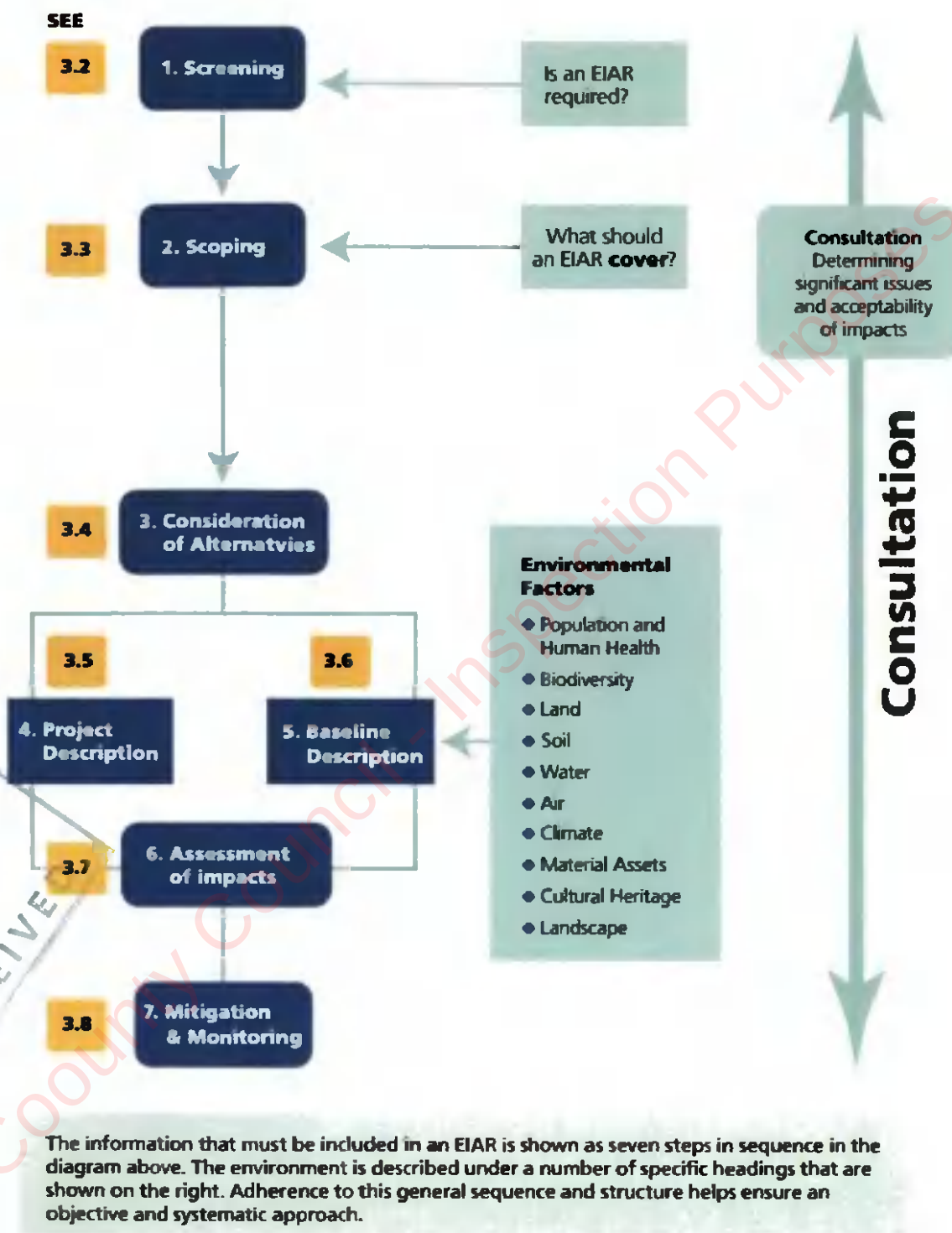


Figure 3.1 EIA Contents in Sequence

Figure 1.1: Extract from Guidelines on the Information to be contained in Environmental Impact Assessment Reports, EPA 2022 EIA Objectives

According to the Environmental Impact Assessment of Projects – Guidance on Screening (European Commission 2017) the EIA process is based on the following four principles:

- *Pursuing Preventative Action*

An assessment of anticipated likely and significant impacts was undertaken during the screening and the considerations of alternatives stages of the EIA process. This involved forming a preliminary opinion with respect to the approximate magnitude and character of the likely environmental impacts. This assessment was based on the knowledge, experience and expertise of the EIA team with reference to EIA guidance material and local information.

- *Maintaining Environmental Focus and Scope*

The EIA process has focussed on those issues where environmental impact is likely to occur and have significant effects.

- *Informing the Decision*

The EIAR has been developed and is presented in such a way as to facilitate the authority decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

- *Public & Stakeholder Participation*

Participation is provided through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

1.6 EIAR Format & Content

This EIAR is sub divided as follows:

- Environmental Impact Assessment Report
- Appendices to Environmental Impact Assessment Report
- Non-Technical Summary.



The EIAR has been prepared in the Grouped Format as set down in the EPA "Guidelines on Information to be contained in an EIS" (2002) and the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022). In general, the EIAR follows the framework presented in the EPA "Advice Notes on Current Practice in the Preparation of Environmental Impact Statements" (September 2003).

The topics examined in this EIAR are categorised under the environmental factors prescribed under the EIA Directive and Planning Regulations. The responsibility for each of the EIAR chapters is also outlined below:

Chapter	Title	Consultant
1.	Introduction & Methodology	McGill Planning Ltd.
2.	Alternatives	McGill Planning Ltd.
3.	Description of Development	McGill Planning Ltd.
4.	Population & Human Health	McGill Planning Ltd.
5.	Biodiversity	Panther Ecology Limited
6.	Lands, Soils & Geology	PUNCH Consulting Engineers

7.	Hydrology & Water Services	PUNCH Consulting Engineers/Bluerock Environmental Limited
8.	Noise & Vibration	Traynor Environmental Limited
9.	Air & Climate	Traynor Environmental Limited
10.	Landscape & Visual	Cunnane Stratton Reynolds Land Planning & Design
11.	Traffic & Transportation	PUNCH Consulting Engineers
12.	Waste Management	Traynor Environmental Limited
13.	Cultural Heritage - Archaeology	John Purcell Archaeological Consultancy
14.	Material Assets	PUNCH Consulting Engineers, MandE Consulting Engineers Ltd.
15.	Interactions	McGill Planning Ltd.
16.	Summary of Mitigations Measure	McGill Planning Ltd.
n/a	Non-Technical Summary	McGill Planning Ltd.

1.7 Methodology

The preparation of this EIAR requires the co-ordination and synthesis of associated yet diverse elements of the overall assessment. To facilitate this process, a schematic structure is proposed in order to provide a coherent documentation of the varied aspects of the environment considered. The grouped format structure of this EIAR is listed below with a brief outline of each specific stage.

Methodology

The specific approach or techniques used to analyse impacts or describe environments. As set out in section 3.7.1 of the EPA Guidelines, the EIAR focuses on:

- Effects that are both likely and significant; and
- Description of effects that are accurate and credible.

It should contain (Annex IV(5) of the Amended Directive):

"A description of the likely significant effects of the project on the environment resulting from, inter alia:

- a) the construction and existence of the project, including, where relevant, demolition works;*
- b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;*
- c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;*
- d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);*
- e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;*
- f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;*
- g) the technologies and the substances used.*

The description of the likely significant effects on the [environmental] factors should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project."

The EPA Guidelines advise that "Effects should be described by reference to the individual environmental factors and their sensitivities. It may be useful to consider such effects in light of the criteria listed in Annex III of the amended Directive.

- a) 'the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);
- b) the nature of the impact;
- c) the transboundary nature of the impact;
- d) the intensity and complexity of the impact;
- e) the probability of the impact;
- f) the expected onset, duration, frequency and reversibility of the impact;
- g) the cumulation of the impact with the impact of other existing and/or approved projects;
- h) the possibility of effectively reducing the impact"

The terminology set out in Table 3.4 of the EPA 2022 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' will be used where appropriate. This terminology is set out in the table below. In this respect the EPA 2022 Guidelines note that 'all categories of terms do not need to be used for every effect'.



Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.	Positive Effects A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see <i>Determining Significance</i>).	Imperceptible An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	Extent Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

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

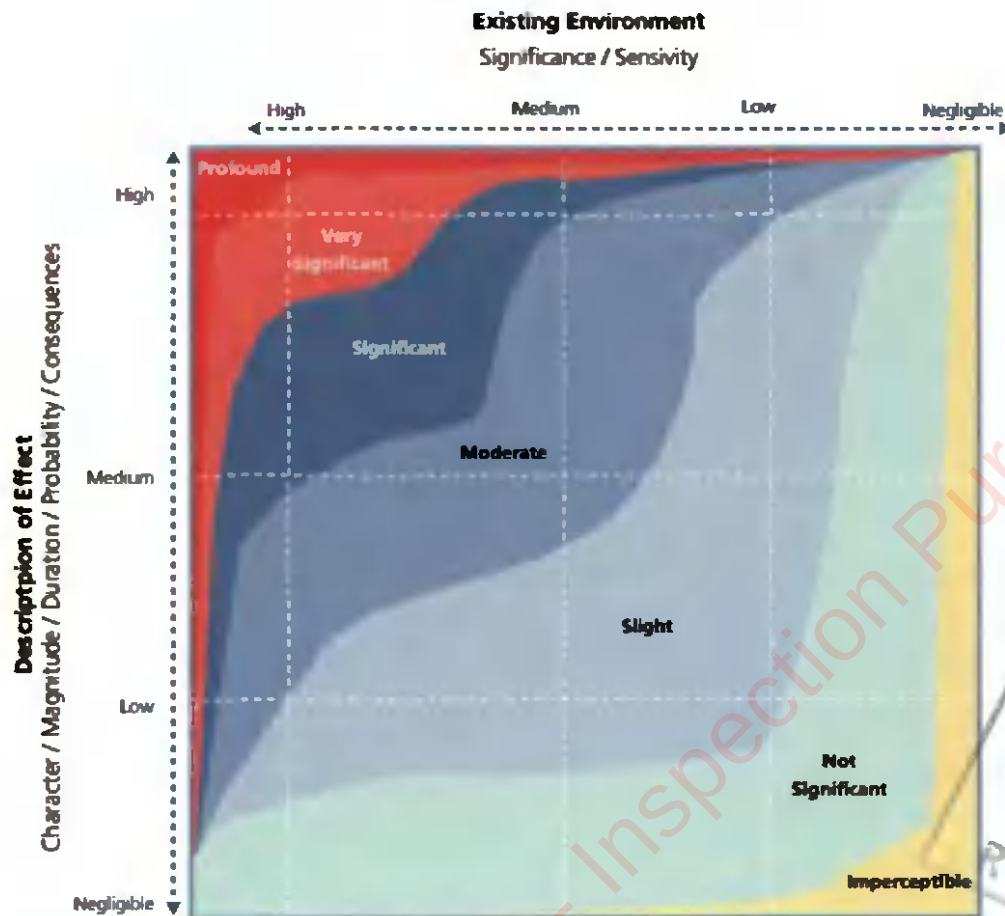


Describing the Types of Effects	Indirect Effects (a.k.a. Secondary or Off-site Effects) Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SO _x and NO _x to produce smog).

Figure 1.2: Extract of table 3.4 from the EPA Guidelines 2022

Figure 3.4 from the EPA Guidelines 2022 shows how comparing the character of the predicted effects to the sensitivity of the receiving environment can determine the significance of the effect.





There are seven generalised degrees of effect significance that are commonly used in EIA. Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in Table 3.4. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions. (ref. Advice Notes⁶⁴.)

Figure 1.3: Determining significance.

Layout of the chapters

As set out above, for simplicity, and to enable better understanding of all readers, each chapter has been laid out with the following headings.

Receiving Environment (Baseline Situation)

Dynamic description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The context, character, significance and sensitivity of the baseline is described. The likely evolution of baseline environmental characteristics without implementation of the proposed project.

Characteristics of the Proposed Development

Description of the physical characteristics of a project having regard to

- the site location

- the size, design and appearance of the proposed project
- the cumulation with other proposed projects
- the use of natural resources
- the production of waste
- emissions and nuisances
- the potential risk of accidents.

The description of the development should take account of the full 'life-cycle' including construction, commissioning (if relevant), operation, changes to the project and potential decommission.

Potential Impacts

The potential impact of the proposal comprises a general description of the possible types of impacts which proposals of this kind would be likely to produce. Impact assessment addresses direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions. This includes consideration of a 'Do Nothing' impact which describes the environment as it would be in the future if the development is not carried out.

Mitigation Measures

A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts described above.

Predicted Impacts

An assessment of the net specific impact of the proposal, noting the direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have. The predicted impact assumes all mitigation measures are fully and successfully applied. A 'Worst Case' impact is also considered. A 'Worst Case' impact is an impact arising where a development or its mitigation measures substantially fail.

Monitoring

A description of any post development monitoring of effects of the environment which might be necessary.

Reinstatement

A description of any post development reinstatement measures which might be necessary.

1.8 Competency

For the preparation of this EIAR, the applicant engaged McGill Planning Ltd. to project manage and coordinate the preparation of the EIAR with a team of qualified specialists engaged to prepare individual chapters, as listed in the table below. Details of the competency, qualifications and experience of the authors is also outlined:

Chapter	Consultant	Lead Consultant	Qualifications
Introduction & Methodology	McGill Planning Ltd.	Trevor Sadler	Master of Regional & Urban Planning
Examination of Alternatives			
Description of Development			
Populations & Human Health			
Interactions			
Summary of Mitigations Measures			
Biodiversity	Kildare County Council Planning Department 12 MAY 2023 RECEIVED Panther Limited	Ecology Dr Ross Donnelly Swift	BSc (Hons) in Biology, MSc in Environmental Science, PhD in Biosystems Engineering, Research Fellow in the School of Natural Science at Trinity College Dublin, Lecturer on Soil Science, Agroecology and Hydrology at Dundalk IT.
Traffic & Transportation	PUNCH Consulting Engineers	Julie Tiernan	BE(Civil) (Hons) MSc CEng MIEI
		John Paul Murray	MEng(Hons) BSc MIEI
Lands, Soils & Geology	PUNCH Consulting Engineers	Mark Richardson	BA BAI(Hons)
		Donal Moreton	MEng (Hons) MIEI
Hydrology & Hydrogeology	PUNCH Consulting Engineers	Mark Richardson	BA BAI(Hons)
	PUNCH Consulting Engineers	Clare Shannon	BEng (Hons) MIEI
	Bluerock Environmental Limited	Niall Mitchell	BE, MSc, CEng MIEI, PGeo. Niall is a Chartered Engineer and Professional Hydrogeologist
Material Assets	PUNCH Consulting Engineers	Mark Richardson	BA BAI(Hons)
		Rachel Lee	CEng BSc (Hons) ME MIEI
	MANDE Consulting Engineers	Keith Phelan	BEng Tech
Noise and Vibration	Traynor Environmental Ltd	Nevin Traynor	BSc. (Hons) Environmental Science & Technology, H. Dip I.T, Certified by Institute of Acoustics in Environmental Noise Measurements and Building Acoustics.
Climate and Air Quality	Traynor Environmental Ltd	Nevin Traynor	BSc. (Hons) Environmental Science & Technology, H. Dip I.T
Waste Management	Traynor Environmental Ltd	Nevin Traynor	BSc. (Hons) Environmental Science & Technology, H. Dip I.T

Landscape and Visual	Cunnane Stratton Reynolds Land planning and Design	Ronan Finnegan	BSc, PG Dip, CMLI
Cultural Heritage – Archaeology	John Purcell Archaeology	John Purcell	BA in archaeology

Table 1.1: Details of the competency, qualifications and experience of the authors

1.9 Difficulties in Compiling the Specified Information

There were no significant difficulties in completing the Environmental Impact Assessment Report. Any minor difficulties are presented in each of the respective chapters.

While every effort has been made to ensure that the content of this EIAR is consistent there may be instances where typographical errors and/or minor inconsistencies do occur. These are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

Please note that any red line site boundary shown in this document is for illustrative purposes only. The architect's drawings should be consulted for an accurate red boundary line.

1.10 Availability of the EIAR

A copy of this EIAR document and Non-Technical Summary of the EIAR document is available for purchase at the offices of Kildare County Council at a fee not exceeding the reasonable cost of reproducing the document.

Additionally, prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal.



2. Alternatives

2.1 Terms of Reference

This section of the EIAR has been prepared by McGill Planning Ltd. It provides a description of the proposed development and explains the evolution of the scheme design through the reasonable alternatives examined.

It is a requirement of the EIA Directive (as amended) to present an outline of the main reasonable alternatives considered, a justification of the final proposed development, including an indication of the main reasons for the option chosen and considering the effects of the project on the environment.

2.2 Introduction

The Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment (2018) state the following:

"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."

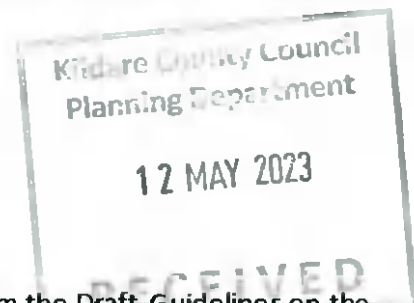
This section of the EIAR document provides an outline of the main alternatives examined throughout the design and consultation process under the following headings:

- "Do-nothing" Alternative
- Alternative Locations
- Alternative Designs
- Alternative Layouts
- Alternative Processes

It is noted that "Alternative Uses" has not been carried forward from the Draft Guidelines on the Information to be Contained in Environmental Assessment Reports (EPA 2017) to the final Guidelines published by the EPA in 2022. However, for thoroughness, the Alternative Uses have been considered in this chapter below.

These headings serve to indicate the main reasons for choosing the development proposed, accounting for and providing a comparison of the environmental effects. The type of alternatives depends on the nature of the project proposed and the characteristics of the receiving environment.

The 2018 Guidelines also note that it is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues. Furthermore, a 'mini-EIA' is not required for each alternative studied.



2.3 Do-Nothing Alternative

The subject site has been zoned for development since the adoption of the Kildare Town Local Area Plan 2002. The zoning has remained the same since this LAP was adopted, with the main area of the site zoned as 'C: New Residential' and the southwestern section of the site zoned as 'G1: Industry and Warehousing'. The objective of zoning 'C: New Residential' within the Kildare Town LAP 2002 was 'to provide for new residential development'. The objective of zoning 'G1: Industry and Warehousing' was 'to provide for new warehousing and industrial development'. East of the site is green belt zoning J which aims 'to protect the Curragh and established agricultural uses, including the bloodstock industry'.

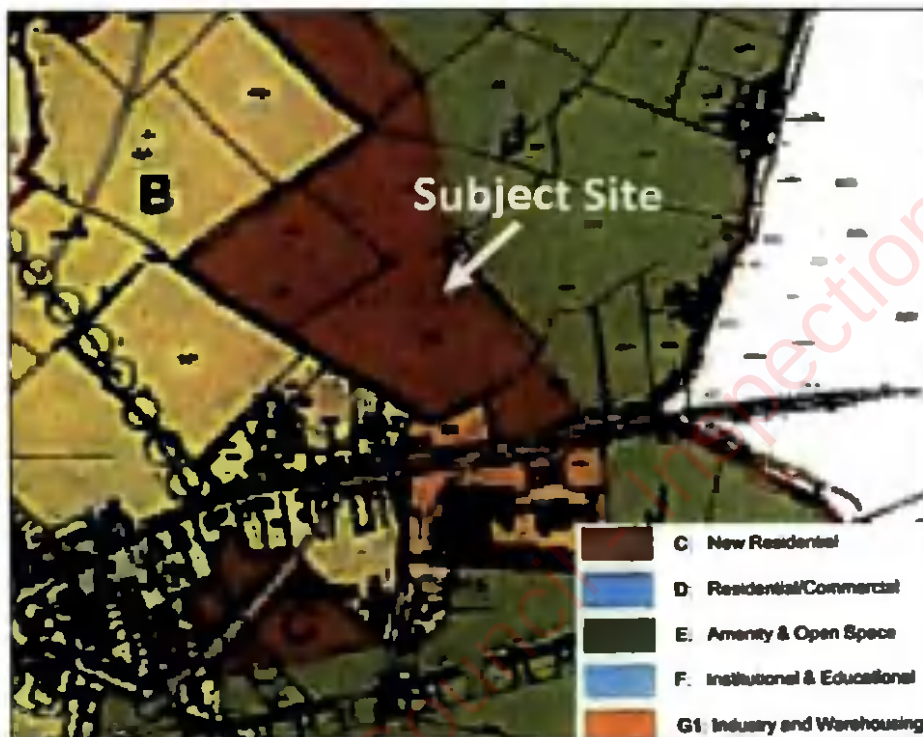


Figure 2.1: Land Use Zoning within the Kildare Town Local Area Plan 2002

Although zoning C permits several uses as listed in land use zoning matrix, no other proposals for the subject site have come forward in the time that the site has been zoned for development. The site has remained vacant and undeveloped for over 20 years.





Therefore, a 'do-nothing' alternative would likely result in the subject site remaining vacant and undeveloped. This would mean that these zoned lands would not be developed in accordance with the objectives of the current Local Area Plan.

This is not in line with National, Regional or Local Plan policies which require the efficient use of zoned land such as these. Furthermore, these lands are considered highly sustainable and suitable for development due to its proximity to a wide range of existing public transport facilities, services and community facilities within the area which are key considerations for the development of any zoned site.

The 2018 Guidelines note that some projects may be “site specific” so the consideration of alternative sites may not be relevant or warranted.

2.3

In this regard, we note that the subject site is located within Kildare County Council administrative area and is primarily zoned 'C New Residential'. The adopted Kildare County Development Plan 2023-2029 outlines that *"Individual Local Area Plans will be prepared for higher order settlements, where individual Infrastructural Assessments will be carried out to apply the tiered approach to the zoning provisions associated with their respective housing allocations."* Therefore, Kildare Town zoning is illustrated within the current adopted Kildare Town Local Area Plan 2012-2018.

A small proportion of the application site along the southern boundary is zoned 'H Industry and Warehousing', the objective of this zoning is 'to provide for and improve industrial and warehousing development.'



2.4

2.5 Alternative Uses

The proposed development is predominantly zoned 'C1 – New Residential, Phase 1' with the objective 'to provide and improve new residential areas and for associated local shopping and other services incidental to new residential development.' Residential and childcare facilities are permissible uses on this land zoning.

Table 14 of the Kildare Town Local Area Plan 2012-2018 outlines the following for zoning 'C – New Residential':

Zoning	Zoning Objective
C – New Residential	This zoning provides for new residential development and associated local services ancillary to residential development. While housing is the primary use in this zone, recreation, neighbourhood services, education, crèche/playschool, clinic/surgery uses and sheltered housing are also envisaged, subject to the preservation of neighbouring residential amenity. Permission may also be granted for home based economic activity within this zone, subject to the preservation of residential amenity and traffic considerations. New residential areas should be developed in accordance with a comprehensive plan detailing the layout of services, roads, pedestrian and cycle routes and the landscaping of open space.

Table 2.1: Table 14 of Kildare Town LAP 2012-2018, Zoning Objectives

Section 8.1.3 of the LAP provides a detailed zoning mix illustration for each land use zoning. 'C – New Residential' permitted in principle and open for consideration uses are as follows:

Permitted in Principle	Childcare/Creche/Playschool, Dwelling unit, Park/Playground, Playing Fields, Residential Development
Open for Consideration	Community Hall, Cultural Uses/Library, Fire Station, Guest House/Hostel, Hotel, Halting Site, Health Centre/Clinic, Medical and related consultancy, Nursing Home, Place of Worship, Pub, Recreational Buildings, Restaurant, School, Shop (Convenience), Sport/Leisure Complex, Tourist camping/caravan park, Utility Structures

Table 2.2: Permitted and Open for Consideration Uses for zoning C – New Residential (Source: Kildare Town LAP 2012-2018)

There is an area south of the site which is zoned H – Industry and Warehousing. The objective of this zoning is 'to provide for and improve industrial and warehousing development.'

Zoning	Zoning Objective
H – Industry and Warehousing	The purpose of this zoning is to provide for industrial and warehousing uses. Other uses, ancillary or similar to industry and warehousing will be considered on the merits of the proposed development and may be acceptable in this zone. Where employment is a high generator of traffic, the location of new employment facilities at an appropriate scale, density, type and location will be encouraged to reduce demand for travel. Residential or retail uses (including retail warehousing) or incinerators/thermal treatment plants will not be acceptable in this zone. Where any Industrial/ Warehousing land adjoins other

	land uses, particularly residential uses, a buffer zone (approximately 10–15 metres) shall be provided for and landscaped in accordance with Chapter 19 of the CDP.
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Table 2.3: Zoning H - Industry and Warehousing Objective

Permitted in Principle	Car Parks, Fire Station, Heavy Commercial Vehicle Parks, Industry, Industry (Light), Repository/ Store/Depot, Utility Structures, Warehouse (Wholesale), Workshop
Open for Consideration	Childcare/ Crèche/ Playschool, Garages/ Car Repairs, Health Centre/Clinic, Medical and related consultancy, Motor Sales, Offices, Park/Playground, Petrol Station, Recreational Buildings, Restaurant, Shop (Convenience)

Table 2.4: Permitted and Open for Consideration Uses for zoning H – industry and Warehousing (Source: Kildare Town LAP 2012-2018)

The proposed development including the buffer zone on the industrial lands accords with the zoning objectives for the area in the Development Plan.

The proposed development is in line with the objectives of “Housing for All”, as it represents an increase in housing supply in the area including social housing and “age friendly housing” and also includes ancillary uses in the form of a new creche facility.

The lack of housing supply in Ireland is a well-documented and ongoing issue. The proposed development incorporates the construction of 295 no. units including houses, duplex apartments and age friendly single storey accommodation, all of which will service demand in the area. As such this is considered the most appropriate use of the land.

2.6 Alternative Designs

Alternative Designs for this development primarily relate to the design of the duplex units and houses, the design of the age friendly housing and the provision of appropriate SuDS measures within the development. These design layouts are following pre-application meetings with the Planning Authority prior to lodgement. Numerous issues were highlighted and informed the design process in areas including but not limited to:

- Character of the site and the street scene
- SuDS measures
- Accessibility.

Design of duplex units and houses

At the pre-application meeting and subsequent correspondence, it was suggested that the proposed development would benefit if the duplexes were altered to ensure internal stairs were provided.





Figure 2.4: Pre-application request duplex apartment design



Figure 2.5: Current proposed duplex apartment designs

As a result of these comments the external appearance has been altered to accommodate an internal stairs. In addition to this the roof has been altered to accommodate SuDS measures in the form of a blue roof to enable further environmental gains within the development.

The character of the duplex units have also been altered to provide a more contemporary feel and a stronger street edge.

The pre-application consultation also asked for the design of the houses to be altered to provide a more unique character to the area, more in line with the character in the wider area.



Figure 2.6: Pre-application house design



Figure 2.7: Current proposal

The change to unit types, materials and break up of units allows for a more visually interesting streetscene. It also enabled corners and public open spaces to be better addressed throughout the development.

The front and rear gardens also benefit from the inclusion of bioretention areas and the inclusion of permeable paving to the front gardens. As well as being aesthetically pleasing it will also further support SuDS throughout the development.



Figure 2.8: Pre-application landscape extract of garden areas



Figure 2.9: Current proposed gardens showing bioretention areas

A final design change was to provide for better access to the creche and age friendly accommodation by moving it closer to the front of the site and providing an appropriate buffer within the H1 zoned land to facilitate this move.



Figure 2.10: Pre-application area behind H1 Zoned land



Figure 2.11: Current proposal of H1 zoned land and area behind

This alternative layout and siting of the unit provides the age friendly accommodation with the privacy required but also the proximity and ease of access to the Dublin Road and the bus routes along there if it is required. There is also the benefit of additional planting in the H1 zoned land providing an attractive transition and buffer area between the two uses.

2.7 Alternative Layouts

The subject site is greenfield and currently used for agricultural purposes. The site's unique feature includes its character with significant changes in levels. There is also a series of mature belts of trees and perimeter hedgerows. The southern, northern and eastern boundaries comprise of mature vegetation, dense trees and hedgerow of varying quality. The western boundary consists of a row of trees and a wall separating the site from the private gardens of the adjacent housing estate. Two hedgerows divide the site in an east/west direction.

The subject site is c.1km east of Kildare Town Centre. It is bounded to the north by Coolaghknock housing estate and to the west by the Ruanbeg housing estate. Dublin Road R445, Heffernan Tyres Limited, and one detached house, bound the site to the south.

Various site constraints and opportunities were considered when developing the final layout:

- The significant level changes throughout the site
- The character and views of The Curragh to the east
- Establishing future pedestrian and vehicular links to adjacent developments with specific consideration for potential access to Phase 2 residential lands to the northeast
- Protecting the Green Belt zoned lands to the east
- Enabling the development of the industrial & warehousing zoned lands to the southwest
- Orientation of housing to achieve best practice daylight and sunlight standards
- Location of the childcare facility and age friendly housing
- Retention of existing mature trees

Six different layouts and designs (Alternatives A-F) were considered for this site.

Alternative Layout A

Figure 2.13 and Figure 2.14 illustrate the initial design concept. The proposal predominantly consists of 2 storey housing units along the boundaries reflecting the surrounding existing low density residential developments to the north and west of the site. This will provide c.315 no. units at a density of c. 35.7 uph.

Three 3 storey duplex blocks are centrally located within this design to establish a focal point within the scheme. The 4 storey element of the scheme is located within the north-western portion of the site to avoid overlooking, overshadowing onto existing neighbouring units.

Vehicular access is located far right of the southern boundary. This vehicular access runs from south-eastern corner through the site to the north-western corner. This creates a diagonal vehicular spine through the site.

Public open space is located along the south-eastern boundary and centrally within the subject site. Existing mature trees are retained within the established open space to protect biodiversity.



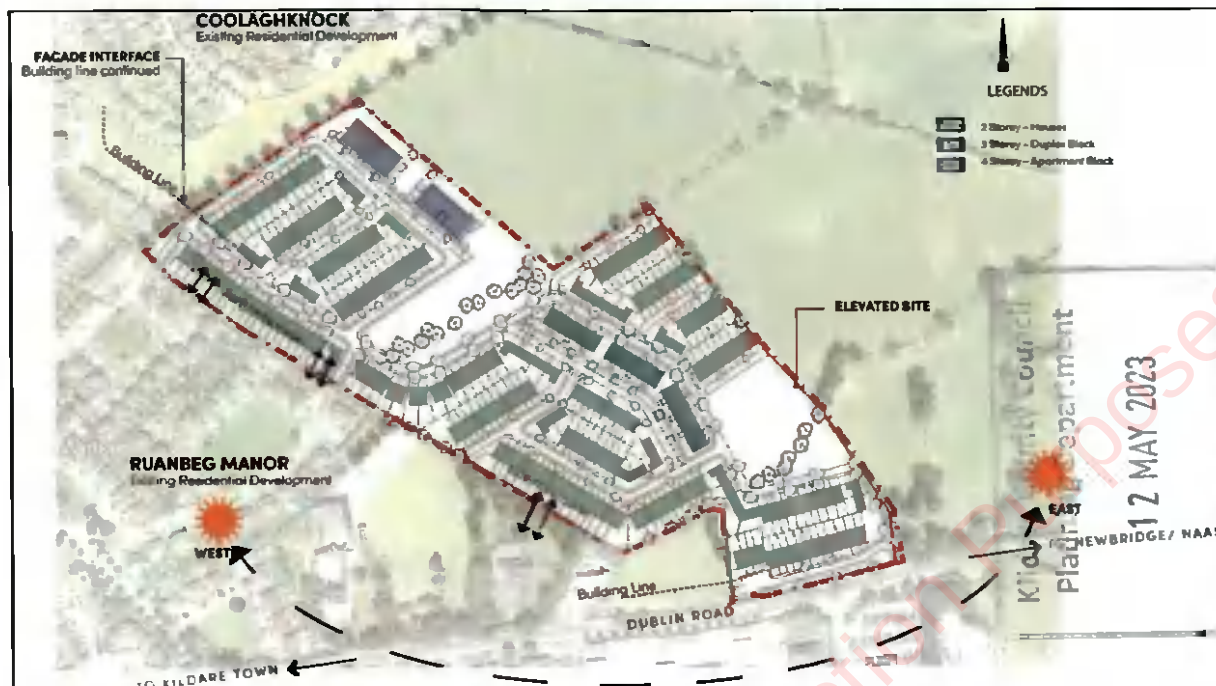


Figure 2.12: Alternative A Site Layout Plan prepared by MCORM Architect's



Figure 2.13: Alternative A Site Layout Plan with proposed landscaping elements (Source: MCORM Architect's)

Environmental Impacts of Alternative Layout A

The road access to the south east of the site resulted a car dominated environment on every side of the houses, particularly on the units fronting onto the Dublin Road. The site entrance opposite two

existing entrances on the opposite side of the road also had the potential to create traffic conflicts at these points.

The four storey apartments were considered to have a detrimental impact on the open character of the Curragh.

There was no connectivity provided to the north, and pedestrian only access to the west resulting in poor integration into the wider area.

Alternative Layout B



Figure 2.14: Alternative B Site Layout Plan prepared by MCORM Architect's

Changes leading on from Alternative A include the reduction in height of the north-eastern units to respect the sensitive nature of the Curragh views. The scale was reduced to single storey age friendly housing in the northeast corner and the provision of 3 storey duplex buildings in lieu of 4 storey apartment buildings. This will provide c.304 no. units at a density of c. 35 uph.

Vehicular and pedestrian connections to existing Ruanbeg Manor/Avenue Residential Developments are established within this design. This ensures the development is permeable and easily connected to existing services and amenities.

House orientation along the western boundary to provide passive surveillance is introduced within this design. This will discourage anti-social behaviour especially within cul de sacs in the development.

The creche and age friendly housing are centrally located, adjacent to the public open space to ensure it is an active and passive surveillance area for residents which are viewed as vulnerable. The age friendly housing also has an internal courtyard which offers opportunities for various activities.

The main vehicular access is relocated to the west and a green buffer provided to the adjacent green belt lands to ensure trees are retained. The southwestern boundary is also extended to integrate

green belt zoned lands. The green belt zoned lands allow the engineers to include an infiltration system in the design.

Improvements along the southern boundary include for pedestrian/cycle route. This will promote cycle and pedestrian arrival to and from the site, a dedicated permeable link is provided immediately within the southern boundary along the Dublin Road.

Environmental Impacts of Alternative Layout B

The introduction of single storey age friendly housing along with the creche is considered to provide more housing choices within the area. While the introduction of the creche provides support to the future community as well as the existing community in the area.

The relocation of the vehicular access creates a safer access route into the site and reduces the dominance of cars throughout. However, it is still considered to have a potential conflict with the adjacent neighbours on the opposite side of the Dublin Road. The provision of accesses into the west of the site also enable better connectivity with the existing neighbourhood.

The use of green belt lands to provide for infiltration and SuDS measures is considered to be detrimental to the zoning and protection of the green belt lands.

Alternative C



Figure 2.15: Alternative C Site Layout Plan submitted as part of the pre planning meeting request documentation.

Main vehicular entrance is relocated further to the west, immediately abutting the industrial zoned land. This access point straddles both the industrial and warehousing zoned lands and enables the application site to provide a shared access development road for both sites. This will provide 303 no. units at a density of c. 35 uph.

A 15 metre set back is provided between the adjacent H1 zoned lands and the proposed scheme.

A green buffer of 15-17 metres is included along the south-eastern boundary to provide a development set back from the green belt land. This maintains the open nature of the site from the Curragh and Dublin Road. Additional tree retention is achieved by keeping the existing clusters of mature trees on this boundary.

The public open space to the south of the site is intentionally located next to the greenbelt to amalgamate these lands further maximising open space in the development.

The creche and age friendly housing complex are centrally located at the heart of the development to create friendly, safer streets which are low trafficked. This location provides an opportunity for the future creche occupier to avail of informal playground areas in the central open space.

Environmental Impacts of Alternative Layout C

The relocation of the proposed vehicular entrance, providing access to both the residential and future industrial site is safe and provides activity at this junction.

The siting of the age friendly housing and creche take advantage of the large area of public open space proposed in the northern half of the site, while are appropriately designed to maintain the openness of views to and from the Curragh.

The retention of existing tree belts and the omission of any engineering features within the green belt land is considered to be a significant improvement.

As a result this site layout was put forward to Kildare County Council as part of the LRD Pre-application Meeting Request.



Alternative D

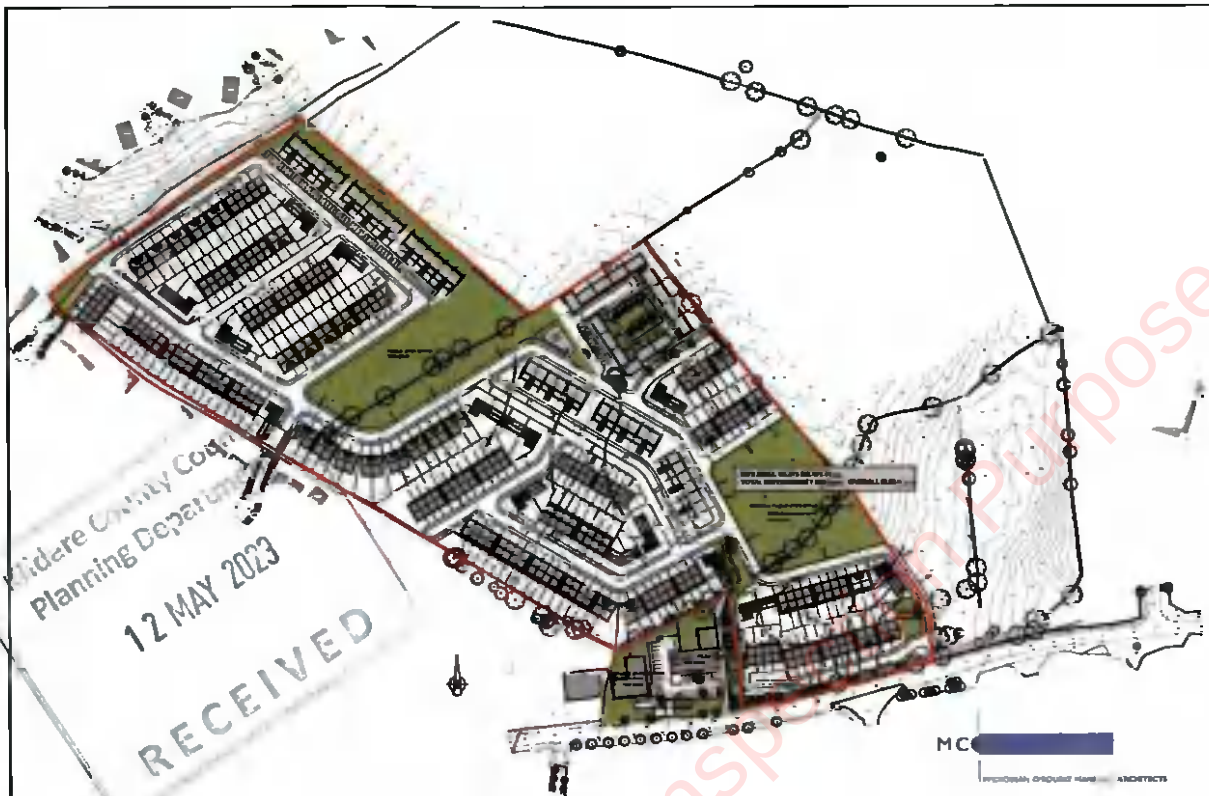


Figure 2.16: Alternative D Site Layout Plan relocating the creche (Source: MCORM Architect's)

Alternative D site layout plan reflects the feedback from Kildare County Council during the LRD meeting. KCC sought the relocation of the creche and age friendly housing closer to the Dublin Road. They also requested that additional SuDS features are included within the development, along with improved connectivity to the surrounding area. This will provide 300 no. units at a density of c. 34 uph.

The design team created this iteration which included the redevelopment of the H1 zoned lands. This land would provide for a creche and play area as well as retail and office space. However, a creche facility was not considered appropriate for this site.

Environmental Impacts of Alternative Layout D

This design was not an ideal situation for the design team as the team believed the creche and age friendly housing should remain together. The two uses would go hand in hand and offer active passive surveillance for elderly residents.

It also did not make best use of this H1 zoned land, which is a scarce resource, nor did it provide for the appropriate buffer required between the residential land and the commercial land as required in the Development Plan.

Alternative E



Figure 2.17: Alternative E Site Layout Plan (Source: MCORM Architect's)

Layout E was designed following guidance from the Kildare County Council LRD Opinion. Various issues were raised in the Opinion however Sustainable Urban Drainage Systems (SUDs) was the most prevalent throughout. The design team collaborated to ensure nature-based suds drainage strategy formed part of the overall site design and layout while also ensuring a high quality urban design was achieved throughout. The aim of this alternative layout was to incorporate high-quality biodiversity and landscaping while addressing architectural and engineering concerns from the LRD Opinion. This will provide 304 no. units at a density of c. 34.5 uph.

The age friendly complex is now relocated from the centre of the site to the front of the site closer to the Dublin Road entrance along with the creche. The relocation of the creche closer to the Dublin Road improves accessibility to neighbouring development which may avail of these services.

Pedestrian access points are indicated along the northern boundary of the residential development into Coolaghknock. In the future these pedestrian connections will be able to facilitate shorter walking distances to existing public transport corridors for the residents of this development.

Units 249, 266, 267, 229, 140 & 56 (shaded in orange) have been relocated on opposing sides of housing cells to ensure units are arranged more harmoniously on the site. The above wide fronted units were previously positioned side by side at slightly different angles at the end of housing cells. By relocating these wide fronted units at opposing sides of the housing cells the slight juxtaposition in the angles/positioning of units no longer occurs in the layout.

The main development entrance has been relocated further west. Relocating the entrance to this location provides for a more complete housing cell and improved frontage to the Dublin road. This new entrance location facilitates future shared access between the warehousing and industrial zoned lands and the residential development.

Pedestrian/vehicular links have been provided to the western boundary of the application site to Ruanbeg Avenue. Proposed engineering road & footpath levels will be designed to facilitate this connection.

A pumping station has been located within the proposed scheme along the western boundary in accordance with feedback from Irish Water. The pumping station is in accordance with Irish Water standard 15 metre clearance rule and no closer than 15m to neighbouring properties.

Environmental Impacts of Alternative Layout E

This design was considered to be nearly perfect, however the full extent of the SuDS elements were not fully realized. The location of the site access, age friendly accommodation and creche, and linkages into the neighbouring estates were considered to achieve all of the ambitions of both KCC and the design team.

Alternative F - Chosen Layout



Figure 2.18: Alternative E Site Layout Plan (Source: MCORM Architect's)

Layout F was designed following a second pre-application consultation meeting with KCC and following the production of the Draft LAP 2023 – 2028. The proposal also incorporates additional upgrade works to the Irish Water network. This will provide 295 no. units at a density of c. 33.4 uph.

The most prevalent change to this design is the inclusion of a new significant nature based management area on the western boundary. This management area resulted in the repositioning of

the pumping station further to the north and the omission of additional residential units to accommodate same.

Along the eastern boundary, additional space has also been created to enable the retention and enhancement of the existing tree and hedge boundary.

All other connections through to the existing neighbouring areas and location of the age friendly accommodation and creche have been retained as permitted.

Environmental Impacts of Alternative Layout F

The inclusions of the additional nature based management area provided a significant gain in terms of meeting the SuDS strategy for the site. The additional space on the eastern boundary provided a benefit to the biodiversity and ecology in the area.

2.8 Alternative Processes

The subject site is zoned predominantly C1 – New Residential which includes a range of permissible uses, as outlined in section 2.4. Many of these permissible uses would result in similar uses to the site as proposed in this development. The Permitted in Principle uses include: *Childcare/Creche/Playschool, Dwelling unit, Park/Playground, Playing Fields, Residential Development.*

The elements which are open for consideration under this zoning include *Community Hall, Cultural Uses/Library, Fire Station, Guest House/Hostel, Hotel, Halting Site, Health Centre/Clinic, Medical and related consultancy, Nursing Home, Place of Worship, Pub, Recreational Buildings, Restaurant, School, Shop (Convenience), Sport/Leisure Complex, Tourist camping/caravan park, Utility Structures.* These would result in different processes on site.

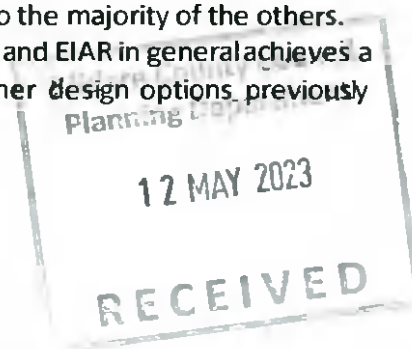
However, as discussed in section 2.4, the proposed residential and childcare uses along with the appropriately located open space and planting areas are considered the most appropriate uses for the subject site. This residential use is in line with the County Development Plan and Local Area Plan for the area. Therefore, it is not considered appropriate to assess other processes in the context of the EIAR.

2.9 Summary Table of Alternative Designs and Environmental Impacts

A comparison of the environmental effects of each of these alternative layouts is shown in table 2.5 below. This table compares the operational effects of each alternative on a variety of environmental factors. Each option is compared to the others and are assessed as follows:

- ✓ Is for those that are considered to have a more positive impact than others
- = 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 compared to the majority of the others.

It is considered that the chosen design as per this planning application and EIAR in general achieves a better result in terms of impact on the environment than the other design options previously considered.



	A	B	C	D	E	F
Population and Human Health	✓	✓	✓	=	=	=
Biodiversity	✓	X	✓	=	✓	✓✓
Soils and Geology	✓	=	=	=	=	=
Hydrology	✓	X	✓	=	✓	✓✓
Air and Climate	✓	=	=	=	=	=
Noise and Vibration	✓	=	=	=	=	=
Traffic and Transportation	X	X	X	✓	✓	✓
Waste Management	✓	=	=	=	=	=
Material Assets	=	=	=	=	✓	✓

Table 2.5: Comparison of effects

The chosen layout provides an attractive urban edge to the Dublin Road. It also provides additional linkages to the west and north. The site will enable the delivery of significant Irish Water infrastructure which will not only benefit the proposed development but also the existing developments in the surrounding areas.

The provision of a nature based management area for water to the western boundary will support not only the sustainable surface water strategy for this development but the future development of the wider area.

This chosen layout will create a strong sense of place, improve legibility and permeability, and create a new local attractive public open spaces for the existing community. While at a higher density than the surrounding areas the proposed development is in accordance with current national and regional policies for compact urban growth.

In terms of population and human health, it is noted that the key benefits of this development, above the other similar schemes, is the increased provision of age friendly housing and creche space located in an appropriate location.

In terms of Biodiversity the retention and enhancement of the existing eastern boundary as well as the significant increase in planting of native species throughout the development, in conjunction with the ponds to support SuDS will result in a significant win in terms of environmental development.



3. Description of Development

3.1 Introduction

This section of the EIAR has been prepared by McGill Planning Ltd. with input from the project design team. The section describes the nature of the proposed development in accordance with the requirements of the relevant EIA legislation and guidance on preparation and content of EIAR.

3.2 Receiving Environment

The subject site is greenfield and currently used for agricultural purposes. The southern, northern and eastern boundaries comprise mature vegetation, dense trees, and hedgerow of varying quality. The western boundary consists of a row of trees and a wall separating the site from the private gardens of the adjacent housing estate. Two hedgerows divide the site in an east/west direction.

The site is c. 1km east of Kildare Town Centre, c. 8km west of Newbridge Town Centre, 19km west of Naas, and 19km east of Portarlinton. It is bounded to the north by Coolaghknock housing estate and to the west by the Ruanbeg housing estate. Dublin Road R445, Heffernan Tyres Limited, and one detached house, bound the site to the south.

The site is not located within a Conservation Area or Architectural Conservation Area and there are no protected structures/monuments on site or within the vicinity of the site. There are no Tree Protection Orders on the site.

As set out in chapter 2, the site falls predominantly within land zoned C New Residential in both the current LAP 2012-2028 and the draft LAP 2023-2029. A small L – Shaped area of the site, falls within the H zoned lands to the south, which allows for Industry and Warehousing and requires a planted buffer to be provided to separate the two uses.





Figure 3.1 Site location and context

3.3 Characteristics of the Proposed Development

The proposed development consists of a Large Scale Residential Development and planning permission is sought for a period of five years.

The development description as set out in the statutory notices is below:



SITE NOTICE

Kildare County Council

LARGE SCALE RESIDENTIAL DEVELOPMENT

MRP Oakland Limited intend to apply for permission for a Large-Scale Residential Development at this site of c.10.3ha on lands at "Ruanbeg" within the townlands of Kildare and Collaghknock Glebe, Kildare Town, Co. Kildare. The development lands are located to the north of the Dublin Road (R445), east/northeast of Heffernan Tyres and Ruanbeg Manor Estate and southeast of Coolaghknock Estate. The application site includes for works along the R445 and at Ruanbeg Park and Ruanbeg Avenue.

The proposed development will comprise the construction of 295 no. residential units along with a two storey creche facility measuring c.472.7sqm. The residential units will include:

- 15 no. single storey, semi-detached/terraced houses (12 no. 1-beds and 3 no. 2-beds) provided as "age-friendly housing".
- 206 no. two storey, semi-detached/terraced houses (10 no. 2 beds, 160 no. 3 beds, 36 no. 4 beds).
- 74 no. three storey duplexes/apartments (37 no. 2 beds, 37 no. 3 beds) arranged within 6 no. blocks.

All residential units will be provided with associated private gardens/balconies/ terraces facing to the north/ south/ east/ west.

New vehicular and pedestrian/cyclist accesses will be via Dublin Road (R445) and Ruanbeg Avenue and a pedestrian only access via Ruanbeg Park, with upgrade to existing public road as necessary.

All associated site development works, including 571 no. car parking spaces (including EV parking), 236 no. cycle parking spaces, public and communal open spaces, landscaping, SuDs features, boundary treatments, plant areas, waste management areas/bin stores, and services provision (including ESB substations, pumping station) are also proposed.

An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development.

The planning application together with the Environmental Impact Assessment Report and Natura Impact Statement may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of Kildare County Council, Áras Chill Dara, Devoy Park, Naas, Co. Kildare, during its public opening hours or on their website www.kildarecoco.ie. The LRD application may also be inspected online at the following website set up by the applicant: www.ruanbeglrd.ie.

A submission or observation in relation to the application and Environmental Impact Assessment Report and Natura Impact Statement may be made in writing to the Planning Authority on payment of the prescribed fee, €20, within the period of 5 weeks beginning on the date of receipt by the authority of the application, and such submissions or observations will be considered by the Planning Authority in making a decision on the application. The Planning Authority may grant permission subject to or without conditions or may refuse to grant permission.

Signed: *Brenda Butterly*

Brenda Butterly (Agent), McGill Planning Limited, 22 Wicklow Street, Dublin 2



Residential

The proposed development is to build 295 no. residential units, of which 15 no. will be age friendly units. The breakdown of the mix of units will include:

	Age friendly units	Duplex apartments	Houses	Total	%
1 bed	12	0	0	12	4%
2 bed	3	37	10	50	17%
3 bed	0	37	160	197	67%
4 bed	0	0	36	36	12%
Total	15	74	206	295	100%

All the houses or duplex apartments provided are dual aspect and they all have private open space to the front or rear.

The age friendly units are provided in a roughly square shaped block around a centralised courtyard. There are 15 no. age friendly units in total.

The houses are two storey and are either semi-detached or terraced. There are 44 no. semi-detached houses, 79 no. mid terrace houses, 4 no. end of terrace houses and 79 no. semi-detached/ end of terrace houses.

There are 6 no. blocks of duplex apartments. These are 3 storeys in height and provide a mix of 2- and 3-bedroom units.

Additional Facilities

In addition to the residential units, the proposed development also provides a stand-alone creche measuring c.472.7sqm. This creche can accommodate 19 no. staff and 87 no. children. This also accommodates staff and pupils' car and cycle parking and an area of outdoor playspace for the children.

Communal Facilities

Two areas of communal open space are provided within the development. The first is within the courtyard associated with age friendly accommodation and measures 403sqm. The second is within the northern block of duplex units, to their east and measures 1162sqm.

Site Development Works

The proposal includes a range of associated site development works, drainage and infrastructural works, servicing (including substations, bin stores), landscaping, open spaces, and boundary treatment works.

The proposal includes for the delivery of a new pumping station in the north west section of the proposed development. This has been sized in line with requirements from Kildare County Council and Irish Water so that it can not only accommodate the proposed residential units associated with this development but also the existing surrounding estates and any future developments that may need to connect with it.

New water services infrastructure works are also proposed as part of the development along the Dublin Road. These will upgrade the existing infrastructure and also provide new pipework along the Dublin Road.

An area of the site has been set aside as a nature based management area to accommodate the surface water pathways modelled in the draft local area plan.

The proposal will also deliver a new cycle track outside of the application site on the Dublin Road.

Layout and Design

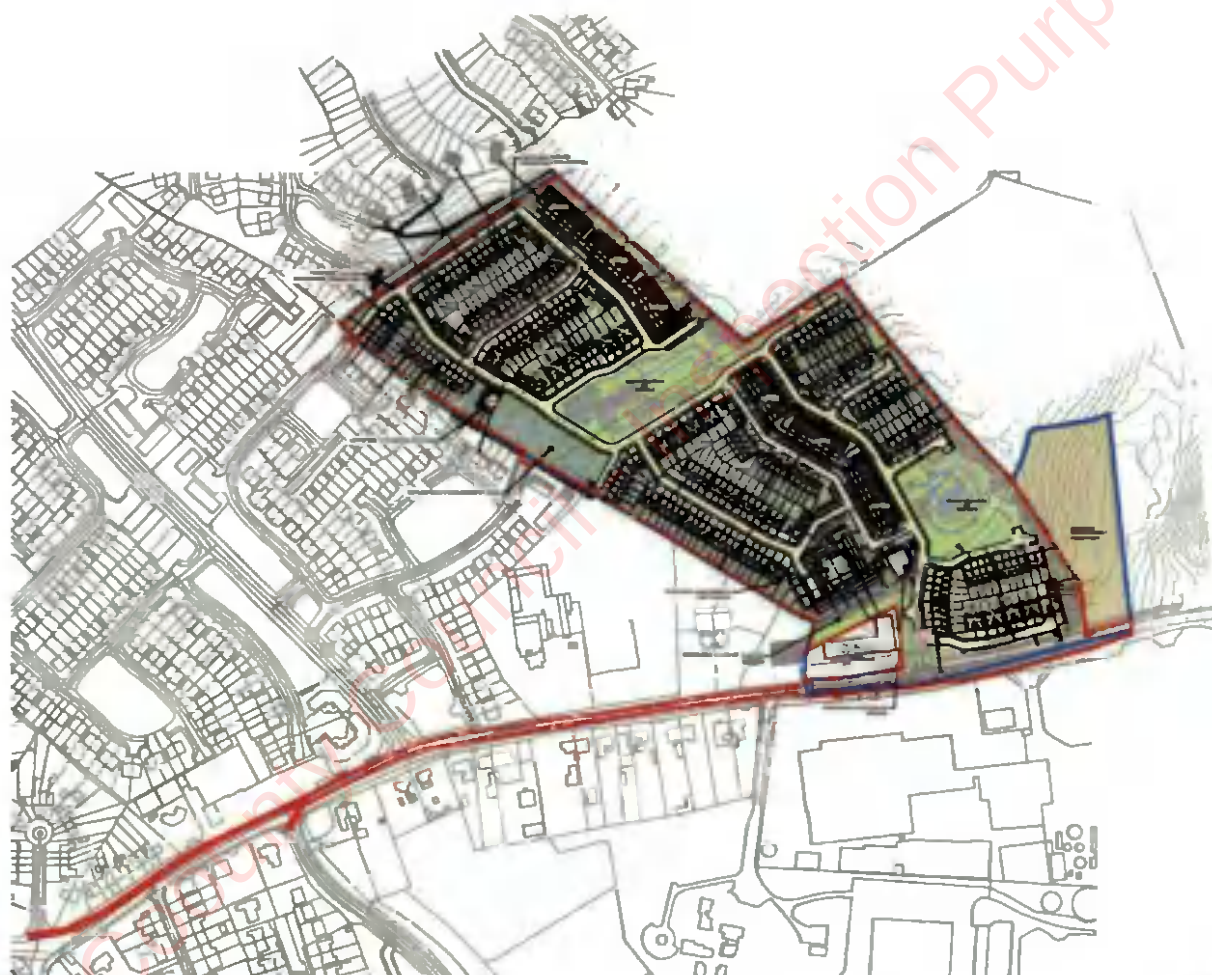


Figure 3.2 Site Layout Plan





Figure 3.3 Character areas

The proposed development is set out two character areas, both of which have a mixture of house types. Character area A is to the south of the site fronting onto the Dublin Road. It is proposed to set the houses back from the Dublin Road to retain the openness of the road and also enable the provision of cycle tracks. There is a large area of public open space in the centre of this area, as well as additional planting to the east along the Curragh Buffer Zone and to the south between the site and the commercially zoned lands. The materials and finishes of the proposed residential units will be designed to a high architectural standard. The materials and finishes have also been considered with regard to the surrounding existing pattern of development.

The creche and age friendly accommodation are located within Character Area A, close to the Dublin Road but set back from it to ensure the safety of the children for drop off and pick up times and also the residential enjoyment of the occupants of the age friendly housing in a quieter location.

The northern end of the site, character area B, again has a mixture of house types, with the exception of age friendly housing. This area provides connections through to the existing estates to the west, while it brings the connections to the boundary of the site in order for connections to the north being delivered in the future subject to agreement with the landowner. This area also provides for a large area of public open space which is designed as a circus, reflecting its position adjacent to the Curragh race track.

The buildings have been located to sensitively reflect the existing neighbouring properties in terms of height and preventing any loss of amenity to the existing properties in terms of privacy or light.

Access and Parking

The site is an accessible site close to Kildare Town Centre. The proposal is for the inclusion of 571 no. car parking spaces which equates to 1 no. car parking spaces per 3 and 4 bedroom unit, 1.5 spaces for

each duplex unit along with 1 spaces for each age friendly unit. In addition to these parking spaces visitor parking is provided throughout. The parking is provided either on curtilage for the houses or in parking courts to the front.

All of the houses can provide cycle parking within their curtilage. In addition to there are 236 no. cycle parking spaces throughout the development. This includes 12 no. spaces for the creche, 38 no visitor spaces for the duplex units and then 186 no. spaces for residents of the duplex units which equates to 1 per bedspace.

The landscaping plan, along with various residential amenities and open spaces have been located to ensure ease of pedestrian movement through the site following desire lines and enabling clear legibility within the site.

3.4 Predicted Impacts and Mitigation Measures

Construction Phase

This section of the EIAR summarises the construction of the proposed development. The Construction and Environmental Management Plan submitted separately in the planning application, and the Resource and Waste Management Plan should also be consulted.

Hoarding, Site Set-up and Formation of Site Access/Egress

The contractor shall be responsible for overall management of the site for the duration of the proposed works and will progress their works with reasonable skill, care, diligence and to proactively manage the works in a manner most likely to ensure the safety and welfare of those carrying out construction works.

The first activity to be carried out at the site will be the establishment of site facilities and security. It is anticipated that site establishment works will take approximately four weeks. The site office and welfare facilities will be confirmed in advance of the commencement of site works and agreed with KCC.

All areas of construction will be fenced / hoarded off to prevent unauthorized access. This fencing shall remain closed at all times during construction works and closed and locked after construction work hours / break times. This fencing shall be erected in accordance with good practice and the Construction Regulations 2013. Fencing arrangements shall be reviewed as the life of the project progresses.

Access/Egress to site for site operatives and visitors shall be via biometric gates. Site security fencing/ Hoarding up to a height of 2.4 M will be erected in line with the Construction Regulations 2013 that will clearly separate the work site from the surrounding public. It is not envisaged that the fencing will impinge upon the safe passage of pedestrians during the construction phase.



Site Clearance

The development will result in the removal of some of the existing vegetation and soil. However, any of the high quality trees will be retained and root protection barriers will be put in place to ensure their safety.

A Construction and Environmental Management Plan has been prepared and submitted with this application and will guide the site clearance.

Construction Traffic and Site Access

The proposed construction vehicle routes for the site will require a traffic management plan to be agreed upon with KCC prior to site workings beginning. Two-way traffic will be maintained throughout the project. Advanced warning signs will be placed at sufficient distances to taper off the entry and exit points. Pedestrian marshals will be used as and when required. Traffic management will be undertaken for the site works in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Department of Transport Traffic Signs Manual 2010 – Chapter 8 Temporary Traffic Measures and Signs for Roadworks
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Any additional requirements detailed in Design Manual for Urban Roads & Streets (DMURS)

Construction traffic operation would be limited to 0800 to 1800 from Monday to Friday and 0800 to 1400 on Saturday for the off-road construction. These times may vary to facilitate specific site requirements and/or construction activities associated with the site. Any variation will be discussed and agreed in advance with KCC.

Car Parking Arrangements

Parking of construction workers vehicles will be limited to the site within the site compound. To minimise congestion, a Construction Traffic Management Plan will be developed by the Contractor to ensure that construction workers access the site using alternative means of transport (i.e. public transport) to negate/minimise any impacts on the local network. This Construction Traffic Management Plan will be developed in line with the mitigation measures outlined in the CEMP submitted with this application and the mitigation measures in Chapter 11 of this EIAR.

Working Hours & Staff

Site development and building works will only be carried out between the hours of 0800 to 1800 Mondays to Fridays inclusive and between 0800 and 1400 hours on Saturdays. There will be no construction works carried out on Sundays or public holidays. Deviation from these times will only take place when written approval is granted by KCC in exceptional circumstances.

Lighting

Construction work will generally be confined to daylight hours and lighting will generally not be required for the construction phase. There will however be occasions where the provision of portable

lighting will be required (works on roadways and powerfloating floors as examples). Where possible and without jeopardising site safety lights will be pointed down at a 45-degree angle and away from sensitive receptors. The site compound will have external lights for safety and security. These lights will be pointed down at a 45-degree angle and away from sensitive receptors where possible. All construction lighting will be turned off each evening and at weekends to reduce the potential impact.

Deliveries

Material deliveries and collections from site will be planned, scheduled and staggered to avoid any unnecessary build-up of construction works related traffic.

Deliveries to site shall be booked in advance using a delivery schedule, so as to prevent lorry congestion on the road networks surrounding the site. Alternative safe routeways shall be established for traffic and pedestrians where existing routeways have to be altered, removed or worked on during the project.

Disposal of water, wastewater and sewage

Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering into any water courses as no construction will be undertaken directly adjacent to open water.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry.

Air Quality

There is the potential for a number of emissions to the atmosphere during the construction stage of the project. In particular, activities may generate quantities of dust. Construction vehicles, generators etc., will also give rise to some exhaust emissions. Vehicular movements to and from the site will make use of existing roads.

The potential for dust to be emitted depends on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

In order to ensure that no dust nuisance occurs, a series of measures are proposed under the Chapter 9, the Dust Management Plan in Appendix 9.3 and the CEMP accompanying the application. Hard surface roads shall be swept to remove mud and aggregate materials from their surface. Furthermore, where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser. Vehicles delivering material with dust potential both on and off the site shall be covered with tarpaulin to ensure minimise dust emissions.

All vehicles exiting the site shall make use of a wheel wash facility, if required, prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads. Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

The dust management plan shall be implemented as outlined in Chapter 9 and Appendix 9.3 of this EIAR and 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.

Further information on the dust minimisation plan is included in Chapter 9.

Operational Phase

It is anticipated that the primary direct significant environmental effects will arise during the construction stage. Once the development is completed, and mitigation measures employed, it is expected to operate without creating any significant additional environmental impacts. The range of anticipated activities, materials/natural resources used, effects/emissions are not expected to result in a significant impact on the constituent environmental factors. The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in the EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated. There is also the potential for cumulative, secondary and indirect impacts (for instance traffic) but are unlikely to be significant and have been addressed in the EIAR.

The proposed development at operational stage will be predominantly a residential development with a creche. The expected use of energy and water would be in line with normal household uses. This is the same situation for the creche operation. There is no single use proposed that has an excessive or unusual demand in terms of energy and water as a result of this development. Once the development is completed and is operational there will be no additional uses of the material or natural resources such as land or soil. The biodiversity of the site will be improved due to the new landscaping proposed as part of the development.

3.5 Changes, Secondary Developments and Potential Cumulative Impacts

The potential for the specific proposed development as described to grow is considered to be limited within the residential area. The potential for the duplex apartments to expand or increase in scale is limited to the confines of the permission sought and new planning permission will be required for further extensions to the blocks.

The houses could have an extension to the rear or an attic conversion. If there was an extension to the rear proposed it could potentially remove the bioretention features proposed within the garden area. The loss of these small areas, while an attractive feature within the development, would not impact on the surface water of the overall SuDS strategy throughout the development.

The potential for increased age friendly accommodation or creche use within those blocks would be subject to further planning permissions.

Committed Developments within the Wider Area

The surrounding area has seen significant development in recent years and numerous residential developments have received planning permission in recent years.

The completion and current development of the following sites are noted in the table below.



12 MAY 2023

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Map No.	Address	Company Name	Units Permitted	Res Units Commenced 2017 -2023	Site Area (HA)	Zoning Kildare LAP 2012-2018	Zoning Kildare Draft LAP 2023	Planning Ref
1	Former Magee Barracks	Ballymount Properties Ltd.	375	51	11.35	Z: Regeneration	T: Mixed Use	ABP 305007
2+4	Southgreen Road	Eurkon (Kildare) Ltd	245	94	7.67	C1: New Residential Phase 1	C: New Residential, B: Existing Residential/Infill, E*:Community and Education	181028
3	Greyabbey Nursey Road	Greyabbey Investments Ltd.	207	207	10.2	C1: New Residential Phase 1	C: New Residential	17523
5	South Green	Makros Ltd.	187	187	9.17	C1: New Residential Phase 1	B1: Existing Residential/Infill	17764
6	Rathbride Road	Tameric mManagement Consultants	15	14	0.52	C1: New Residential Phase 1, B: Existing Residential	B: Existing Residential/Infill	171271
7	Junction of Priest Lane And Chapel Lane	Kevin & Geradline Doyle	7	7	0.15	B: Existing Residential	B: Existing Residential/Infill	19209
8	Black Millers Hill Rathbride Road	Kelland Homes Ltd.	74	74	3.11	C1: New Residential Phase 1	B: Existing Residential/Infill	20159
9	Tameric House Tully Road	Shane Nevin	6	6	0.09	C1: New Residential Phase 1	B: Existing Residential/Infill	20339
10	Curragh Road (R445) Leinster Walk	Sonlee Properties Ltd. (Padraig Leeson)	3	3	0.1408	B: Existing Residential	B: Existing Residential/Infill	191401 & 181438
11	Loughlin	Soreze Developments Ltd.	64	53	2.948	C1: New Residential Phase 1	B: Existing Residential/Infill, E*: Community and Education	181033
12	Coolaghknock Glebe. Melitta Road	Renson Ltd.	7	7	0.28	B: Existing Residential	B: Existing Residential/Infill	19539
14	Newtown Cross Roads	Quattur Ventures Ltd.	11	11	1.12	C1: New Residential Phase 1	B: Existing Residential/Infill	18617
15	Tully Road	Kelland Homes Ltd. (Kelly family)	21	21	0.5	C1: New Residential Phase 1	B: Existing Residential/Infill, small portion zoned F: Open Space and Amenity	19284 & 15653
16	Rathbride Road	Kelland Homes Ltd. (Kelly family)	33	33	1.7	C1: New Residential Phase 1	B: Existing Residential/Infill, small portions zoned F: Open Space and Amenity	161227
18	Rathbride Road	Sonlee Properties Ltd. (Padraig Leeson)	4	4	0.15	B: Existing Residential	B: Existing Residential/Infill	18334 & 16942
19	Rathbride Road	Garyaron Homes Ltd.	14	14	0.62	B: Existing Residential	B: Existing Residential/Infill, small portions zoned F: Open Space and Amenity	17371
21	Rathbride Road	Sonlee Properties Ltd. (Padraig Leeson)	7	7	0.396	B: Existing Residential	B: Existing Residential/Infill, small portion zoned F: Open Space and Amenity	17597
22	Dublin Street & Meadow Road	Masonbrook Holdings Ltd.	37	37	0.75	A: Town Centre	A: Town Centre	161091
			1317	830				

Future Development

Any future planning applications relating to the development will be assessed separately and are outside the scope of this EIAR.

3.6 'Do Nothing' Scenario

The site remains undeveloped as a greenfield agricultural site.

3.7 Worst Case Scenario

The site gets partially completed and is a ghost estate. This can be mitigated against through the use of appropriate conditions and security bonds requiring the developer to complete in line with the proposed development.

3.8 Monitoring & Reinstatement

Not applicable

3.9 Difficulties in Compiling Information

There were no difficulties in compiling this information

3.10 References

None applicable



4. Population and Human Health

4.1 Introduction

This chapter addresses the impacts of the proposed Large-scale Residential Development on population and human health. This chapter has been prepared by Trevor Sadler, who is the director of McGill Planning Limited, has worked for 20 years as a Town Planner in Ireland. Trevor has a Master's in Urban and Regional Planning from University College Dublin. McGill Planning Limited, has carried out numerous EIAR's, EIA Screenings and S299B and C assessments. They have also been involved multiple Strategic Housing Developments, Large-scale Residential Development as well as Strategic Development Zones and regular planning applications in recent years.

The following guidance was used in the preparation of this chapter:

- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment (European Union, 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2002)
- United States (US) EPA Health Impact Assessment Resource and Tool Compilation (US EPA 2016);
- Institute of Public Health in Ireland (IPHI) Health Impact Assessment Guidance (IPHI 2009).
- IEMA's Health in Environmental Impact Assessment: a primer for a proportionate approach

4.2 Methodology

Population

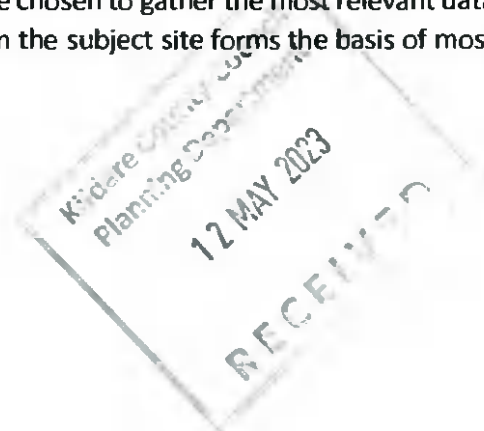
To establish the existing receiving environment/baseline for the subject site, the methodology included site visits to evaluate the location and likely significant potential impact upon the human population in the area.

Desk based study included an analysis of the Central Statistics Office Census (CSO) data, the ESRI Quarterly Economic Commentary, and national, regional and local planning policy, and school and creche enrolment figures.

Different local catchment areas were established for analysing population data, creche demand and capacity, and school demand and capacity. These areas were chosen to gather the most relevant data for each factor. A general local catchment area of 1km from the subject site forms the basis of most areas of analysis.

The following datasets were used during the survey:

- 2011 CSO Statistics
- 2016 CSO Statistics
- 2023 Google Maps
- Kildare County Council website
- Department of Education
- HSE Facilities



- Pobal
- Information from schools in the area.
- Kildare Town Social Infrastructure Audit (January 2023)

Human Health

To establish an existing baseline of the human health of the area, desk-based study including an analysis of the Central Statistics Office Census (CSO) data was undertaken. As referenced in the Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála, (taken from the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (2017)), human health is:

"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."

The WHO (World Health Organization) also define health as

"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

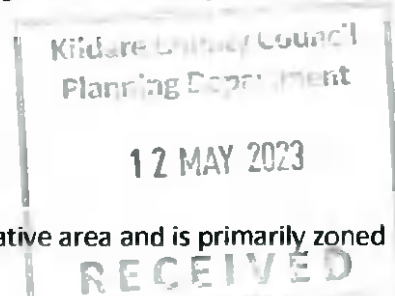
4.3 Receiving Environment

Land Use and Settlement Pattern

The subject site is located within Kildare County Council administrative area and is primarily zoned 'C New Residential'.

The objective of zoning 'C New Residential' is 'to provide and improve new residential areas and for associated local shopping and other services incidental to new residential development'. In particular, the site is zoned C1 and therefore is designated to be included within the first phase of new residential development for Kildare Town. The LAP notes that Phase 2 lands will not be eligible for development until such a times as Phase 1 plans are developed appropriately, Section 8.1.1 of the LAP provides further guidance on the phasing of lands.

A small proportion of the application site along the southern boundary is zoned 'H Industry and Warehousing', the objective of this zoning is 'to provide for and improve industrial and warehousing development.'



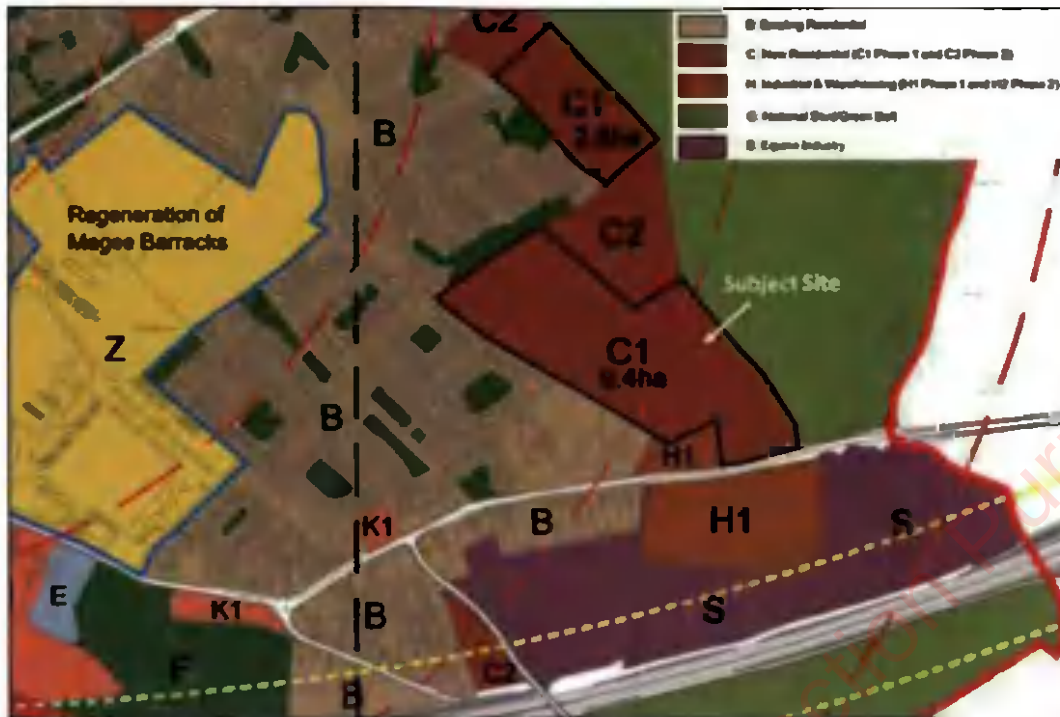


Figure 4.1: Kildare Town LAP 2012-2018 Land Use Zoning

As set out in chapter 2 a Draft LAP has been published for public consultation. This is at early stages in the process, but it is important to note that the zoning of the site remains unchanged.

Population

For the purpose of this population analysis a local catchment area was selected to include the Electoral Divisions (EDs) within 1km of the subject site. This area is shown in Figure 4.2 and will be referred to as the Local Area. The EDs were chosen as a basis of analysis as, unlike the Small Area boundaries, the ED boundaries have remained unchanged and therefore can be used to compare population changes over time.





Figure 4.2: ED boundary



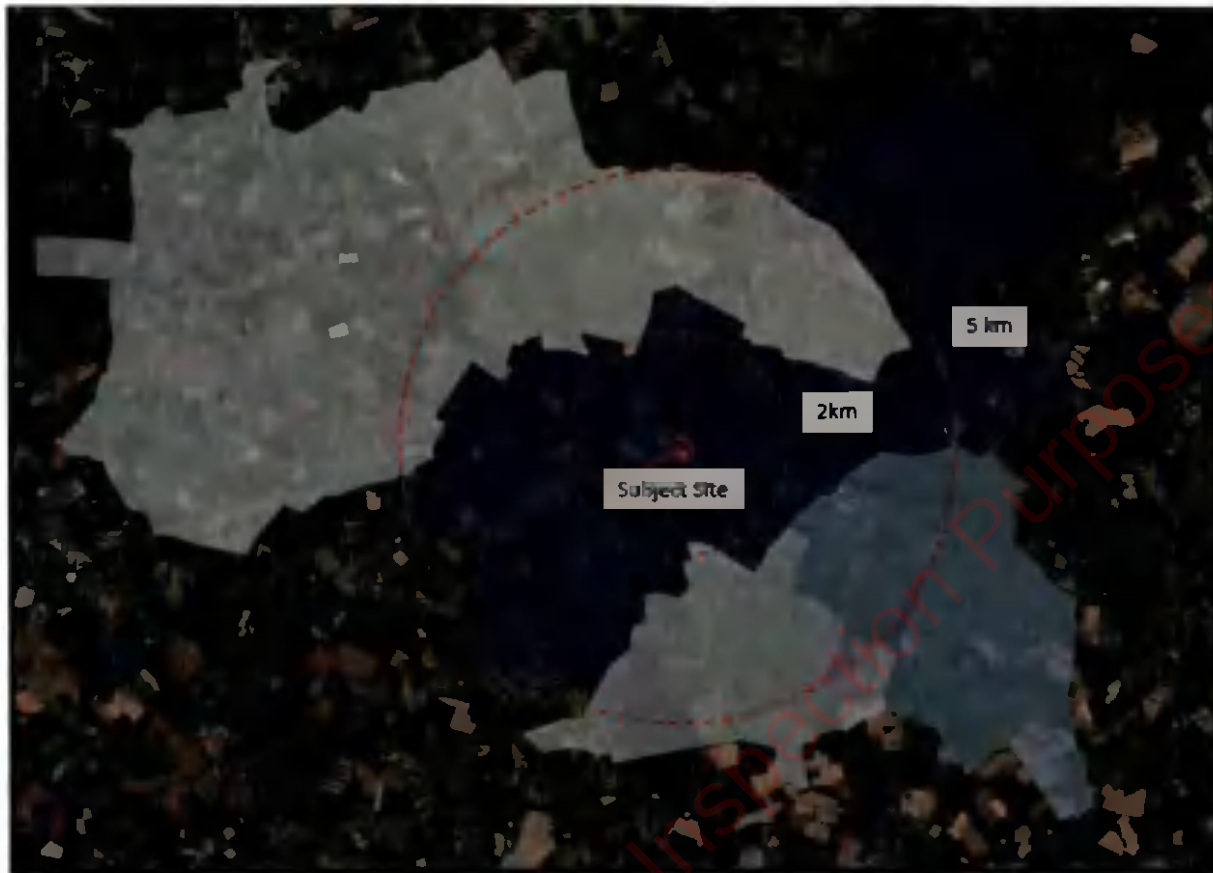


Figure 4.3: ED boundaries of the wider area

The subject site is located within the 'Kildare' electoral division, which had a population of approximately 9,874 people at the time of the 2016 census. There was a c.5.89% increase in the population between the 2011 and 2016 Census.

Level	Name	2011	2016	% Change
Electoral Division	Kildare	9,325	9,874	+5.89%
County	Kildare	210,312	222,504	+5.8%

Table 4.1: Electoral Division and County CSO population data

For the purpose of a demographic assessment, the local catchment area will consist of just the Kildare ED as the entire subject site and 1km buffer are within its boundary.

Age Profile

As set out above approximately 9,874 no. people were living within the Local Area at the time of the 2016 Census, an 5.89 % increase on the 2011 population.

The local area has seen a decrease in the preschool age group (0-4) by -14.11% whereas both the primary (5-12) and post primary (13-18) age groups have increased since 2011. The primary school age group has increased significantly by 19.62% and post primary by 9.53%. Young adults (19-34) has also decreased by 12.17% which may indicate that young professionals are out-migrating for third level education or employment opportunities elsewhere. There is an increase in adults (35-64) age group of 13.28% and a 28.07% increase for 65+ adults.

2011 Population	2016 Population	Population Change 2011-2016	Percentage Change 2011-2016
9325	9874	549	5.89%

Table 4.2: CSO ED Census data

Age	2011	2016	Change	Percentage Change
0-4 Pre-school	900	773	-127	-14.11%
5-12 Primary School	1157	1384	227	19.62%
13-18 Post Primary	766	839	73	9.53%
19-34 Adults	2350	2064	-286	-12.17%
35-64 Adults	3404	3856	452	13.28%
65+ Adults	748	958	210	28.07%

Table 4.3: CSO Census Data - ED Age Groups

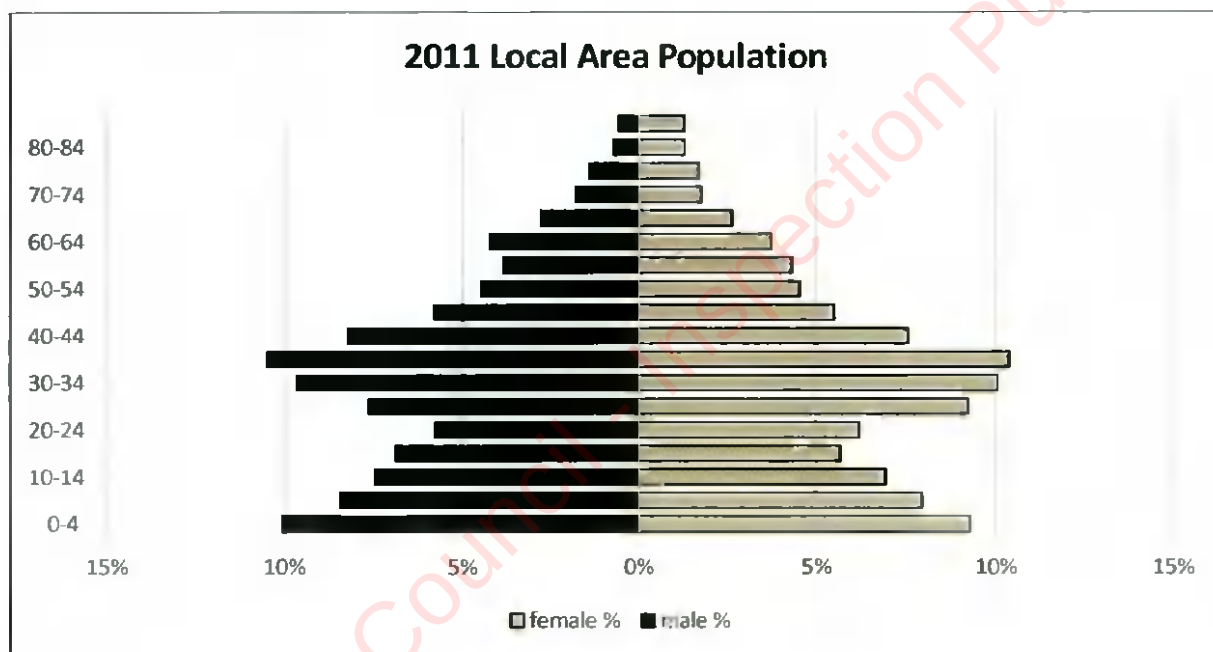


Figure 4.4: Population Pyramid for the 2011 Local Area Population



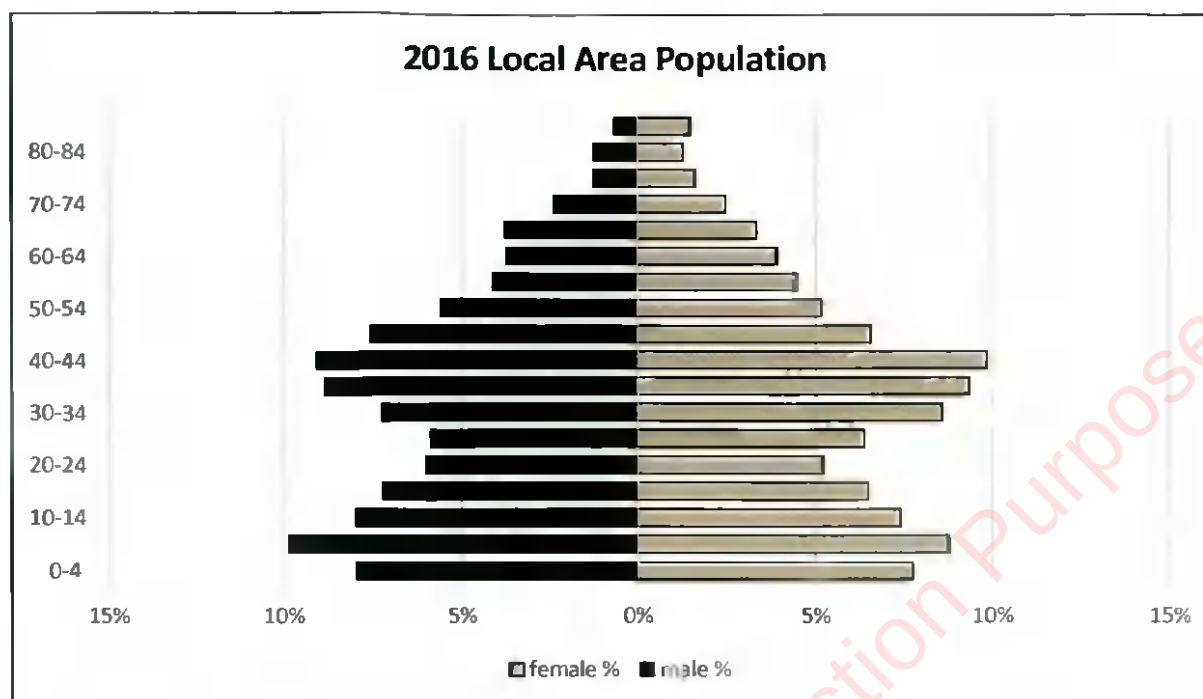


Figure 4.5: Population Pyramid for the 2016 Local Area Population

Employment

The CSD's Quarterly Labour Force Survey provides information in relation to national employment levels, unemployment levels and current labour force participation rates. While the Covid-19 pandemic significantly impacted the employment and unemployment levels since March 2020. Therefore, slightly adjusted measures were produced to ensure transparency around the impact of Covid-19 on the labour market. These figures were not consulted within this section as Covid-19 is no longer an ongoing issue. The unadjusted data for Q4 2020 and Q4 2021 is consulted to determine a comparison with Q4 2022.

ILO Economic Status Ireland	Q4 2020	Q4 2021	Q4 2022	Annual Change	
All Persons				2021-2022	%
In Labour Force	2,445,100	2,633,300	2,686,500	53,200	2.02%
In Employment	2,306,200	2,506,000	2,574,500	68,500	2.73%
Unemployed	138,900	127,400	112,000	-15,400	-12.09%
Not in Labour Force	1,546,600	1,411,800	1,473,300	61,500	4.36%
Total Persons aged 15 or over	3,991,700	4,045,100	4,159,800	114,700	2.84%
Unemployment Rate %	5.7%	4.9%	4.2%		

Table 4.4: Labour Force Survey Q4 2020, 2021 and 2022 (standard methodology). Source: CSO

Within the local catchment area, 40.8% of the population aged 15 and over are in work. This was determined from data collected based upon ones 'principal status'. See Table 4.5 below which provides a breakdown of those 'at work', 'retired', 'looking for first regular job' etc.

Principle Economic Status	2011	2016	Change
At work	3,584	4,031	+447
Looking for first regular job	78	91	+13
Unemployed having lost or given up previous job	954	693	-261
Student	666	736	+70
Looking after home/family	696	634	+62
Retired	672	800	+128
Unable to work due to permanent sickness or disability	330	408	+78
Other	15	32	+17
Total	6,995	7,425	+540

Table 4.5: Primary Status of population in Kildare electoral division according to the census

Kildare ED had a population of 4,031 at work, according to the 2016 census. This was an increase of 447 since 2011. The unemployment rate decreased by 261. The largest industry was commerce and trade employing 1,118 people in 2016. It had grown by 139 since 2011. The only industry that decreased in employment was public administration.

There was a significant increase by 128 in retired individuals which could be a sign of an aging population. The area would benefit from increased inward migration of younger families to add to the work force.

Industry	2011	2016	Change
Agriculture, Forestry and Fishing	224	245	+21
Building and Construction	142	189	+47
Manufacturing Industries	366	451	+85
Commerce and Trade	979	1,118	+139
Transport and Communication	226	274	+48
Public Administration	324	289	-35
Professional Services	630	720	+90
Other	663	745	+82
Total	3,584	4,031	+447

Table 4.6: Populations at work by industry in Kildare electoral division

Retail, Community & Cultural Facilities

A desktop survey of the existing retail and community services within 1200m and 2km of the proposed development was assessed. The key retail areas are identified in blue in figure 4.6 (numbered 1-16) and are listed in Table 4.7.

The nearest shops are on the Curragh Road leading into Kildare Town Centre. These provide access to most services including a range of shops, pharmacies, supermarkets, medical centres, post offices and restaurants/cafes. This is a c.12-15 minute walk from the subject site. At the western end of Kildare Town Centre is Kildare Village which is a significant comparison retail/outlet store destination.



Figure 4.6: Retail Facilities within 1200m and 2km of the subject site

No. on Map	Retail Facilities	Location	Distance
Retail Centres			
1.	Kildare Village	Kildare, Nurney Road	c. 2km
2.	Dublin Street and Market Square	Dublin Street and Market Square	c. 1.55km
3.	Cleamore Road	Cleamore Road	c. 1.8km
4.	Fairview Cottages	R401, Fairview Cottages	c. 1.7km
5.	Kildare Business Park	Melitta Rd, Whitesland East	c. 1.2km
6.	Curragh Road	R445, Curragh Road	c. 1km
Retail Stores			
7.	Lidl	Curragh Rd, Dublin St	c. 1.15km
8.	Dealz	Dublin Rd	c. 1.25km
9.	Smak	R415, Kildare	c. 1.6km
10.	Croi na Follaine	R415, Kildare	c. 1.55km
11.	ALDI	Grey Abbey Rd	c. 1.7km
12.	Tesco Superstore	Monasterevin Rd	c. 2km
13.	Centra Bretts Kildare Town	Melitta Road	c. 1.3km
14.	Dunmurry Store	Dunmurray Rd, Bishopsland,	c. 2km
15.	Centra Junction 13	Junction 13, Nurney	c. 2.3km
16.	Guilfoyles Garden Centre	Grey Abbey Rd	c. 2.35km

Table 4.7: Retail Facilities within a 2km buffer distance of the subject site

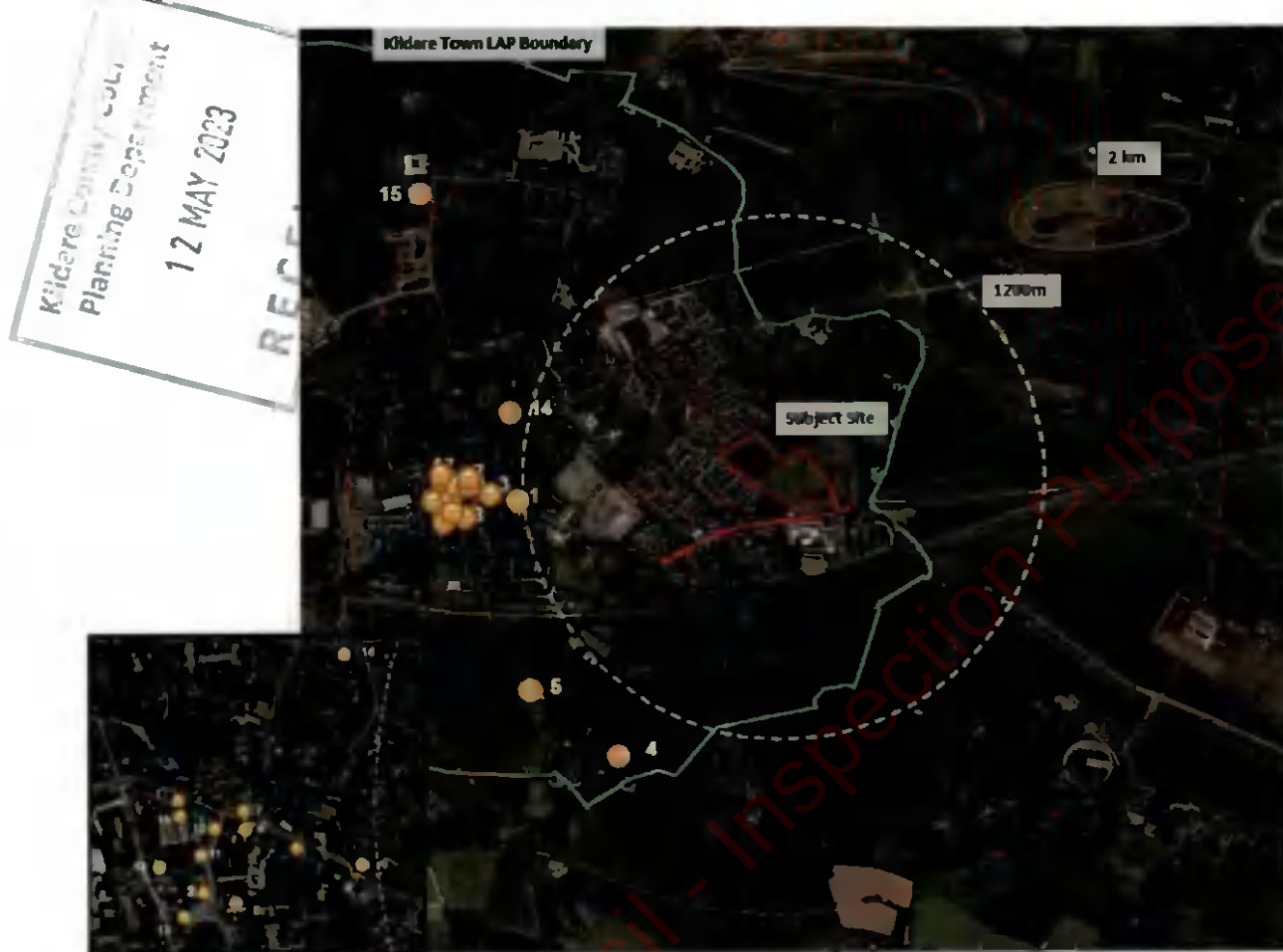


Figure 4.7: Cultural and Community Facilities within a 2km buffer distance of the site

No. on Map	Cultural & Community Facilities	Location	Distance
1.	Kildare Garda Station	Dublin St	c. 1.2km
2.	Kildare Day Care Centre	Bride St	c. 1.5km
3.	Kildare Town Youth Hub	Dublin St	c. 1.3km
4.	Irish Racehorse Experience	Brallistown Little, Tully	c. 1.5km
5.	Solas Bhríde Centre	Tully Rd, Brallistown Little	c. 1.55km
6.	Bank of Ireland	The Square	c. 1.4km
7.	Kildare Town Tourist Office and Heritage Centre	Market Square	c. 1.4km
8.	St. Brigid's Parish Catholic Church	Bride St.	c. 1.4km
9.	St. Brigid's Cathedral & Round Tower	Market Square	c. 1.45km
10.	Kildare Tourist Office	Bride St	c. 1.45km
11.	Kildare Credit Union Limited	Bride St	c. 1.45km
12.	Teach Dara	Academy St	c. 1.55km
13.	CMWS Hall Kildare	Saint Brigids Square	c. 1.5km
14.	Kildare Mens shed	Campion Cres, Kildare	c. 1.25km
15.	St. Conleth's Graveyard	Bishopsland	c. 2.1km
16.	Kildare Town Library	Claregate St	c. 1.5km

17.	Kildare Post Office	Claregate St	c. 1.5km
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Table 4.8: List of Cultural and Community Facilities within a 2km buffer distance of the site

Leisure and Recreation

A large range of recreational and leisure facilities are in Kildare Development Area. Racing Academy and Centre of Education (RACE), Fox Covert Stables, CMWS Hall Kildare, Pilates Studio Kildare, North Kildare Reapers American Football Club and St. Fiachra's Garden are all located within a c.25-minute walking distance from the proposed development. Each primary and post-primary school have their own sports facilities and outdoor recreational space.

The Curragh Racecourse is located just outside of the Kildare Town development area. It is the largest racecourse in Ireland and is visible from the proposed development site. It is complimented by Racing Academy and Centre of Education (RACE) which is a 3-minute walk from the proposed site and offers training in horse racing.



Figure 4.8: Leisure and Recreational Facilities within a 2km buffer distance of the site

No. on Map	Leisure and Recreation	Location	Distance
1.	Racing Academy and Centre of Education (RACE)	Curragh House, Dublin Rd	c. 240m
2.	The Curragh Racecourse	Newbridge	c. 1.2km
3.	McDonagh Pitch & Putt Club	McDonagh Barracks, Curragh Camp	c. 3.7km
4.	The Curragh Walk	Curragh Chase	c. 4km
5.	Fox Covert Stables	Melitta Rd, Collaghknock Glebe	c. 800m
6.	St. Fiachra's Garden	Brallistown Little, Tully	c. 1.3km
7.	Japanese Gardens	Brallistown Little, Tully	c. 1.6km
8.	Play Area Kildare Village	Kildare Village, Greyabbey	c. 1.95km
9.	Round Towers GAA	Old Road	c. 1.8km
10.	Kildare Athletic Club	Old Road	c. 1.6km

11.	Gym Dog	Kilcumney House, Southgreen Rd	c. 2.15km
12.	St.Brigid's Boxing Club Kildare Town	Melitta Rd, Whitesland East	c. 900m
13.	Kildare Town AFC	Rathbride Rd, Cloghgarrett Glebe	c. 1.9km
14.	Pilates Studio Kildare	14 Claregate St, Kildare	c. 1.6km
15.	CiDS Gymnastics	Academy St, Kildare	c. 1.65km
16.	CMWS Hall Kildare	Saint Brigids Square	c. 1.55km

Table 4.9: List of Leisure and Recreational Facilities within a 2km buffer distance of the site

Childcare and Healthcare Facilities

Based on the data available online through Pobal, there are 6 no. childcare facilities operating within 2km of the subject site. These are listed in the table below. MCG Planning contacted Kildare Childcare Committee for further information on childcare facilities within the surrounding area. The childcare committee confirmed that "there are no vacancies for the 0-3 year age groups, and waiting lists are in operation" within Kildare Town.

The Kildare Childcare Committee provided the design team with a detailed letter outlining statics from a survey carried out by Pobal in May 2022, which concludes that "In Kildare town, as of May 2022, there was a significant demand for childcare places for young children, with waiting lists also in operation. This is based on data from the Pobal early years sector profile."



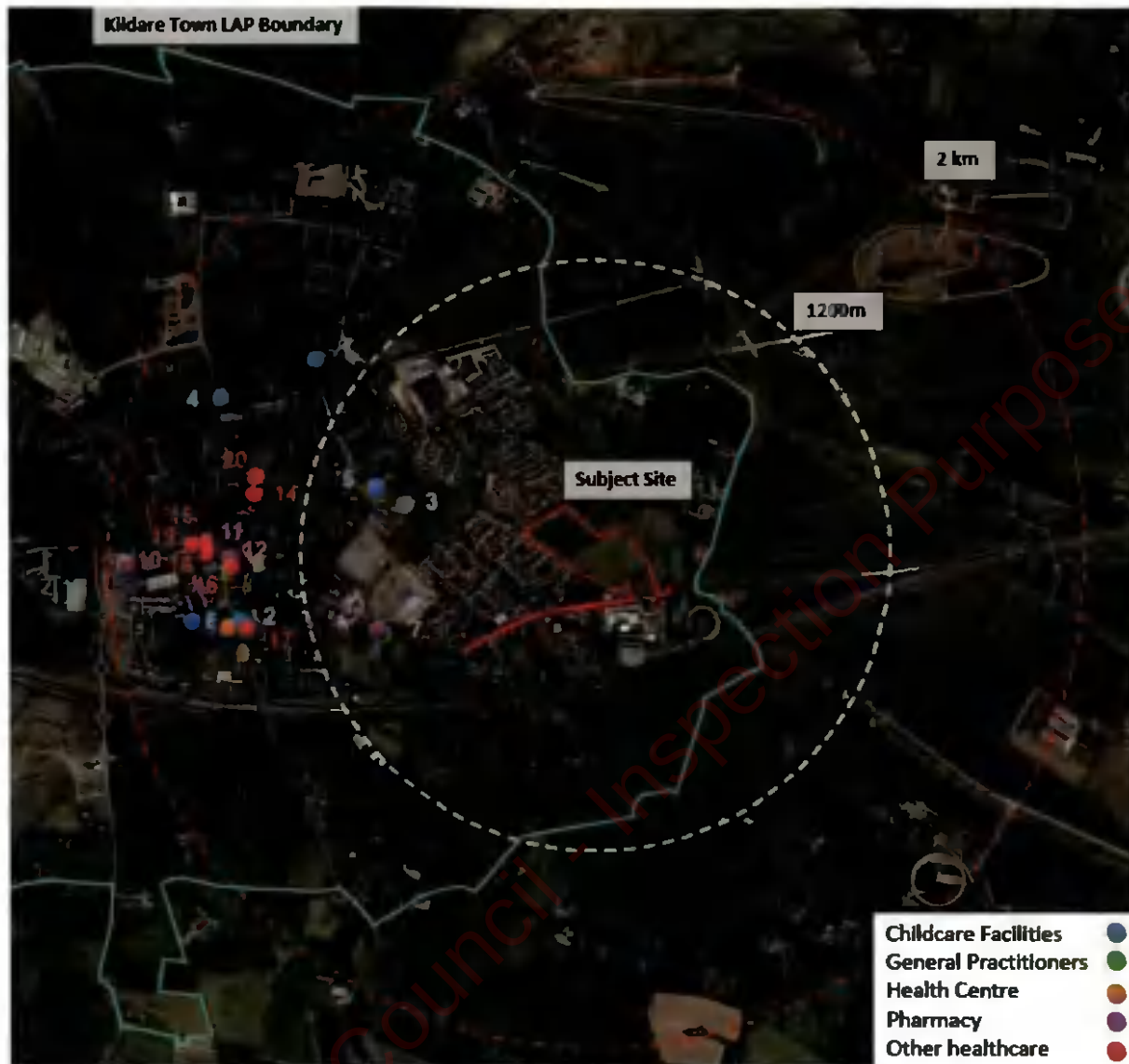


Figure 4.9: Childcare and Healthcare Facilities within a 2km buffer distance of the site

No. on Map	Childcare Facilities	Location	Distance
1.	Toad Hall Childcare	11 Curragh Finn, Whitesland East	c. 1.4km
2.	Kildare Village Little Stars	Tully Rd	c. 1.4km
3.	Naíonra Uí Shionnaigh Teoranta	Melitta Rd	c. 800m
4.	Bright Beginnings (Dunmurray)	Dunmurry Ct, Bishopsland	c. 1.65km
5.	Child's Play Early Education	Melitta Rd	c. 1km
6.	Bright Beginnings (St. Brigid's)	Grey Abbey Rd	c. 1.65km

Table 4.10: List of Childcare Facilities within a 2km buffer distance of the site

A total of 21 health facilities were identified in throughout Kildare Town comprising of one Primary Healthcare Campus (including Health Service Executive, a General Practitioner Surgery, and a Pharmacy), three General Practitioners (GPs), two Dentist Practices, three Physiotherapists, one Optician and Hearing Centre, three Nursing Homes, five Pharmacies and four other Specialist Services which provide mental health services for adults, a service for intellectual disability, an infant health service and an acupuncturist.

The table and map below demonstrate the accessibility of the site to a wide range of healthcare facilities within 1km and 2km of the site. The closest hospital is Naas General Hospital (W91AE76), c.19km away or 19 minutes drive. The average distance to an Emergency Hospital from the Kildare Electoral Division is 10 - <25km.

No. on Map	Healthcare Facilities	Location	Distance
General Practitioners			
7.	Kildare Medical Centre	Old Hospital Street, Curragh Road	c. 900m
8.	Kildare Family Practice	Bride St	c. 1.45km
Health Centre			
9.	Kildare Health Centre	Tully Road, Kildare	c. 1.45km
Pharmacies			
10.	Kildare Pharmacy	Monasterevin Road	c. 1.85km
11.	Whelan's Pharmacy	Claregate Street	c. 1.5km
12.	Connolly's Pharmacy	The Square	c. 1.45km
13.	Whelan's Pharmacy	Primary Care centre, Dublin Rd	c. 890m
Health Consultant			
14.	Zing True Health Clinic	Saint Jude's, Station Rd	c. 1.35km
Physical Therapy			
15.	The Waterfall Clinic	Claregate St	c. 1.55km
16.	Kildare Physiotherapy	Bride St	c. 1.45km
17.	MDC Physiotherapy Ltd.	Ounavarra, Tully Rd	c. 1.4km
Opticians			
18.	Kelliher Opticians	Claregate St	c. 1.6km
Dental Care			
19.	Kildare Dental Centre	Claregate St	c. 1.6km
20.	Fairgreen Dental	Fairgreen Court, Station Rd	c. 1.4km

Table 4.11: List of Healthcare Facilities within a 2km buffer distance of the site

Schools

Desktop research of the schools in the area was carried out using the available information from The Department of Education and other mapping sources. A 5km catchment area was chosen on the basis for examining the schools in relation to the subject site. This 5km catchment area is recommended within the Kildare County Development Plan 2023-2029 under objective SC070:

"Require social infrastructure audits to be submitted with development proposals to outline up to date capacity and enrolment figures of schools within the catchment (10-20 minute walk/cycle) of the proposed development noting that Second Level Schools serve a wider catchment and as such, the assessment of these should include schools within a 5km radius or otherwise agreed by the Planning Authority."

Within this catchment area there are four primary schools and two post-primary schools. The locations of these schools are shown in Figure 4.10. The Department of Education provides enrolment information for all primary and post primary schools in the country. The 2022/2023 enrolment figures for the schools within 5km of the subject site are shown in the Table 4.12 below. MCG Planning Limited also wrote to all of the schools to confirm these enrolment figures. The total combined enrolment for primary schools for the academic year 22/23 is 1,749 students and 1,191 for post primary students.



Figure 4.10: Primary and Post Primary Schools within 5km of the Subject Site

Primary Schools						
No. on Map	School Name	Address	Enrolment 22/23		School Capacity	School Response
			Boys	Girls		
1.	Kildare Town Educate Together National School	Melitta Road	203	235	450	Yes
2.	Gaelscoil Mhic Aodha	Bóthar Mhelitta	101	112	215	No
3.	St. Brigid's Primary School*	Kildare Town	468	492	1,066	Yes
6.	St. Catherine of Sienna	Curragh Camp	60	78	150	Yes
Enrolment for Primary Schools 22/23 within 5km of the subject site			832	917	1,881	-
Estimated primary school capacity			132 no. Primary School Students			

Post Primary Schools						
No. on Map	School Name	Address	Enrolment 22/23		School Capacity	School Response
			Boys	Girls		
5.	Curragh Community College **	Mcswiney Road	100	96	196*	Yes
4.	Kildare Town Community School	Dunmurray Rd	505	490	1,000	Yes
Enrolment for Post Primary Schools 22/23 within 5km of the subject site			605	586	1,196	-
Estimated Post Primary School Capacity			5 Post Primary School Students* 279 no. post primary spaces in 2024/2025 804 no. post primary spaces in 2028/2029			

Table 4.12: List of Primary and Post Primary Schools within 5km of the Subject Site

*St. Brigid's Primary School confirmed that the maximum capacity for the primary school is 1,066 pupils however the schools' notes that their numbers are always in flux and currently rising due to new housing within Kildare Town.

**Curragh Community College is currently located at McSwiney Road, Curragh Camp for the academic year 2022/23. In the academic year 2024/25 this post primary school will be in situ at McGee Barracks Site, adjacent to Ruanbeg with 475 students. It is expected that by the academic year 2028/2029 the numbers will have reached 1,000 no. students and that will be intake number for every year thereafter. There is space for an additional 279 no. space in 2024/2025 and 804 no. spaces in 2028/2029 once this new site is fully open.

There is also a further education centre and education support centre within the town to serve the local area and more of the county. These include the Further Education and Training Centre in Kildare Town, Kildare Education Support Centre and the National Association of Boards of Management in Special Education.

Health

Human Health is a very broad factor and is interrelated with climate and air quality, water quality, the noise environment, access to nature, mobility and accessibility, and human connections. The World Health Organization defines "health" broadly as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".

The 2016 census records the self-evaluation general health status of respondents. Results from the 2016 census indicated that 58.4% of the local area identified themselves as being of "Very Good" health. This is similar to that of the State's population with 59.4% identifying as being of "Very Good" health. According to data, the highest percentage of the population of the local area identified themselves as being of "Very Good" health, and the lowest percentage of the population identified themselves as being of "Very Bad health".

General Health	Local Area	State
Very Good	58.4%	59.4%

Good	28.1%	27.6%
Fair	8.2%	8.0%
Bad	1.7%	1.3%
Very Bad	0.3%	0.3%
Not Stated	3.3%	3.3%
Total	100%	100%

Table 4.13: General Health Results for the State and Local Area (Source: CSO Census 2016)

The surrounding context of the site consists of a mix of residential, community and amenity related land uses including the Greenbelt to the east and the Curragh. Therefore, it is not expected that future residents of the scheme will suffer from poor levels of air quality or noise levels from surrounding activities. The surrounding area also does not include any man-made industrial sites or activities (including SEVESO II Directive sites) that would be likely to result in a risk to human health and safety.

Access to nature has biological, mental, and social benefits to people. There are a number of parks within the vicinity of the subject site. For instance, The Curragh is located to the north east of the site and is open to the public to walk around and enjoy the green spaces. These existing, accessible public spaces, along with the proposed open spaces in the development will provide opportunities for residents to recreate and to connect with adjoining communities in the area.

4.4 Characteristics of the Proposed Development

The proposed development consists of a Large-Scale Residential Development with residential units, a creche, age friendly housing, and open space.

A detailed development description is included in Chapter 3 of this EIAR and in the statutory notices.

4.5 Potential Impacts

Impacts on Business and Residences

Construction Phase

The development in the short term (5 years maximum) will provide for construction related employment during the different phases of development, with additional spend in the local shops, restaurants etc.

Businesses directly involved in the construction phase of the development will generate value and secure direct employment which in turn will contribute to the overall GDP of the economy and tax revenues at national level. The construction of the proposed development is therefore likely to have a moderate positive effect on the local employment and economic activity too. Through additional spending, this positive impact will be temporary through the construction phase.

Operational Phase

The proposed development will provide 295 no. of residential units and considering the national household size of 2.7 people this development will likely generate a population of c. 797 when fully occupied.

Considering the number of people in employment in the local area (54%), it can be expected that c.430 of the population generated will be working. The proposed creche will also bring employment to the area, it is estimated that c.19 people would be employed in the creche.

This increase in the local employment population will contribute positively to local businesses and amenities, while also improving the vibrancy and vitality of the area and the community. This will have a positive permanent effect on Business and Residences.

Impacts on Air Quality and Climate

Construction Phase

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM₁₀ and PM_{2.5} emissions. There are a number of high sensitivity receptors bordering the site to the west and north. 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.

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Operational Phase

Traffic related air emissions have the potential to impact air quality which can affect human health. 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. It can be determined that the impact to human health during the operational stage is long-term, neutral and imperceptible and therefore, no mitigation is required. These effects are discussed in further detail in Chapter 9 - Air Quality and Climate.

Impacts on Retail and Community Services

Construction Phase

During the construction phase, the local retail and community services will be temporarily negatively impacted by construction noise, traffic and dust. Although negative, this impact will be minor and will only continue for the construction period. The local retail and community services will also be positively impacted by increased spending in the area by construction workers.

Operational Phase

The local population increase that will be generated by the proposed development will support the existing retail and community facilities in the area.

Impacts on Human Health

The European Commission's Guidance on the preparation of the Environmental Impact Assessment Report states at footnote no. 2

'Human health is 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.'

It is clear from this broad definition that human health is interrelated with many factors which are addressed in separate EIAR Chapters. The relevant potential impacts from those chapters are summarised below.

Construction Phase

The construction phase of the proposed development may give rise to short term (less than 5 years) impacts to the locality such as

- increased construction traffic including the hauling of building materials to and from the proposed development site
- increased surface contaminants,
- increased exposure to dust and exhaust emissions,
- increased exposure to traffic and construction noise, and
- increased littering.

Operational Phase

The operational stage of the development is unlikely to cause any adverse impacts on the existing and future residents of the locality in terms of human health, and in fact, the development is likely to positively impact the wellbeing of residents. The design of the development has been formulated to provide for a safe environment for the future residents and visitors alike. The paths, roadways and public realm have been designed in accordance with the best practice and applicable guidelines. All open areas have been designed to be inviting, safe and conveniently located. The landscape design is made up of natural play areas and communal open spaces.

When complete the proposed development will increase the permeability and walkability of the site by providing safe and inviting pedestrian and cycling connections off Dublin Road to the south, through the site into Ruanbeg housing estate. Connections are also provided to the boundary of Coolaghknock to the north to enable future connection between these sites. This will make walking and cycling an attractive transport mode and will encourage people to walk and cycle, which will in turn increase daily physical activity and improve people's health.

Chapter 11 Traffic and Transportation notes the proposed development will generate a number of trips by various modes of travel including vehicular, pedestrian, cycle and public transport. These trips may have an impact on the surrounding road network and could contribute to increased congestion.

Chapter 8 Noise and Vibration states that once the development is operational, the potential noise impacts to the surrounding environment are minimal. The residential aspect of the development is

not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing etc.) and hence no significant impact is expected from this area of the development site.

Impacts on Childcare

Construction Phase

There are no childcare facilities within 500m of the site. However, during the construction phase, the childcare facilities may be temporarily impacted by construction noise, traffic and dust. Although negative, this impact will be minor and will only continue for the construction period.

Operational Phase

The proposed developments projected need for childcare spaces has been based on the local demographics, the quarterly national household survey, and national guidelines.

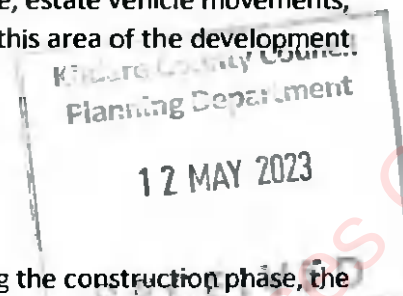
The Childcare Facilities Guidelines for Planning Authorities (2001) provides a standard of one childcare facility with a minimum 20 childcare places per approximately 75 dwellings. This would require a childcare facility of c. 78 no. childcare spaces for the proposed development.

The 2022 Guidelines on Design Standards for New Apartments note that the threshold for the provision of childcare facilities *'should be established having regard to the scale and unit mix of the proposed development and the existing geographical distribution of childcare facilities and the emerging demographic profile of the area'*. It also notes that *'one-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms'*

Based on the average household size of 2.7 persons, the estimated population of the proposed development when complete is c. 797 no. (295 no. units*2.7 household size). Based on the local demographic analysis above, it is estimated that c. no.56 of this population will be aged 0-4 (7% of 797 people).

As noted above, not all children in the 0-4 age cohort require private childcare. The Quarterly National Household Survey (QNHS) indicated that in the Mid-East region only 14% of pre-school age children attend private childcare. Applying this percentage to the total estimate of children indicates that c. 8 no. childcare spaces are needed, assuming that each residential unit has children in the 0-4 age category.

The Apartment Guidelines recommend the exclusion of studio units and one bed units when calculating childcare demand. On this site it is reasonable to exclude the age friendly housing. When these units are excluded from the calculations, it is estimated that c. 53 no. children aged 0-4 would be in the development. When the QNHS proportion is included for the no. of children attending childcare would be estimated at 7 children. The above calculations are summarised in the table below. The table also includes a scenario in which 50% of the children would require private childcare, but this scenario is unlikely.



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Type of childcare	Pre-school children								
	North	Midland	West	Central	Mid-East	Mid-West	South-East	South-West	Total
Parent / Partner	45	45	45	45	45	45	45	45	45
Unpaid relative or family friend	15	15	15	15	15	15	15	15	15
Paid relative or family friend	5	5	5	5	5	5	5	5	5
Childminder / Au Pair / Nanny	13	13	13	13	13	13	13	13	13
Creche / Montessori / Play group / After-school hours	18	18	18	18	18	18	18	18	18
Other	1	1	1	1	1	1	1	1	1
Total pre-school children using non-parental childcare	45	45	45	45	45	45	45	45	45
Unweighted sample	120	120	120	120	120	120	120	120	1,072

Figure 4.11 Extract from Quarterly National Household Survey, 2016 Q4 Module on Childcare

The table below provides an overview of the expected childcare demand resulting from the 'Ruanbeg' development, as calculated in line with the above guidelines and local demographics.

	2001 Guidelines	Revised assessment in line with the Apartment Guidelines advice		
	All apartments	Without age friendly housing	Without Studios, 1 beds + 50% 2 beds	3 + beds only
Calculation based on 2001 Guidelines				
No. of units	295	280	255	233
2001 Guidelines (20 no. spaces/75 no. units)	79	75	68	62
Refined calculation based on population analysis as advised in the Apartment Guidelines				
Total Population generated (2.7 per household)	797	756	689	629
Population 0-4 (7% of Pop)	56	53	48	44
Quarterly National Household Survey 25% of all 0-4 year old				
Total Requiring Childcare (14%)	8	7	7	6
Worst case scenario total Requiring Childcare (50%)	28	27	24	22

Table 4.12 Estimated Childcare Demand from Proposed Development

Notwithstanding the above a creche is proposed as part of the development to provide for 87 childcare spaces, which will accommodate the full development and also provide capacity for the

wider area. On this basis the sizing of the creche is considered appropriate for the development. This will have a positive effect on population and human health as the proposed creche will accommodate for the 87 no. childcare spaces required which is more than the need generated by the development.

Impacts on Schools

Construction Phase

During the construction phase of development there will be minimal impact on the surrounding schools. There are no schools within 500m of the application site. If any school is impacted, it will be temporarily negatively impacted by construction noise and dust. However, any negative impact will be of short duration and will be mitigated appropriately.

Operational Phase

The 2016 census indicates the share of population in the Primary School (4-11) and Post Primary School (12-19) years. This percentage share was used to estimate the number of primary and post-primary school children the proposed development would generate.

An analysis of the 2016 Census information shows that the total population for the local area was 9,874 people, of which 1,384 were of primary school age (5-12) and 839 were of post-primary school age (13-19). This equates to approximately 14% of the population as primary school age and 8.5% as post-primary school age.

Local Area Catchment	Number of People	% Total 2016 Population
Primary School Age (5-11)	1384	14%
Post Primary School Age (12-19)	839	8.5%
Total 2016 Population	9874	22.5%

Table 4.13 Breakdown of 2016 Local Population

The national household size, according to the 2016 census, is 2.7 people. The proposed residential development contains 295 no. units and will have an expected population of c. 797 when mature. Using the percentages explained above, the estimated maximum primary school going population that would be generated by the development is c. 129 and c. 148 students for post-primary.

Projected School Aged Population of Development	Projected Population when Mature
Total Population	797
Primary School Age (5-11)	112
Post Primary School Age (12-19)	68

Table 4.14 Projected School Aged Population of Development

It is also noted that 15 no. of these units proposed are age friendly housing and are unlikely to have any children/ teenagers living in these units. When this is taken into account the projected school population is set out in the table below.

Projected School Aged Population of Development	Projected Population when Mature
Total Population	756
Primary School Age (5-11)	106
Post Primary School Age (12-19)	64

Table 4.14: Projected School Aged Population of Development excluding age friendly housing units

Furthermore, if in line with the Apartment Guidelines 2022 only half of the 2 beds are considered the total population of school aged children is further reduced.

Projected School Aged Population of Development	Projected Population when Mature
Total Population	689
Primary School Age (5-11)	97
Post Primary School Age (12-19)	59

Table 4.15: Projected School Aged Population of Development when considering only half of the 2 beds as per the Apartment Guidelines 2022

While any of these forecasts are equally valid, assuming the highest figures based on all the units proposed included in the school population forecast there is sufficient spaces in the existing schools based on data provided by the schools themselves to accommodate the proposed development.

Based on the assessment of the school capacity in the area, it is noted that there are at c. 132 no. spaces currently available at primary and c. 5 no. post-primary level currently. Regarding the post primary school figures, it is noted that Curragh Community College will be relocated and there will be spaces for 475 students by 2024/25. Furthermore, by the academic year 2028/2029 it is anticipated that there will be additional space for 1,000 no. students.

Therefore, it is considered that there will be sufficient capacity within the schools in the area to cater for the increased demand expected from the proposed development by the time of occupation.

We note that enrolment levels in schools change over time and national enrolment projections estimate decreasing enrolment numbers first at primary school and 5 years later at post primary school. These national projections are carried out by the Department of Education. This is likely to be reflected in the coming years in this ED area given the reduction in population of 0-4 years old in the 2016 by 14.11%.

The Department of Education published *Projections of Full-Time Enrolment Primary and Second Level 2020-2038* in November 2020 which outlined the results of 3 possible scenarios for the future enrolment in schools. Enrolment projections show that primary school enrolment numbers reached their peak in 2018 and that a continuous decline in enrolment until 2036 is expected. The projected enrolment for post-primary schools is not expected to peak until 2024 or 2025, which is then expected to be followed by a continuous decline until 2039.

It is noted that these national projections may not be precisely applicable to each local area, although as a general guidance they are informative. Following these projections, it can be assumed that the increase in primary school aged children caused by the development will be lower than the c. 112 children as projected above, at any one time.



Figure 1 Actual and projected enrolments in primary schools, 1989-2051

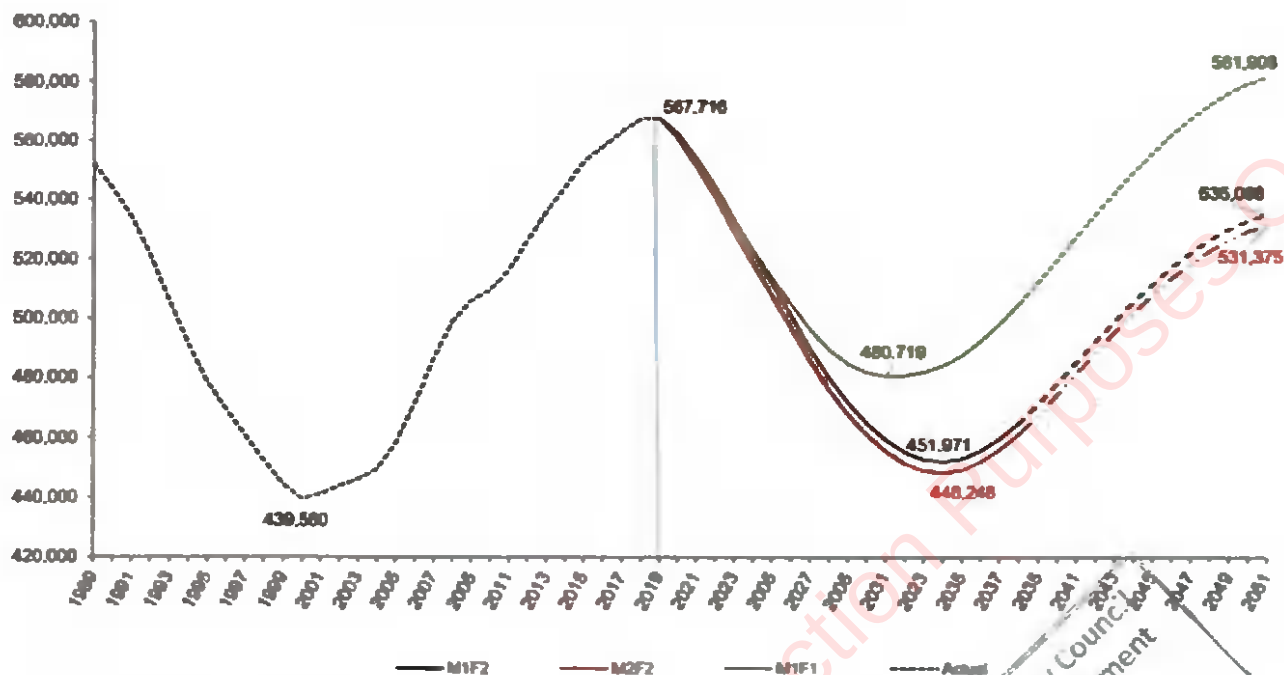


Figure 4.12 Projected Primary School Enrolment. Source: Dept. of Education

Figure 2 Actual and projected enrolments in post-primary schools, 1989-2051

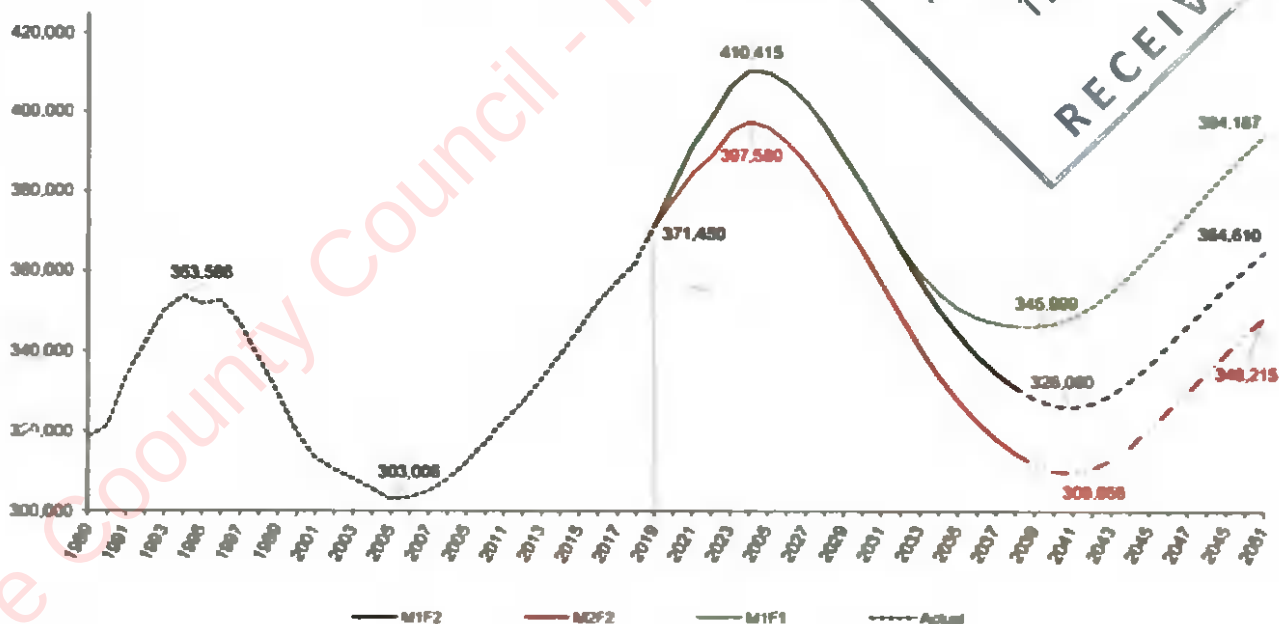


Figure 4.13 Projected Post-Primary Enrolment. Source: Dept. of Education

4.6 Potential Cumulative Impacts

Overall, the cumulative impacts of the proposed development on the population and human health are envisaged to be positive. The significant new population will contribute to the economic viability

of the area, increasing in spending and a range of new services and facilities and new open spaces will add to the viability and vibrancy of the area. The existing services and facilities will tap into the expanding population and invest more. Schools, Buses, shops etc. will benefit from the increase in population.

4.7 Mitigation Measures

Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared by Panther Ecology Limited and will be implemented during the construction phase to reduce the detrimental effects of the construction on the environment and local population and is submitted with this application.

Construction noise and vibration impacts are expected to vary during the construction/demolition/site clearance phase depending on the distance between the activities and noise sensitive buildings and that best practice control measures will ensure impacts at off-site noise sensitive locations are minimised. These are outlined in detail in Chapter 8.

Chapter 11 Traffic and Transportation and the CEMP submitted with the application include traffic management measures to minimise the impact of construction traffic.

These measures are put forward to avoid any significant negative environmental impacts on the population and human health. No additional mitigation measures are considered necessary.

Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through the provision of various physical and social infrastructure as part of the development as are outlined in Chapter 3 of this EIAR.

Chapter 9 Climate and Air Quality notes the proposal includes operational phase mitigation by design measures to minimise the impact on air quality and climate. These include efficient glazing, thermal insulation, and the inclusion of electric car charging points.

Chapter 11 Traffic and Transportation has been prepared for the proposed development with the aim of encouraging sustainable travel practices for all journeys. Increased sustainable travel practices will also reduce the negative impact of traffic emissions on the air quality.

No additional mitigation measures are considered necessary.

4.8 Predicted Impacts

Construction Phase

Any adverse likely and significant environmental impacts will be avoided by the implementation of the remedial and mitigation measures proposed throughout this EIAR.

Chapter 8 Noise and Vibration notes during the construction phase of the project there is the potential for short-term noise effects on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is



kept to a minimum as far as practicable. Likely noise and vibration effects during the construction phase will be local, negative, short-term and moderate.

Chapter 9 Climate and Air Quality notes that once the dust minimisation measures outlined in Chapter 9 and Appendix 9.2 are implemented, the impact of the proposed development in terms of dust soiling will be short-term, negative, localised and imperceptible at nearby receptors.

Chapter 11 Traffic and Transportation notes that provided the mitigation measures and management procedures outlined in the Construction Environmental Management Plan are incorporated during the Construction Phase, the residual impact upon the local receiving environment is predicted to be temporary in the nature and slight in terms of effect.

Positive impacts are likely to arise due to an increase in employment and economic activity associated with the construction of the proposed development.

The overall predicted likely and significant impact of the construction phase will be short-term, temporary and neutral.

Operational Phase

The proposed development will contribute to further growth and expansion of the neighbourhood contributing to the existing and future populations.

Chapter 8 Noise and Vibration notes that the predicted impact, once mitigation measures are implemented, of additional traffic, the mechanical plant, and the creche will be of neutral, imperceptible, and long-term impact.

Chapter 9 Climate and Air Quality notes that the air dispersion modelling has shown that emissions of air pollutants are 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.

Overall, the predicted impacts of the Operational Phase are considered to be long term and positive to population and human health.

4.9 'Do Nothing' Scenario

A 'do nothing' scenario will result in the subject site remaining undeveloped.

4.10 Worst Case Scenario

The development is partially completed, and all of the proposed infrastructure is not delivered.

4.11 Monitoring & Reinstatement

There is no monitoring required during the construction or operation of the proposed development in relation to population and human health. The monitoring measures required for the aspects of water, air quality and climate, noise, landscape and visual impact, etc provides an appropriate response in this instance. There are no reinstatement works proposed for the proposed site.



4.12 Difficulties in Compiling Information

As outlined above, the census data that informed this chapter's analysis dates from 2016, which could be considered out of date. This was a minor limitation in compiling the population data.

4.13 References

Central Statistics Office, 2021, *Labour Force Survey Quarter 1 2021*. Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-lfs/labourforcesurveyquarter12021/>

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Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft August 2017).

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Institute of Public Health in Ireland (IPHI) Health Impact Assessment Guidance (IPHI 2009).

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5. Biodiversity

5.1 Introduction

The biodiversity chapter of this EIAR describes the existing ecological setting and potential effects on biodiversity associated with the construction phase and operational phase of the proposed development at Ruanbeg, Kildare Town, Co. Kildare. The assessment methodology, existing habitats, likely significant impacts and recommended mitigation measures are described in the following sections. The assessment addresses the potential impact of the proposed development upon biodiversity.

The scope of this study is to assess whether significant impacts on protected flora and fauna with a particular emphasises on protected species found within the proposed development and with cognizance for Natural Heritage Areas (NHAs) and to identify and/or mitigate any potential significant effects on protected species. This report has been prepared with regards to the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), and the later amendment regulations (S.I. No. 233 of 1998; S.I. No. 237 of 2005; S.I. No. 477 of 2011).

A study was undertaken by Panther Ecology Ltd. that is a leading Ecological & Environmental Consulting Firm based in Carlow, Ireland. Panther Ecology is led by Dr Ross Donnelly-Swift who has a BSc (Hons) in Biology from Maynooth University NUI, an MSc in Environmental Science from Trinity College Dublin and a PhD in Biosystems Engineering from University College Dublin. In addition, Ross was a Research Fellow in the School of Natural Science at Trinity College Dublin and Lecturer on Soil Science, Agroecology and Hydrology at Dundalk Institute of Technology. Ross has extensive ecological knowledge gained from academic research and field work, from species-specific and protected species surveys for the completion of AA & NIS, EclA and EIAR biodiversity chapters for projects both small and large in a range of areas such as industrial, residential, and amenity/recreational developments. Ross also gained valuable knowledge and experience working and volunteering in the ecological field on numerous ecological projects. The ecological team also includes Mr. Rory O'Hanlon who has a BSc Environmental Science from Atlantic Technological University Sligo (formerly IT Sligo), a Higher certificate in Animal Science from St John's Central College Cork and experiences in bird, reptile and mammal surveys and animal husbandry skills and Ms Paula Farrell who has a BSc in Wildlife Biology from Munster Technological University (formerly IT Tralee) and has experience in elasmobranch, amphibian, bird, invertebrate and floral surveys.

5.2 Legislative Context

The following legislation is relevant to the proposed development and biodiversity:

- The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife and provides for the control of specific activities which could adversely affect wildlife, for example the regulation of hunting and wildlife trading. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA). European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011)

and (Amendment) Regulations, 2015 (S.I. No. 355 of 2015), transposing the Habitats Directive 92/43/EEC (as amended) and Birds Directive 2009/147/EC.

- The Flora (Protection) (S.I. No. 235 of 2022). This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats.
- Following on from Ireland's third National Biodiversity Plan 2017–2021, Ireland's fourth National Biodiversity Action Plan 2023–2027 has been drafted for public consultation and "is set against a backdrop of unprecedented challenges for nature in Ireland and globally". It aims to build on from the successes of previous NBAP's. It sets out 6 objectives which include for a whole government approach to biodiversity, to meet conservation and restoration needs, to secure nature's contribution to people, embed biodiversity at the heart of climate action, enhance the evidence base for action on biodiversity and to strengthen Ireland's contribution to international biodiversity initiatives. The new plan also includes a set of targets and actions for each objective. Kildare County Development Plan (CDP) includes a policy (BI 03) "Actively support the implementation of national biodiversity initiatives such as the All-Ireland Pollinator Plan 2021-2026."
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011). These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the "Habitats Directive") and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the "Birds Directive") into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009). The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.
- Water Framework Directive (2000/60/EC). The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain "good status" in all water bodies.
- Kildare County Development Plan, 2023-2029. Under these regulations, development plans must include mandatory objectives for the conservation of natural heritage and for the conservation of European sites. The CDP contains a number of policies that relate to the protection of the environment.

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5.3 Methodology

The following guidance documents have been consulted for this assessment:

- *Appropriate Assessment of Plans and Projects in Ireland. Guidelines for Planning Authorities.* DoEHLG, 2010.
- *Ecological Guidance for Local Authorities and Developers* (Scott Cawley, 2013)
- *Managing Natura 2000 sites – The Provisions of Article 6 of The Habitats Directive 92/43/EEC.* European Commission, 2000.
- *NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority)
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission, 2002.
- Commission Notice “Managing Natura 200 sites the provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission, 21.11.2018
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.
- Expedition Field Techniques: Bird Surveys (Bibby et al., 2000);
- Bird census and survey techniques (Gregory et al., 2004);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.) (Collins 2016);
- Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2006);
- Bats and artificial lighting in the UK (Bat Conservation Trust, 2018);
- Bats & Lighting: Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010).
- *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (National Roads Authority (NRA), 2010);
- *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes* (NRA, 2006a);
- *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes* (NRA, 2006b);
- *Guidelines for the Treatment of Bats during the Construction of National Road Schemes* (NRA, 2006c);
- *Bat Mitigation Guidelines for Ireland* (Kelleher and Marnell, 2006);

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and the National Roads Authority (2009), a Zone of Influence should be determined,

which identifies the area in which the development could potentially impact upon ecological receptors and aquatic environments. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur. The zone of influence also takes into consideration the watercourse surrounding the proposed development. Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

Desktop Research

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site. To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species, and cognisance has been taken of available online baseline data (e.g. flora and fauna records from the NBDC, consultation with NPWS regarding protected / threatened species, consultation with BCI regarding bat roost records, previous surveys undertaken by Wildlife Surveys) and a precautionary approach taken.

Desktop research was carried out to gather information on the ecology of the site and surrounding areas. The locations of the Natura 2000 sites, Natural Heritage Areas (NHAs) and protected flora and fauna records for the proposed development at Ruanbeg, Kildare, Co. Kildare. Various mapping websites, including EPA Envision, Google Maps and OSI.

Water quality data from the EPA was reviewed for the assessment of biological and environmental data collected on waterbodies in Ireland as per the Water Framework Directive (WFD) Monitoring Programme of River Ecology Monitoring Results (2021).

Biological records from the National Biodiversity Data Centre (NBDC) for the site and surrounding area (10km grid square/tetrad) were reviewed and account taken of notable species including any rare, protected, threatened and invasive species.

In addition to the above, the NPWS was contacted on the 8th June 2022 in relation to records for sensitive, rare, threatened and protected species within 10km of the development location. Results are contained further within this report.

Information on the characteristics of the Natura 2000 sites within the potential zone of influence was reviewed from the conservation objectives documents, site synopses and Standard Natura 2000 data forms available on the NPWS website.

In addition, a Natura Impact Statement has been prepared for the proposed development and accompanies the planning application (Report Ref. PE_NIS_10024) and is provided in **Appendix 5.3** of this EIAR. This NIS took into consideration the locations of the Natura 2000 sites within the potential zone of influence. An assessment of the potential impacts on the habitats and species of Pollardstown Fen SAC. Mitigation measures have been proposed to avoid any adverse impact on this protected site.

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Field Survey

Site characterisation assessments were undertaken to examine the ecological context of the development site, by systematically walking the site, adjacent land and boundaries and determining the habitats present. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's *"A Guide to Habitats in Ireland"*, a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, *"Best Practice Guidance for Habitat Survey and Mapping"*, (Smith *et al.*, 2011).

Bird species and signs of fauna activity and dwellings were also noted. Particular attention was given to the possible presence of habitats and/or species, which are legally protected under Irish and European legislation and to assessing any potential ecological connectivity with Natura 2000 sites or supplementary or steppingstone habitats of relevance to Natura 2000 sites. While walking the development site, stops were undertaken on a regular basis during which time the area was scanned as far as the terrain or weather conditions allowed. Birds were identified by visual sightings and auditory identification of songs and calls. Birds flying overhead were also included as part of the survey.

Study Area/Zone of Influence

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors and aquatic environments. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur. The zone of influence also takes into consideration the any watercourse surrounding the proposed development.

Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

Survey Limitations

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site.

The optimal habitat survey period runs from April to September, the growing season for the majority of plants (Smith *et al.*, 2011). Weather conditions were suitable for bat surveys and nocturnal animals. To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species, and cognisance has been taken of available online baseline data (e.g. flora and fauna records from the NBDC and BSBI, reviewing BCI bat records, previous surveys undertaken by Wildlife Surveys) and a precautionary approach taken.

Field Surveys Methodology

Site assessments were undertaken on in June, August, November and December 2022 and January 2023 to examine the ecological context of the proposed development, as outlined in *Table 5.1* below. Any drainage ditches were also surveyed as part of the site assessment for aquatic flora and fauna.

Survey	Study Area	Survey Dates
Habitat Survey	Complete Site & Boundary Buffer	10 th June 2022 and 9 th November
Fauna Survey	Complete Site & Boundary Buffer	10 th June 2022 and 9 th November
Badger Survey	Complete Site & Boundary Buffer	10 th June 2022 and 9 th November
Bird Survey	Complete Site & Boundary Buffer	10 th 30 th June & 25 th August 2022
Bat Survey	Complete Site & Boundary Buffer	21 st 22 nd 30 th June & 25 th August 2022
Wintering Bird Survey	Complete Site & Boundary Buffer & Curragh	9 th November, 16 th December 2022 and 19 th January 2023

Table 5.1: Ecological Surveys

Badger and Other Fauna Survey

Fauna surveys were undertaken during bright and dry weather conditions. Direct observation methods were used for the survey of fauna. However, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests, droppings, food items and hair. The habitats on site were assessed for signs of usage by fauna, and the potential to support protected or red-listed species.

Badgers and their setts are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. The removal of badgers from affected setts and subsequent destruction of these setts must be conducted under licence by experienced badger experts or other suitably qualified personnel. The most frequent location of badger setts in the Irish countryside is within or close to hedgerows and treelines, as these provide cover and safety from disturbance from agricultural and other activities. Setts are also frequently located in deciduous woodlands and areas of scrub, and they do occur in urban areas as well as in the open countryside. Setts are used by generations of badgers and some setts may be of considerable antiquity. Typically, the main setts of a badger, which are the focus of the social groups, are usually larger than other setts, averaging seven entrances each (Smal, 1995). A badger sett is divided into different types with main setts used for breeding and have multiple entrances. With outliers usually have one entrance and lie towards the fringes of their territory (Lowen, 2016).

Invertebrate surveys (terrestrial)

Terrestrial habitats within the study area are considered unlikely to support any protected invertebrate species, as the study area does not support the food plants of the protected Marsh Fritillary (*Euphydryas aurinia*) or suitable habitat for protected Whorl snail species (*Vertigo* spp.).

Aquatic surveys

There were no drainage ditches or watercourses within or adjacent to the site with the potential to contain protected species or habitats.

Bat Survey

Areas within the site with the potential to support bat roosts and / or foraging / commuting routes, and which have the potential to be impacted upon by the proposed development were the main focus of the surveys outlined below.

The aims of the bat survey are to collect robust data following good practice guidelines to allow an assessment of the potential impacts of the proposed project on local bat populations. To facilitate the design of control measures, enhancement, and monitoring strategies for local bat populations recorded. Provide information to enable robust decisions with definitive outcomes that aid in the conservation of local bat populations. In order to assess bat activity at a site a survey can be carried out. An emergence dusk survey is carried out at dusk from 30 minutes prior to sunset and continues up to 120 minutes after sunset. Depending on the type of site or habitats contained within the survey can concentrate on areas of suspected or potential bat roosts such as buildings (with accessible features) and trees with cracks and crevices as noted below. This survey is done to determine if the building/tree is a bat roost. Transect surveys are carried out by walking the site with a bat detector to determine the level and type of bat activity at a site. Other more detailed surveys are carried out if a bat roost is suspected and if knowledge on the type of roost is required to determine the best conservation methods.

All bat species are listed in Annex IV of the Habitats Directive while the Lesser Horseshoe (*Rhinolophus hipposideros*) is afforded additional protection through its inclusion on Annex II of the EU Habitats Directive. As a result, SACs have been designated for this species throughout its European range, including in Ireland.

It is an offence under Section 23 of the Wildlife Act and under Section 51 of Habitat Regulations, 2011 to kill a bat or to damage or destroy the breeding or resting place of any bat species. Under the Habitat Regulations, 2011 actions that intentionally or unintentionally harm, damage or destroy a bat or its roosting site are considered to be an offence. According to Section 54(2) of the Habitats Regulations 2011, a derogation licence to disturb bats or the breeding or resting places may be granted 'where there is no satisfactory alternative, and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range. The assessment comprised of an external inspection of trees to identify potential roost features (PRFs) and evidence of bat activity. Any cracks or crevices were further inspected visually with the aid of a strong torch to look for bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. The criteria used to categorise the PRFs or suitability of trees as a potential roost are summarised in the table below, based upon the guidelines by Collins (2016) and Hundt (2012).

Examples of such features include;

- Natural holes;
- Cracks/splits in major limbs;
- Loose bark; and,
- Hollows/cavities.

Climbing trees to look for roosts, using appropriate equipment and safety precautions, is a possible approach for small numbers of trees with a high probability of bats, but the results of radiotracking



studies of some species suggest that bats may use cracks or crevices that are far from obvious Kelleher & Marnell, (2006).

Furthermore, as a signatory to the EUROBATS Agreement (Agreement on the Conservation of Populations of European Bats, 1994), Ireland is required to protect their habitats and important feeding areas from damage or disturbance. All Irish bat species are listed in Appendix II of the Bern Convention (1979), as species requiring protection.

The IUCN Red List categories and criteria are used as an easily understood system for classifying species by their risk of global extinction (IUCN 2012). Irish bats have most recently been categorised in the updated IUCN red list of terrestrial mammals in Ireland. All bats normally occurring on the island are listed as "Least Concern" (Nelson et al., 2019). The status of the Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) is not yet determined in Ireland as only one record has been confirmed.

Assessment of Bat Roost Potential

A daytime assessment of individual trees and hedgerows within the proposed development site potentially affected by the proposed development was undertaken on the 10th, 22nd, 30th June and 25th August and 9th November 2022. The assessment comprised of an external inspection of trees to identify potential roost features (PRFs) and evidence of bat activity, using close focusing binoculars. The criteria used to categorise the PRFs or suitability of trees and buildings as a potential roost are summarised in the table below, based upon the guidelines by Collins (2016) and Hundt (2012).

CATEGORY	DESCRIPTION
High Trees / buildings that are suitable for use by large numbers of bats on a regular basis	Features include holes, cracks or crevices that extend or appear to extend back to cavities suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. In trees, examples include hollows and cavities, rot holes, cracks/splits and flaking or raised bark which could provide roosting opportunities. Any ivy cover is sufficiently well-established and matted so as to create potential crevices beneath. Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.
Moderate Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.	From the ground, building / tree appears to have features (e.g. holes, cavities, cracks or dense ivy cover) that may extend back into a cavity. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for roosting bats. Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.
Low Low potential is assigned to structures and trees with features that could support	If no features are visible, but owing to the size, age and/or structure, hidden features, sub-optimal for roosting bats, may occur that only an elevated inspection may reveal. In respect of

CATEGORY	DESCRIPTION
individual bats opportunistically.	ivy cover, this is not dense (i.e. providing PRF in itself) but may mask presence of PRF features. Further survey work may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under license or supervision of a bat worker).
Negligible	Trees have no potential for bat roost.

Table 5.2: Bat Roost Potential Categories

Bats use echolocation to hunt and navigate in their environs, echolocation calls are used to identify bat species and therefore bat detectors are the principal tool to aid bat surveys. Bat surveys of the site were carried out in June and August 2022 using an Anabat Walkabout Active Bat Detector with both heterodyne and frequency division. In addition, a data logger was used to record bat ultrasounds for analysis. The survey on the 21st and 30th June was a dusk survey and commenced at 9.30pm (approx. 30 minutes before sunset) and was approx. two and a half hours in duration, finishing at 00.00 (Midnight). The dawn survey on the 22nd June commenced at 2am (approx. 2 hours before sunrise) and was approx. two and a half hours in duration, finishing at 4.30am. The dusk survey on the 30th August 2022 commenced at 8pm (approx. 30 minutes before sunset) and was approx. two hours in duration finishing at 10pm.

The proposed development site was assessed during the day for potential bat activity with an emphasis on the mature treelines, hedgerows (there are no waterbodies within site). Weather conditions were suitable for bat activity during the survey, with calm, partly cloudy and dry conditions (temperatures of +18°C to +12°C during the dusk/dawn surveys). Bat surveys should be carried out with air temperature of 8°C or greater. Moth/insect activity was noticeable during the assessments.

Bird Surveys

Bird usage of the development site was assessed on the 10th, 30th June & 25th August. Wintering bird usage of the development site and surrounding fields was assessed on 9th of November, 16th of December 2022 and 19th of January 2023. Vantage Point (VP) Surveys were undertaken. These surveys comprise a series of watches from a fixed location to quantify the flight activity of birds at a proposed development site. In addition, while walking the development site, stops were undertaken on a regular basis during which time the area was scanned as far as the terrain or weather conditions allowed. Birds were identified by visual sightings and auditory identification of songs and calls. Birds flying overhead were also included as part of the survey. Birds observed while undertaking habitat and specific fauna surveys were also noted. Priority habitat/features such as trees, dense hedgerows or shrubs, reed beds, or small bodies of water are areas that surveying can concentrate on for shy species with low detection. Disturbance to the site should be kept to a minimum while undertaking a bird survey.

Target species will be limited to those species which are afforded a higher level of legislative protection. Some species may also be selected as a result of their behaviour which makes them more likely to be subject to impact from the proposed development. There are three important species lists from which target species may be drawn;

- Annex I of the EC Birds Directive;

- Schedule 1 of the Wildlife Act;
- Red & Amber listed Birds of Conservation Concern.

In addition, species identified locally as of conservation concern within Local Biodiversity Action Plans.

If surveys are carried out in less-than-ideal conditions, this should be noted as limitation in the report, with justification and a consideration of potential impacts. However, all bird surveys were carried out on bright warm days with low wind conditions. The Wintering Bird Survey were carried out on clear dry days.

Where areas within a site cannot be accessed, this should be noted in the report as a constraint to the survey. The site at Ruanbeg was fully assessable. There were no waterbodies within or outside the redline boundary that would have the potential to support waterfowl.

The Curragh Plains were also assessed on the 9th of November 2022 and 19th of January 2023 for the presence of wintering birds of note such as Golden Plover (*Pluvialis apricaria*) and Lapwing (*Vanellus vanellus*). In addition, Pollardstown Fen was generally assessed on the 19th January 2023 for the presence of wintering birds of note.

5.4 Description of Existing Environment

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly housing block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

The Curragh is designated as a proposed Natural Heritage Area (pNHA) (Site Code 000392) and is located approximately 130m east of the proposed site. See Section 5.8 for protected sites within 15km of the proposed development. The proposed development site has been in use as agricultural land for livestock grazing for over 10 years as shown imagery captured by Maxar Technologies © in 2009 and 2022, See Figure 5.2 below. The proposed development will require the removal of 306 linear metres of hedgerows. The proposed development will see the removal of 22 trees to facilitate the development and a further 3 due to poor health as per Arbor Care recommendations (See Appendix 5.5 Arborist Report). Stormwater will ultimately discharge to ground via a drainage network that includes attenuation tanks with ponds. No construction works will take place within or adjacent to a watercourse, riparian zone or wetland.





Figure 5.2: The Development Site (red line indicates habitat survey area) (i) 2022 and (ii) 2009 (Source Google Earth)



Figure 5.2: The Development Site (red line indicates habitat survey area) (i) 2022 and (ii) 2009 (Source Google Earth)

Existing Environment

During the site survey four main habitats were identified during the site assessment on the 10th of June 2022 as detailed below. There were no Third Schedule invasive species or protected species recorded within the site. See **Appendix 5.2** for Complete List of Flora.

Improved Agricultural Grassland (GA1)

This habitat is found in the fields of the site. The flora found here include Ryegrasses (*Lolium* spp.), Bent grasses (*Agrostis* spp.), Meadow-grasses (*Poa* spp.), Meadow Foxtail (*Alopecurus pratensis*), Creeping Buttercup (*Ranunculus repens*), Clover (*Trifolium* spp.), Creeping Thistle (*Cirsium arvense*), Common Mouse-ear (*Cerastium fontanum*), Daisy (*Bellis perennis*), Dandelion (*Taraxacum* spp.), Broad-leaved Dock (*Rumex obtusifolius*), Shepherd's-purse (*Capsella bursa-pastoris*), Spear Thistle (*Cirsium vulgare*), Sow-thistle (*Sonchus* spp.) and Nettle (*Urtica dioica*).



Figure 5.3: Improved Agricultural Grassland (GA1)

Hedgerows (WL1)

Along the field boundary of the development site is hedgerow (WL1) habitat with tree species such as Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Blackthorn (*Prunus spinosa*), Hawthorn (*Crotaegus monogyna*), Holly (*Ilex aquifolium*), Elder (*Sambucus nigra*), Elm (*Ulmus* sp.) and Oak (*Quercus* spp.). Other species commonly found in this habitat are Bramble (*Rubus fruticosus*), Cow Parsley (*Anthriscus sylvestris*), Dog-rose (*Rosa canina* agg.), Herb-Robert (*Geranium robertianum*), Ivy (*Hedera helix*), Cleavers (*Galium aparine*), Speedwell (*Veronica* spp.), Hogweed (*Heracleum sphondylium*), Pignut (*Conopodium majus*), Yarrow (*Achillea millefolium*), Snowberry (*Symphoricarpos albus*), Gorse (*Ulex europaeus*), Buckler-fern (*Dryopteris* spp.), Hart's Tongue Fern (*Asplenium scolopendrum*), Privet (*Ligustrum* sp.) and Nettle (*Urtica dioica*).

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Figure 5.4: Hedgerows (WL1)

Treelines (WL2)

Along the field boundaries is treelines (WL2) habitat. This is predominately Ash (*Fraxinus excelsior*) with Beech (*Fagus sylvatica*), Elm (*Ulmus* sp.), Sycamore (*Acer pseudoplatanus*) and Poplar (*Populus* spp.). See accompany Arborist Report by Arbor-Care Ltd (Appendix 5.5) for complete assessment of the trees and their quality as per guidelines for developments.



Figure 5.5: Treelines (WL2)

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Spoil and bare ground (ED3)

Small areas of bare ground were observed mainly at the gated entrance to a field. This is caused by soil compaction and poaching by Cattle. There is no flora of note found here.



Figure 5.6: Buildings and artificial surfaces (BL3)



Buildings and artificial surfaces (BL3)

The wall boundary and is classified as buildings and artificial surfaces (BL3) habitat with few flora species present such as Ivy (*Hedera helix*). This is outside the red line boundary. Other features of BL3 within the site are the south west boundary wall with Ruanbeg Court.

HABITAT CLASSIFICATION HIERARCHY		
LEVEL 1	LEVEL 2	LEVEL 3
E – Exposed rock and disturbed ground	ED – Disturbed ground	ED2 – Spoil and bare ground
B – Cultivated and built land	BL – Built Land	BL3 – Buildings and artificial surfaces
G – Grassland and marsh	GA – Improved grassland	GA1 – Improved agricultural grassland
W – Woodland and scrub	WL – Linear woodland / scrub	WL1 – Hedgerows
		WL2 – Treelines

Table 5.3: Habitats found in and along boundary of the development site

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
Improved agricultural grassland (GA1)	Local importance, lower value	No. Modified habitat, low ecological value.
Hedgerows (WL1)	Local importance, lower value	Yes. Area of semi-natural habitat, comprising mainly of native species. May provide opportunities

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
		for bird nesting and foraging for bats.
Treelines (WL2)	Local importance, lower value	Yes. Area of semi-natural habitat, comprising of native and non-native species. May provide opportunities for bird nesting. Foraging bats recorded here with potential for roosting.
Buildings and artificial surfaces (BL3)	Local importance, lower value	No. Comprised of boundary walls and a livestock pen (outside boundary)
Spoil and bare ground (ED2)	Local importance, lower value	No. Modified habitat, low ecological value.

Table 5.4: Ecological Value of Identified Habitats at the Proposed Development



Figure 5.7: Habitat Map (Google Earth)



Habitats Surrounding the Proposed Development

Buildings and Artificial surfaces (BL3)

To the west is the town of Kildare with both commercial, amenity and residential buildings. There is a livestock pen located outside the site boundary to the south.

Dry-humid acid grassland (GS3)

Further east is the Curragh Plains which are an extensive expanse of semi-natural grassland approximately 200km² predominately in use for sheep grazing. It is also of considerable hydrogeological importance due to the existence the Curragh aquifer, which is the largest gravel aquifer in Ireland and whose discharge feeds major springs to Pollardstown Fen (Misstear and Brown 2008).

Hydrologic Connectivity

The proposed development is located within the Barrow_SC_060 sub-catchment which is part of the Barrow Catchment (ID:14). The closest watercourse to the proposed development is the Tully Stream (EPA Code: 14T02 – Order 1) located approximately 1.6km south west. Continuing 1.6km (hydrologically) downstream this stream is joined by the Tully West Stream (EPA Code: 14T10 – Order 1). From this confluence point the stream continues as the Tully Stream (EPA Code: 14T02 – Order 2) for approximately 11km (hydrologically) before joining the Kildoon (EPA Code: 14K27 – Order 3) and continuing in a south west direction as the Tully Stream (EPA Code: 14T02 – Order 3). It should be noted that from this point the Kildoon River and the Tully Stream (Order 3) are designated as part of the River Barrow and River Nore SAC (Site Code: 002162). Other watercourses within the vicinity include Lenagorra (EPA Code: 14L34 – Order 1), the Harristown Lower (EPA Code: 14H03 – Order 1), the Walterstown Lower (EPA Code: 14W04 – Order 1) and the Kingsbog or Common (EPA Code: 14K31 – Order 1). See Figure 5.8 for watercourses relative to the proposed development. Protected aquatic habitats and species are summarised below.



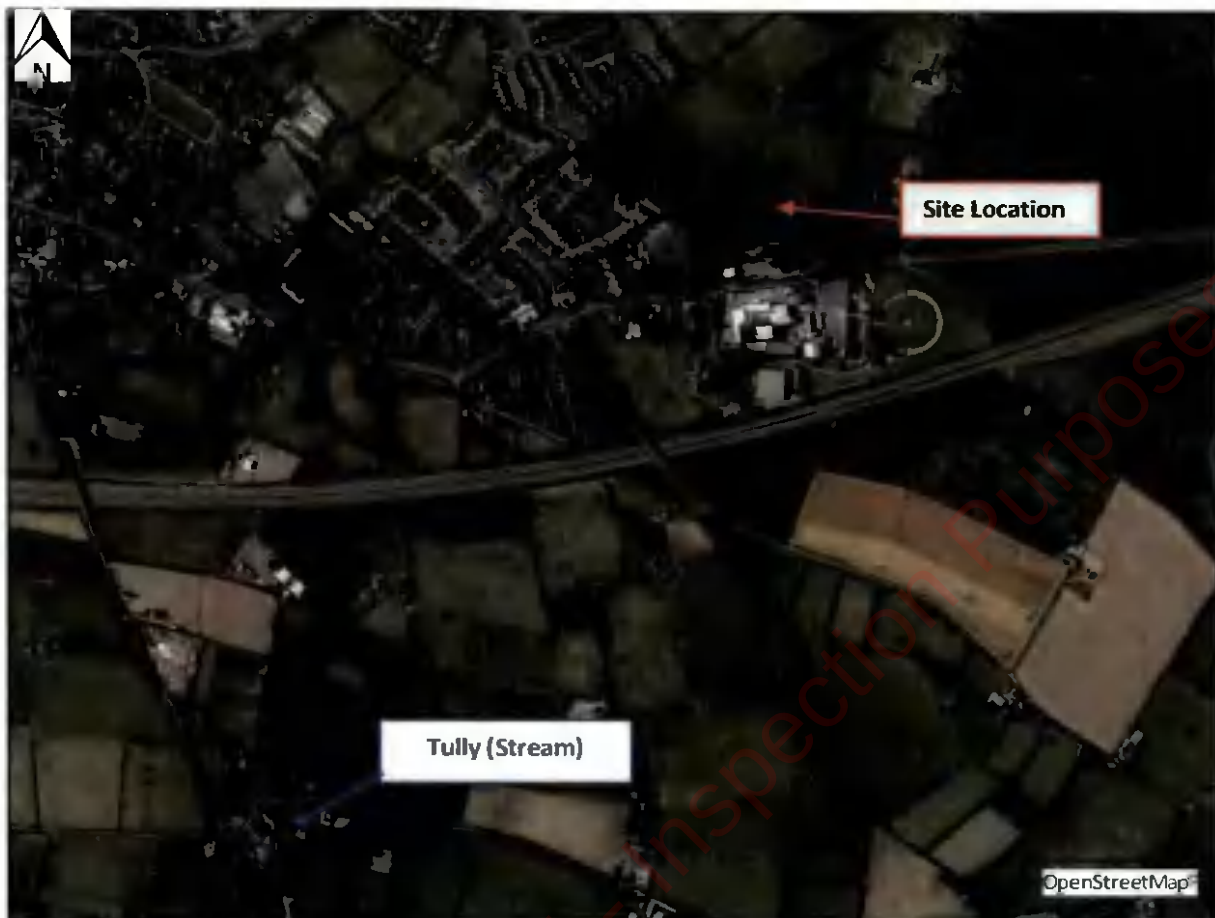


Figure 5.8: Mapped watercourses within vicinity of the proposed development

5.5 Invasive Species

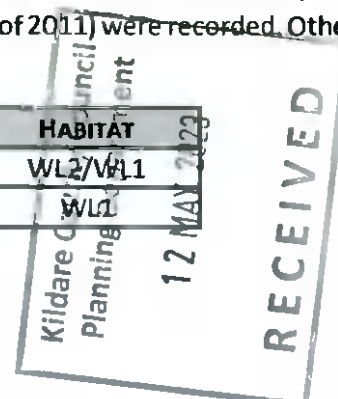
Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence.

Materials containing invasive species such as Japanese Knotweed are considered “controlled waste”, and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011, it is a legal requirement to obtain a license to move “vector materials” listed in the Third Schedule, Part 3.

During the site assessment no invasive plant species listed in the Third Schedule of the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) were recorded. Other invasive species recorded within the site;

INVASIVE SPECIES	HABITAT
Sycamore (<i>Acer pseudoplatanus</i>)	WL2/VL1
Snowberry (<i>Symphoricarpos albus</i>)	WL1

Table 5.5: Invasive Flora



Three invasive plant species listed in the Third Schedule of the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) were recorded within the 10KM grid square (N71) – this includes Pollardstown Fen and the majority of the Curragh;

THIRD SCHEDULE INVASIVE SPECIES	10KM grid square
Fringed Water-lily (<i>Nymphoides peltata</i>)	N71
Giant Hogweed (<i>Heracleum mantegazzianum</i>)	N71
Japanese Knotweed (<i>Fallopia japonica</i>)	N71

Table 5.6: NBDC Invasive Records

5.6 Protected Species Observed at Site

Developments have the potential to impact upon terrestrial and aquatic biodiversity through destruction and loss of habitat, disturbance due to noise and dust, the potential introduction of invasive species and light pollution. The following species were observed during site assessments and within the wider area from published flora and fauna records.

Birds

Given the agricultural and urban land use of the surrounding area it would be expected that common grassland, garden and hedgerow bird species would be present in the area. Bird species noted during the site assessment are included in the Table 5.7 below.

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BOCCI* RED LIST	BOCCI* AMBER LIST
Blackbird	<i>Turdus merula</i>	-	-	-
Blue Tit	<i>Parus caeruleus</i>	-	-	-
Buzzard	<i>Buteo buteo</i>	-	-	-
Chaffinch	<i>Fringilla coelebs</i>	-	-	-
Coal Tit	<i>Parus ater</i>	-	-	-
Collared Dove	<i>Streptopelia decaocto</i>	-	-	-
Dunnock	<i>Prunella modularis</i>	-	-	-
Great Tit	<i>Parus major</i>	-	-	-
Goldfinch	<i>Carduelis carduelis</i>	-	-	-
Hooded Crow	<i>Corvus cornix</i>	-	-	-
House Martin	<i>Delichon urbicum</i>	-	-	✓
House Sparrow	<i>Passer domesticus</i>	-	-	✓
Jackdaw	<i>Corvus monedula</i>	-	-	-
Lesser Black-backed Gull	<i>Larus fuscus</i>	-	-	✓
Magpie	<i>Pica pica</i>	-	-	-
Pheasant	<i>Phasianus colchicus</i>	-	-	-
Robin	<i>Erithacus rubecula</i>	-	-	-
Rook	<i>Corvus frugilegus</i>	-	-	-
Starling	<i>Sturnus vulgaris</i>	-	-	✓
Swallow	<i>Hirundo rustica</i>	-	-	✓
Woodpigeon	<i>Columba palumbus</i>	-	-	-
Wren	<i>Troglodytes troglodytes</i>	-	-	-

Table 5.7: Birds Observed at Site

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BoCCI* RED LIST	BoCCI* AMBER LIST	SURVEY NUMBER
Blackbird	<i>Turdus merula</i>	-	-	-	1, 2, 3
Blue Tit	<i>Parus caeruleus</i>	-	-	-	1, 2, 3
Bullfinch	<i>Pyrrhula pyrrhula</i>	-	-	-	2,3
Buzzard	<i>Buteo buteo</i>	-	-	-	1,3
Chaffinch	<i>Fringilla coelebs</i>	-	-	-	1, 2, 3
Coal Tit	<i>Periparus ater</i>	-	-	-	1, 2, 3
Dunnock	<i>Prunella modularis</i>	-	-	-	1, 2, 3
Fieldfare	<i>Turdus pilaris</i>	-	-	-	3
Goldfinch	<i>Carduelis carduelis</i>	-	-	-	1, 2, 3
Herring Gull	<i>Larus argentatus</i>	-	-	✓	1, 2, 3
Hooded Crow	<i>Corvus cornix</i>	-	-	-	1, 2, 3
House Sparrow	<i>Passer domesticus</i>	-	-	✓	1, 2, 3
Jackdaw	<i>Corvus monedula</i>	-	-	-	1, 2, 3
Magpie	<i>Pica pica</i>	-	-	-	1, 2, 3
Pied Wagtail	<i>Motacilla alba</i>	-	-	-	1, 2, 3
Red Wing	<i>Turdus iliacus</i>	-	-	-	3
Robin	<i>Erithacus rubecula</i>	-	-	✓	1, 2, 3
Rook	<i>Corvus frugilegus</i>	-	-	-	1, 2, 3
Starling	<i>Sturnus vulgaris</i>	-	-	✓	1,3
Thrush	<i>Turdus philomelos</i>	-	-	-	1, 2, 3
Woodpigeon	<i>Columba palumbus</i>	-	-	-	1, 2, 3

Table 5.8: Wintering Bird Survey Results

*The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.

Blackbird, Tit family, Chaffinch, Wren, Dunnock, Robin, and Woodpigeon were observed within the hedgerows and treelines of the site. Goldfinch, House Martin, House Sparrow, Swallow and Starling were observed feeding within and or flying over the grassland fields. The Crow family were observed both within and flying over the site. Gulls were only observed flying over the site. Evidence of Pheasant (feathers) was at the site. Buzzard was observed along the treeline at the east boundary. Collared Dove was observed along the boundary with the existing housing estate.

During the wintering bird survey, the majority of birds were observed within the fields foraging or along the hedgerows and treelines throughout the site. The heaviest activity was observed along the western and northern hedgerows/treelines that provide the boundary between the proposed site and the existing residential estates. Red Wing was observed on the Curragh Plains near the racecourse and Donnelly's Hollow but not within the site. The fields are currently used for livestock grazing and are classified as improved agricultural grassland. Red Wing are red listed under the BoCCI classification and four species; Herring Gull, House Sparrow, Robin and Starling are amber listed. None of the bird species recorded are listed under Annex I of the E.U. Birds Directive. Bird records for the previous thirty years were reviewed on the NBDC website for the 10KM grid square (N71) in which the proposed development is located. Bird species of note recorded within the Table 5.9 below;

NBDC RECORDS FOR 10KM grid square(N71)		
SPECIES	DATASET	DESIGNATION
Barn Owl (<i>Tyto alba</i>)	Birds of Ireland	Red List
Barn Swallow (<i>Hirundo rustica</i>)	Birds of Ireland	Amber List
Black-headed Gull (<i>Larus ridibundus</i>)	Birds of Ireland	Red List
Common Coot (<i>Fulica atra</i>)	Birds of Ireland	Amber List
Common Grasshopper Warbler (<i>Locustella naevia</i>)	Birds of Ireland	Amber List
Common Kestrel (<i>Falco tinnunculus</i>)	Birds of Ireland	Amber List
Common Kingfisher (<i>Alcedo atthis</i>)	Birds of Ireland	Amber List
Common Linnet (<i>Carduelis cannabina</i>)	Birds of Ireland	Amber List
Common Redshank (<i>Tringa totanus</i>)	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Red List
Common Snipe (<i>Gallinago gallinago</i>)	Birds of Ireland	Amber List
Common Starling (<i>Sturnus vulgaris</i>)	Birds of Ireland	Amber List
Common Swift (<i>Apus apus</i>)	Birds of Ireland	Amber List
Eurasian Curlew (<i>Numenius arquata</i>)	Birds of Ireland	Red List
Eurasian Marsh Harrier (<i>Circus aeruginosus</i>)	Birds of Ireland	Protected Species: Wildlife Acts
Eurasian Teal (<i>Anas crecca</i>)	Bird Atlas 2007 - 2011	Amber List
Eurasian Tree Sparrow (<i>Passer montanus</i>)	Birds of Ireland	Amber List
Eurasian Wigeon (<i>Anas penelope</i>)	Birds of Ireland	Amber List
Eurasian Woodcock (<i>Scolopax rusticola</i>)	Birds of Ireland	Amber List
European Golden Plover (<i>Pluvialis apricaria</i>)	Birds of Ireland	Red List
Gadwall (<i>Anas strepera</i>)	Bird Atlas 2007 - 2011	Amber List
Great Cormorant (<i>Phalacrocorax carbo</i>)	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Amber List
Grey Plover (<i>Pluvialis squatarola</i>)	Birds of Ireland	Amber List

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Hen Harrier (<i>Circus cyaneus</i>)	Bird Atlas 2007 - 2011	Amber List
House Martin (<i>Delichon urbicum</i>)	Birds of Ireland	Amber List
House Sparrow (<i>Passer domesticus</i>)	Birds of Ireland	Amber List
Lesser Black-backed Gull (<i>Larus fuscus</i>)	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Amber List
Little Egret (<i>Egretta garzetta</i>)	Bird Atlas 2007 - 2011	Annex I Bird Species
Little Grebe (<i>Tachybaptus ruficollis</i>)	Bird Atlas 2007 - 2011	Amber List
Merlin (<i>Falco columbarius</i>)	Birds of Ireland	Amber List
Mew Gull (<i>Larus canus</i>)	Birds of Ireland	Amber List
Mute Swan (<i>Cygnus olor</i>)	Birds of Ireland	Amber List
Northern Lapwing (<i>Vanellus vanellus</i>)	Birds of Ireland	Red List
Northern Shoveler (<i>Anas clypeata</i>)	Bird Atlas 2007 - 2011	Red List
Peregrine Falcon (<i>Falco peregrinus</i>)	Bird Atlas 2007 - 2011	Annex I Bird Species
Sand Martin (<i>Riparia riparia</i>)	Bird Atlas 2007 - 2011	Amber List
Sky Lark (<i>Alauda arvensis</i>)	Birds of Ireland	Amber List
Spotted Flycatcher (<i>Muscicapa striata</i>)	Birds of Ireland	Amber List
Stock Pigeon (<i>Columba oenas</i>)	Bird Atlas 2007 - 2011	Amber List
Tufted Duck (<i>Aythya fuligula</i>)	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Amber List
Water Rail (<i>Rallus aquaticus</i>)	Birds of Ireland	Amber List
Yellowhammer (<i>Emberiza citrinella</i>)	Birds of Ireland	Red List

Table 5.9: NBDC Records for 10KM grid square (N71)

Badger and Other Fauna

NBDC has records of badger activity in the surrounding landscape of the proposed development. Animal paths were noted within the development site however these were observed to be from livestock. Evidence of Fox (*Vulpes vulpes*) was noted during the site assessment and was heard calling during the dusk assessments. Fox was observed during the winter site assessments. There was evidence of animals moving from the hedgerow (gaps) however the openings in the vegetation were not of suitable size for badgers. These were noted as from Rabbit (*Oryctolagus cuniculus*) activity as faeces were found. Rabbit was observed during the winter site assessments. In addition, domestic animals (cats) were noted as active along the hedgerow with the north west housing estate. There was no evidence of a badger sett or badger activity at the site during any of the site assessments. The grassland habitats could offer suitable foraging habitat for badgers however the site is partly

surrounded by urban development and a busy industrial site/road that would be of considerable disturbance to badgers.



Figure 5.9: Tracks/paths through the site

Bats

Desk Based Review

The development site is located outside of the current distribution, current range and favourable reference range of Nathusius' Pipistrelle (*Pipistrellus nathusii*) [1317] Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303] but within the current distribution, current range and favourable reference range of Soprano Pipistrelle (*Pipistrellus pygmaeus*) [5009] Common pipistrelle (*Pipistrellus pipistrellus*) [1309], Daubenton's Bat (*Myotis daubentonii*) [1314] and Leisler's Bat (*Nyctalus leisleri*) [1331]. Whiskered Bat (*Myotis mystacinus*) [1330], Natterer's Bat (*Myotis nattereri*) [1322] and Brown long-eared Bat (*Plecotus auratus*) [1326] are within the current distribution and current range of the proposed development (NPWS, 2019b).

The NPWS's National Lesser Horseshoe Bat Roost Database was consulted (August 2022) with regards any roost records for Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The Lesser Horseshoe Bat is mainly confined to the west of Ireland, with the NPWS database indicating that the nearest record for this bat is located approximately 123km to the south east of the development site near Limerick City (Grid R6461).

NBDC RECORDS FOR BATS	
SPECIES	10KM GRID SQUARE
Brown Long-eared Bat (<i>Plecotus auritus</i>)	R71
Daubenton's Bat (<i>Myotis daubentonii</i>)	R71
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	R71
Lesser Noctule (<i>Nyctalus leisleri</i>)	R71
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	R71

Table 5.10: NBDC has records for bats within the 10km square (Tetrad R71) at the proposed development.

In addition, Bat Conservation Ireland's habitat suitability index available to view on the NBDC online mapping portal, classifies the landscape, within which the site is located, as having a low habitat suitability for bats, with a score of 24.33 for the development site and surrounding landscape. The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index

ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The maps are constructed using spatial units of the OSI National Grid. The index presented is for all species combined, in addition to the individual species' indices (Lundy et al., 2011).

BAT HABITAT SUITABILITY INDEX	
SPECIES	INDEX
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	36
Brown long-eared Bat (<i>Plecotus auratus</i>)	36
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	38
Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)	0
Lesser Noctule (<i>Nyctalus leisleri</i>)	49
Whiskered Bat (<i>Myotis mystacinus</i>)	12
Daubenton's Bat (<i>Myotis daubentonii</i>)	17
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	5
Natterer's Bat (<i>Myotis nattereri</i>)	26

Table 5.11: Bat habitat suitability index for the proposed development site

Bat call analysis was undertaken using Kaleidoscope software. Kaleidoscope software was used to analyse bat calls recorded during dusk and emergence survey. Bat species identification was interpreted using known call parameters (*British Bat Calls: A Guide to Species Identification*, Jon Russ 2012) and existing literature on the ecology of Irish and UK bat species, including distribution, range, habitat associations and behavioural characteristics, in addition to surveying the flight pattern and foraging. Every attempt was made to identify bats to species level. However, in some instances it is only possible to take the analysis to genus level (distinguishing between certain bat species echolocation calls can be very difficult due to the overlap in call parameters e.g. those species within the *Myotis* genus).

Bat Surveys Results

Bat activity levels were high in Area A and Area B as shown in Figure 5.10. Bat activity was not detected at the site until 30 minutes after sunset. No bat activity was detected from 20 minutes before sunrise.

- Foraging activity was most active along the hedgerow with housing estate to the north west (Area A) and along the treeline to the south east (Area B).
- Common pipistrelle (*Pipistrellus pipistrellus*) was noted a foraging along the treeline/hedgerow at Area A (Hedge 1 of Tree Constraint Plan – Appendix 5.6).
Leisler's Bat (*Nyctalus leisleri*) was noted a foraging along the treeline at Area B (3965- 3966 (x10) of Tree Constraint Plan– Appendix 5.6).
Leisler's Bat (*Nyctalus leisleri*) was noted a foraging along the treeline/hedgerow at Area C (Boundary with R445 road).
- Minor activity (commuting) was observed along the other hedgerows/treelines of the site. With Soprano Pipistrelle (*Pipistrellus pygmaeus*) detected commuting (in proximity to 3980 of Tree Constraint Plan– Appendix 5.6).
- Two Common pipistrelle (*Pipistrellus pipistrellus*) were observed returning to a mature Ash tree along the north east boundary at dawn (See Figure 5.7.2), however follow up dusk surveys did not show bats emerging from this tree. This Ash tree (3975) has dense ivy growth along the trunk and into the crown but no signs of significant cracks/crevices. This tree was assessed to be a temporary night roost.
- All trees were assessed for potential bat roost potential, with trees that are to be removed as part of the proposed development further reassessed during the day for potential bat roosts. Any tree that had the potential to contain a bat roost or are to be removed were monitored

at dusk and dawn to ascertain if bats were using the tree to roost. None of the trees to be removed as part the proposed development were in use as a bat roost such as (within 3976 – 3977 x10), (3978), (3944 – 3946), (3948), (3972 – 3970). See – **Appendix S.6** for Tree Constraint Plan by Arbor Care for tree locations.

- Bat activity was particularly prevalent along the road R445. The street lights are attracting considerable insect activity and were being predated on by Leisler's Bat. This bat was mainly detected foraging above the street lamps along the R445 road (Area C).
- Light pollution was highest along the R445 boundary, with lower light spill from adjoining housing estates.

BAT SURVEY RESULTS			
SPECIES	NIGHT ROOSTING	FORAGING	COMMUTING
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	-	-	✓
Brown long-eared Bat (<i>Plecotus auratus</i>)	-	-	-
Common Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	✓	✓	✓
Lesser Horseshoe Bat (<i>Rhinolaphus hipposideros</i>)	-	-	-
Lesser Noctule (<i>Nyctalus leisleri</i>)	-	✓	✓
Whiskered Bat (<i>Myotis mystacinus</i>)	-	-	-
Daubenton's Bat (<i>Myotis daubentoniid</i>)	-	-	-
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	-	-	-
Natterer's Bat (<i>Myotis nattereri</i>)	-	-	-

Table 5.12: Results of Bat Activity at the Development Site



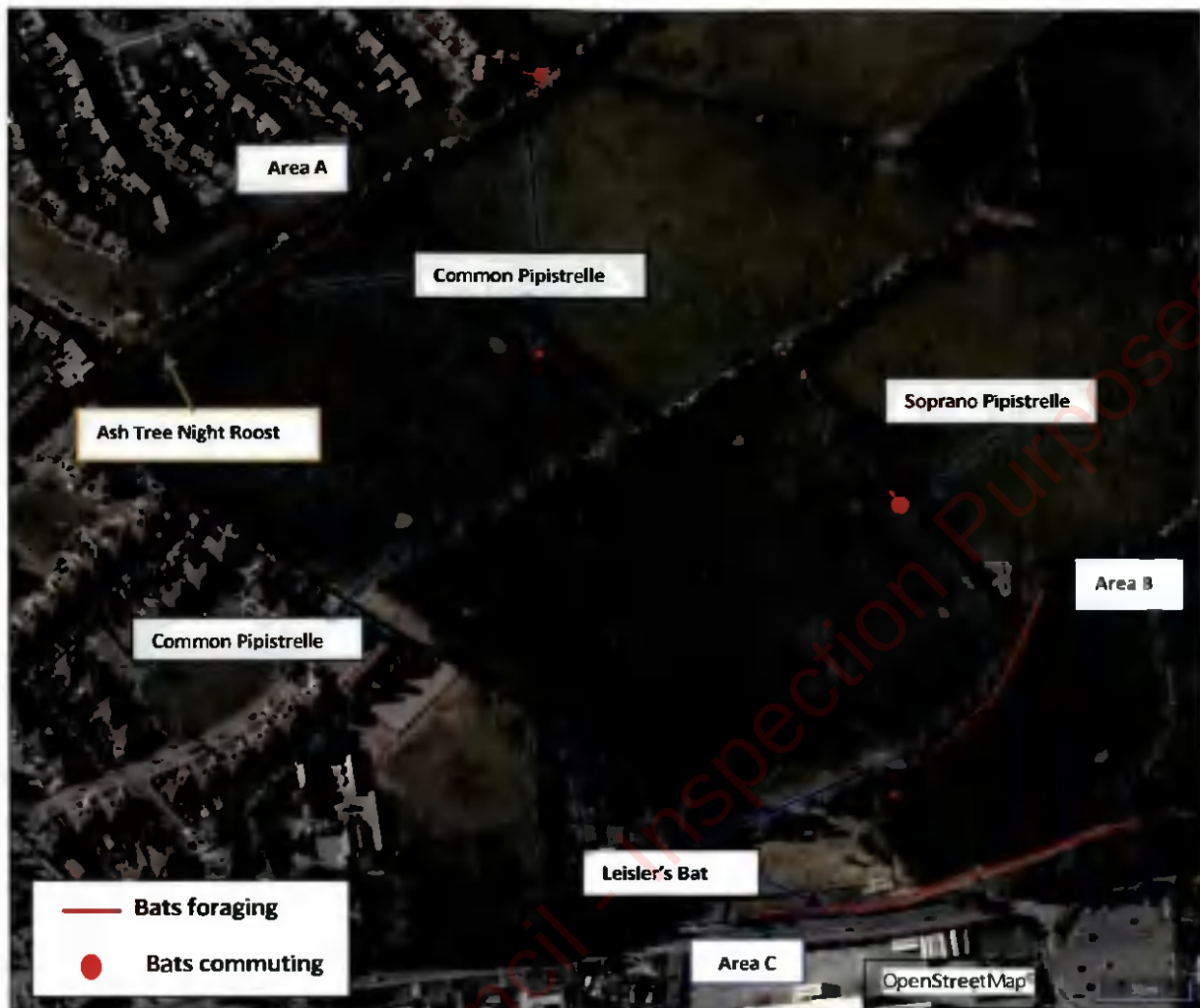


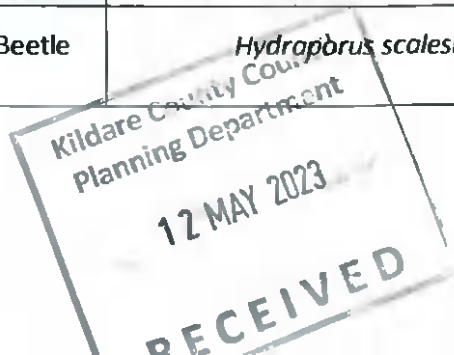
Figure 5.10: Bat activity the proposed development

See **Appendix 5.1** for the different bat roosting potential of trees located within the site and for the light disturbance encountered during the bat surveys.

Invertebrates Records

The site had some Bumblebees (*Bombus*), Horseflies (*Tabanida*) and Midge (*Nematocera*) with butterfly species found throughout the site such as Peacock (*Inachis io*), Small Tortoiseshell (*Aglais urticae*) and Large White (*Pieris brassicae*). Other invertebrates noted were Spiders (*Arachnids*). The hedgerows, treelines and grasslands would provide suitable habitat for invertebrates. With a lack of suitable aquatic habitats within the proposed development site there would not be any protected invertebrates associated with a watercourse or wetland. Invertebrates' records for the previous thirty years were reviewed on the NBDC website for the 10km square in which the proposed development is located. Invertebrates' species of note recorded within the 10KM grid square (N71) include;

SPECIES	SPECIES NAME	DATASET	DESIGNATION
Beetle	<i>Hydroporus scalesianus</i>	Water Beetles of Ireland	Near threatened



Beetle	<i>Gyrinus natator</i>	Water Beetles of Ireland	Near threatened
Butterfly	Dark Green Fritillary (<i>Argynnis aglaja</i>)	Butterflies of Ireland	Vulnerable
Butterfly	Dingy Skipper (<i>Erynnis tages</i>)	Butterflies of Ireland	Near threatened
Butterfly	Large Heath (<i>Coenonympha tullia</i>)	Butterflies of Ireland	Vulnerable
Butterfly	Marsh Fritillary (<i>Euphydryas aurinia</i>)	Butterflies of Ireland	Vulnerable
Butterfly	Small Heath (<i>Coenonympha pamphilus</i>)	Butterflies of Ireland	Near threatened
Butterfly	Wall (<i>Lasiommata megera</i>)	Moths Ireland	Endangered
Dragonfly	Scarce Blue-tailed Damselfly (<i>Ischnura pumilio</i>)	Dragonfly of Ireland	Vulnerable
Bee	Large Red-Tailed Bumble Bee (<i>Bombus (Melanobombus) lapidarius</i>)	Bees of Ireland	Near threatened
Bee	Moss Carder-bee (<i>Bombus (Thoracombus) muscarum</i>)	Bees of Ireland	Near threatened
Mollusc	Budapest Slug (<i>Tandonia budapestensis</i>)	All Ireland Non-Marine Molluscan Database	Invasive Species
Mollusc	Common Whorl Snail (<i>Vertigo (Vertigo) pygmaea</i>)	All Ireland Non-Marine Molluscan Database	Near threatened
Mollusc	Desmoulin's Whorl Snail (<i>Vertigo (Vertigo) moulinsiana</i>)	All Ireland Non-Marine Molluscan Database	Endangered
Mollusc	English Chrysalis Snail (<i>Leiostryla (Leiostryla) anglica</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Geyer's Whorl Snail (<i>Vertigo (Vertigo) geyeri</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Hollowed Glass Snail (<i>Zonitoides (Zonitoides) excavatus</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Lake Orb Mussel (<i>Musculium lacustre</i>)	All Ireland Non-Marine Molluscan Database	Threatened Species: vulnerable
Mollusc	Jenkins' Spire Snail (<i>Potamopyrgus antipodarum</i>)	All Ireland Non-Marine Molluscan Database	Invasive Species
Mollusc	Keeled Slug (<i>Tandonia sowerbyi</i>)	All Ireland Non-Marine Molluscan Database	Invasive Species

Mollusc	Lake Orb Mussel (<i>Musculium lacustre</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Marsh Whorl Snail (<i>Vertigo (Vertigo) antivertigo</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Narrow-mouthed Whorl Snail (<i>Vertigo (Vertilla) angustior</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Point Snail (<i>Acicula fusca</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Prickly Snail (<i>Acanthinula aculeata</i>)	All Ireland Non-Marine Molluscan Database	Near threatened
Mollusc	Smooth Grass Snail (<i>Vallonia pulchella</i>)	All Ireland Non-Marine Molluscan Database	Vulnerable
Mollusc	Striated Whorl Snail (<i>Vertigo (Vertiga) substriata</i>)	All Ireland Non-Marine Molluscan Database	Near threatened
Mollusc	Wrinkled Snail (<i>Candidula intersepta</i>)	All Ireland Non-Marine Molluscan Database	Invasive Species

Table 5.13: Results of Invertebrates of note within 10KM grid square (N71)

Amphibians and Reptiles

The majority of the site consisting of grassland would not offer ideal habitat for frogs or newts. No Lizards were noted during the site assessment. The mature hedgerows could act as suitable terrestrial habitat and migration corridors for both amphibians and reptiles. NBDC website for the 10KM grid square (N71) include the protected species Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*) and Common Lizard (*Zootoca vivipara*).

Other Species

The site would not offer suitable habitat for Otter (*Lutra lutra*). Other fauna not observed but would be typically found throughout the rest of Ireland would be present in the area of the proposed development. These include the protected Pine Marten (*Martes martes*), Irish Hare (*Lepus timidus hibernicus*), Pygmy Shrew (*Sorex minutus*) Hedgehog (*Erinus europaeus*) and Red Squirrel (*Sciurus vulgaris*). Also present would be Stoat (*Mustela erminea hibernica*) and Wood Mouse (*Apodemus sylvaticus*). Fauna records for the previous thirty years were reviewed on the NBDC website for the 10KM grid square (N71) include the following the species Red Squirrel (*Sciurus vulgaris*), Pygmy Shrew (*Sorex minutus*), Pine Marten (*Martes martes*), Red Deer (*Cervus elaphus*) and Hedgehog (*Erinaceus europaeus*). Invasive species within the 10KM grid square(N71) are American Mink (*Mustela vison*), Brown Rat (*Rattus norvegicus*), Grey Squirrel (*Sciurus carolinensis*), Rabbit (*Oryctolagus cuniculus*) and Sika Deer (*Cervus nippon*).

SPECIES	SPECIES RATING	RATIONALE
Badger	Local importance, higher value	No. The treeline and hedgerow would provide foraging resource for badgers. However, given the proximity of the wider

SPECIES	SPECIES RATING	RATIONALE
		urban area the development would be lower potential for foraging badgers given the significant disturbance as a factor.
Bats	Local importance, higher value	Yes. The hedgerows / treelines within and adjacent to the proposed development are utilised by bats for both foraging and commuting. With Ash Tree (3975) in use as a night roost.
Other	Local importance, low to high value	No. Limited fauna sightings / evidence of other mammals. Site has limited potential to support other mammal species. Fox was observed at site but no den. Rabbit is listed as medium impact invasive.
Breeding Birds	Local importance, higher value	Yes. All birds, their nests, eggs and young are protected under the Wildlife Act.
Aquatic Fauna	Local importance, lower value	No. The site contains no aquatic habitats

Table 5.14: Ecological Value of Species of the Proposed Development

5.7 National Parks and Wildlife Services Records

Records of protected, rare or threatened flora and fauna species within 10km of the proposed development obtained from the NPWS are included in Tables below.

COMMON NAME	SCIENTIFIC NAME	PROTECTION ¹	CONSERVATION STATUS ^{2,3}
Basil Thyme	<i>Acinos arvensis</i>	FPO	Vulnerable
Henbane	<i>Hyoscyamus niger</i>	None	None
Green Figwort	<i>Scrophularia umbrosa</i>	None	Near Threatened
Mountain Pansy	<i>Viola lutea</i>	None	Vulnerable *
Red Hemp-nettle	<i>Galeopsis angustifolia</i>	FPO	Vulnerable

Table 5.15: Records of Protected, Rare or Threatened Flora Species from the NPWS

Notes:

¹ HD II/IV = Habitats Directive Annexes II/IV; FPO = Flora Protection Order.

² Vascular flora from the Irish Red Data Book 1 Vascular Plants (Curtis and McGough, 1988; Wyse Jackson *et al.*, 2016); Bryophytes from the Irish Red List No. 8 (Lockhart *et al.*, 2012).

³ IUCN Red list <http://www.iucnredlist.org/> - accessed July 2022

* Record over 100 years old.



COMMON NAME	SCIENTIFIC NAME	PROTECTION ¹	CONSERVATION STATUS ^{2,3}
Badger	<i>Meles meles</i>	WA	Least Concern
Red Deer	<i>Cervus elaphus</i>	WA	Least Concern
Common Frog	<i>Rana temporaria</i>	WA	Least Concern
Desmoulin's whorl snail	<i>Vertigo moulinsiana</i>	HD II/V, WA	Endangered
Geyer's Whorl Snail	<i>Vertigo geyeri</i>	HD II/V, WA	Vulnerable
Hedgehog	<i>Erinaceus europaeus</i>	WA	Least Concern
Irish Hare	<i>Lepus timidus hibernicus</i>	WA	Least Concern
Marsh Fritillary	<i>Eurodryas aurinia</i>	HD II	Vulnerable
Narrow-mouthed Whorl Snail	<i>Vertigo angustior</i>	HD II/V, WA	Vulnerable
Otter	<i>Lutra lutra</i>	HD II/IV, WA	Near Threatened
Pine Marten	<i>Martes martes</i>	WA	Least Concern
Red Squirrel	<i>Sciurus vulgaris</i>	WA	Near Threatened
Sika Deer	<i>Cervus nippon</i>	WA	Least Concern

Table 5.16: Records of Protected, Rare or Threatened Fauna Species from the NWPS

Notes:

¹ HD II/IV/V = Habitats Directive Annex II/IV/V; WA= Wildlife Acts; BDI = Birds Directive Annex I

² Terrestrial Mammal Red List (Marnell et al. 2009); Birds of Conservation Concern in Ireland 2020-2026 (G. Gilbert, A. Stanbury & L. Lewis, 2021); Red-listed Amphibians, Reptiles and Freshwater Fish (King et al. 2011); Red-listed Non-marine Molluscs (Byrne et al., 2009)

³ IUCN Red list <http://www.iucnredlist.org/> - accessed July 2022

5.8 Protected Species

Natura 2000 Sites Within Zone of Influence

One RAMSAR site occurs within 15km of the proposed development (Pollardstown Fen). Four Special Area of Conservation (SAC). No Special Protection Area (SPA) occur within 15km of the proposed development as per the table below.

SITE NAME	FIGURE 5.11 NO.	DESIGNATION	SITE CODE	DISTANCE
Pollardstown Fen	1	SAC	000396	3.8km NE
Mouds Bog	2	SAC	002331	6.5km NE
River Barrow and River Nore	3	SAC	002162	11.8km W
Ballynafagh Lake	4	SAC	001387	14.5km NE

Table 5.17: Natura 2000 Sites

See accompanying Natura Impact Statement (Appendix 5.3) for a complete assessment of the SACs and their qualifying interests.

Natural Heritage Areas Within Potential Zone of Influence

No Natural Heritage Areas occur within 15km of the proposed development. Seven proposed Natural Heritage Areas (pNHA) occur within 15km of the proposed development.

SITE NAME	FIGURE 5.11 NO.	DESIGNATION	SITE CODE	DISTANCE
Curragh	5	pNHA	000392	30m E
Pollardstown Fen	1	pNHA	000396	3.8km NE
Grand Canal	6	pNHA	002104	5km NE
Liffey Bank Above Athgarvan	7	pNHA	001396	8km E
Mouds Bog	2	pNHA	000395	6.5km NE
Derryvullagh Island	7	pNHA	001390	13km SW
Dunlavin Marshes	8	pNHA	001772	13.6km SE

Table 5.18: Natural Heritage Areas

Pollardstown Fen pNHA is very similar in size to Pollardstown Fen SAC. Potential impacts and proposed mitigation measures for Pollardstown Fen SAC have been outlined in the accompanying NIS report (Appendix 5.3). Water quality would not have an impact on the Grand Canal pNHA due to no hydrological connection during both the construction and operational phase. The Mouds Bogs, Liffey Bank Above Athgarvan, Derryvullagh Island and the Dunlavin Marshes are not hydrologically connected to the proposed site nor is the development of close proximity to these pNHA's. This limits the potential connectivity to these sites and would therefore the proposed development would not have a significant impact on the habitats and species located here. The Curragh pNHA is a significantly important Dry-humid acid grassland (GS3) habitat in Ireland. The Curragh is predominately made up of Sheep fescue (*Festuca ovina*) with the bryophyte *Rhytidiadelphus squarrosus* abundant in the ground layer. The Curragh aquifer is a main source of water for Pollardstown Fen and is important habitat for wintering Lapwing (*Vanellus vanellus*) and Golden Plover (*Pluvialis apricaria*). The Curragh is mainly in use for Sheep grazing and Horse racing. Potential impacts on this pNHA are increased off road driving and illegal dumping. The Irish Semi-Natural Grasslands Survey 2007-2012 noted the Curragh was one of the largest areas of grassland habitat affected by the habitat review that resulted in the acidic grasslands of the Curragh being no longer regarded as the Annex I habitat, due to a lack of species diversity (O'Neil et al, 2013).



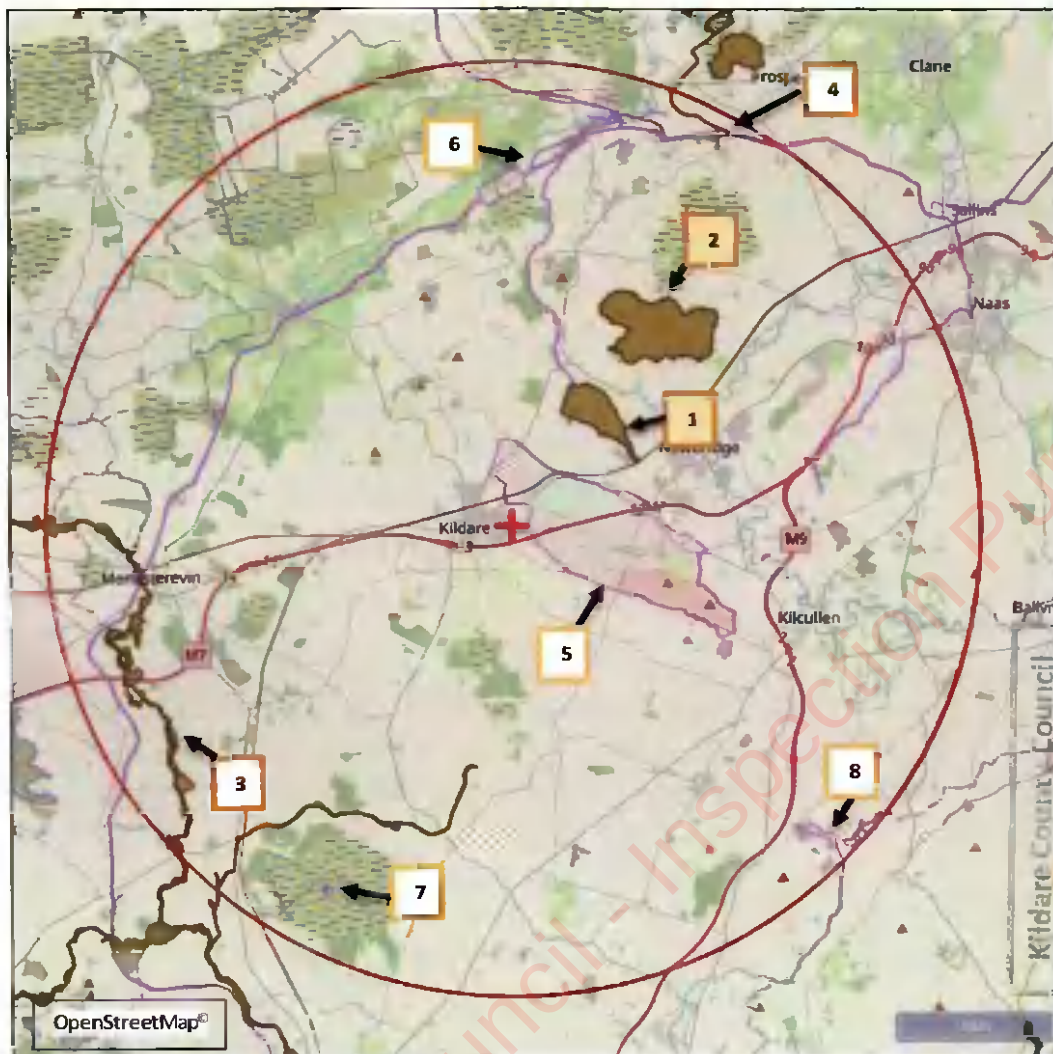


Figure 5.11: Protected habitats within approximately 15km of the site

5.9 Ecological Impact Assessment

The construction phase of the development would result in a direct and permanent loss of the existing habitats of agricultural grassland (GA1) and some hedgerow (WL1) and treelines (WL2). The majority of the flora found in GA1 are grasses with recolonising species associated with agricultural fields, as such the area would be considered as having been modified and of low ecological value. Therefore, the loss of this habitat would not be considered significant.

The removal of the hedgerow would not be undertaken during the 1st March to the 31st August, so as not to disturb nesting bird species. The majority of hedgerow will be maintained. The hedgerows are in good ecological condition with majority of species native with the exception of Sycamore (*Acer pseudoplatanus*) and Snowberry (*Symphoricarpos albus*) that are medium impact invasive species. The treeline species are predominantly Ash (*Fraxinus excelsior*) with Ash Dieback (*Hymenoscyphus fraxineus*) impacting on some of these trees. Elm (*Ulmus* sp.) within the hedgerow is already dead or dying due to Dutch Elm Disease (*Ophiostoma novo-ulmi*), this pathogen is established in Ireland and prevents the majority of native and introduced Elms from reaching maturity.

The majority of mature Ash trees are of good ecological value and were observed as roosting sites for birds such as Buzzard (*Buteo buteo*), Starling (*Sturnus vulgaris*), Woodpigeon (*Columba palumbus*) and numerous other hedgerow bird species.

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata and have the potential to cause nuisance to fauna. Given the transient nature of construction works the potential impact to flora and fauna would not be considered significant when appropriate measures are taken to protect the environment during the construction phase.

The following Table 5.19 provides a Summary of Predicted Impacts Pre-Mitigation



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Impact	Development Phase	Direct / Indirect	Likelihood	Duration	Reversible	Significance	Impact Type
Habitat Loss	Construction	Direct	Certain	Permanent	No	Not significant	Negative
Introduction of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Spread of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Fauna Disturbance	Construction	Indirect	Possible	Temporary	Yes	Slight significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Fauna Mortality	Construction	Direct	Dependent upon timing of works relevant to breeding season	Permanent	No	Moderate significance	Negative
Bats – Disturbance / Severance of Habitat	Construction	Direct & Indirect	Unlikely	Permanent	Yes	Slight significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Negative
Groundwater Quality Deterioration	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
	Operational	Direct	Unlikely	Permanent	Yes	Not significant	Neutral
Designated Sites	Construction	Indirect	Unlikely	Temporary	Yes	Not significant	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral

Table 5.19: Summary of Predicted Impacts Pre-Mitigation

5.10 Potential Impacts

Terrestrial Biodiversity Protection Protocol

The proposed development could impact on the wider ecological environment during the construction phase due to potential disturbance and construction activities.

Disturbance To Protected Habitats and Species

The proposed development does not directly impinge on any part of a protected site, and as such would not be expected to have any in-situ effects upon a protected site through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

Badger

No badger setts were recorded during ecological survey or within the zone of influence of significant disturbance of the proposed development.

Foraging Badgers could enter into an active construction site. Badgers will not be impacted during the operational phase as the site is not in use for foraging and the boundary hedgerow will screen the site for any potential impact on foraging badgers along the Curragh Buffer Zone.

Bats

Artificial lighting during the construction and operational phases has the potential to negatively impact upon bat species, as illumination can impact upon their roosting sites, commuting routes and foraging areas. Cutting down or disturbing potential roosting sites for bats. Occupation of roosts in trees by bats may be very transient and there is potential that mature broadleaved trees in the footprint of the proposed site could be used occasionally as roosting or resting places by individual/small numbers of bats. The roosting potential of trees within the site boundary is considered low with their removal during the construction phase to be outside the maternity season for bats (May – September). Removal of treeline within the south section (3967-3972 & Group 1 & 3943 -3949) and the first section of 3976 (from west boundary) will have an impact at local level on foraging bats. Lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for certain species such as *Myotis*.

Birds And Other Fauna

It is not anticipated that there would be any significant impacts upon other fauna during the operational/construction phase of the development. The proposed development does not contain any aquatic habitats of note nor would the vegetation within the site support other protected fauna.

Invasive Species

During construction works, there is potential for invasive species to be introduced to the site through the movement of materials, such as soil and stone, and the arrival of construction plant and equipment from an area with invasive species.

Aquatic Ecology

It is not anticipated that there would be any significant impacts upon water quality during the operational/construction phase of the development. The proposed development does not contain any aquatic habitats nor would the vegetation within the site support other aquatic fauna. During the operational phase the spread of invasive aquatic flora and fauna would be unlikely as the site will discharge to ground, water quality discharged from the site will not contain any potential sediments or containments after passing through a hydrocarbon interceptor and attenuation system. In addition, there is no surface water connection from the site to a watercourse.

Ground Water

Construction works have the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise due to the potential release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils). However, the only hydrological connection is via ground water therefore measures to prevent an impact on the Curragh Aquifer must be implemented.

5.11 Mitigation/Monitoring Measures

Terrestrial Biodiversity Protection Protocol

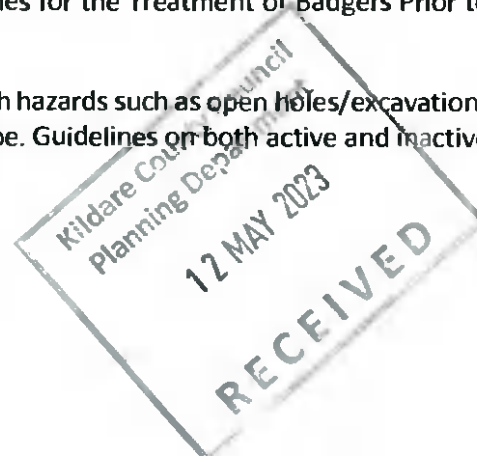
As a matter of standard construction practice, the development would be constructed in accordance with the following methods and guidelines:

- All construction works would be confined as far as possible to the development footprint;
- Where possible, vegetation removal works would be scheduled outside of the 1st of March to the 31st of August period, so as not to disturb nesting bird species;
- If works should take place beside any trees that will remain as part of the landscape plan, then a root protection zone will be established to ensure no construction works will disturb the root zone (See **Appendix 5.5**);
- The Tree Protection Plan has been prepared with regard to the British standard BS 5837:2012 Trees in relation to design and construction recommendations this standard gives recommendations and guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees, including shrubs, hedges and hedgerows, with structures;
- The construction works contractor will take cognisance of the NRA's document "*Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*", 2006. In particular, the construction works contractor will take cognisance of the guidelines with regards soakaway, sewage system and drainage ponds area and the determination of the root protection area of the existing trees to be retained within the development site;
- A Landscape Plan has prepared as part of the development and has taken into consideration the urban setting and the use of native species where possible, with native tree species only used along the east and northeast boundary in proximity to the Curragh Buffer zone (See **Appendix 5.7**);
- The landscape plan includes areas of meadow, wildflower meadows, wetland planting and bioretention areas. These areas are being planted with native flora that will increase biodiversity and pollinator activity within the proposed development;
- All planting of trees and hedges to be undertaken during bare root season November to April. The balance of tree & shrub planting and lawn & meadow seeding to be completed within 12 months of the completion of construction work of the development.

Badger

Mitigation measures will be put in place regard for Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2006).

- The building site will be made safe for mammals with hazards such as open holes/excavations covered over or fitted with ramps to allow for escape. Guidelines on both active and inactive sets must be followed:



"The destruction of a successfully evacuated badger sett may only be conducted under the supervision of qualified and experienced personnel under licence from the NPWS. The possibility of badgers remaining within a sett must always be considered; suitable equipment should be available on hand to deal with badgers within the sett or any badgers injured during sett destruction"

- Where possible, no construction works will be conducted outside of normal working hours, to reduce potential noise disturbance to nocturnal species.
- Should a Badger be found during the construction phase of the project, an officer of the NPWS will be notified prior to the resumption of construction works.
- Before site clearance works begin a badger survey must be completed. If a badger sett is found within or outside boundary but within 150m then a Badger Conservation Plan must be put in place before works commence.

Bats

- No chemicals will be used within the development site and will not be used near treelines and hedgerows or any drainage system;
- The planting of landscape features integrated to the wider network of green corridors such as hedgerows, woodland and scrub, the landscape plan has maintained connectivity along the north east boundary of the site;
- Bat boxes can be installed to suitable mature trees along the site boundary;
- Bats rely on linear habitats such as hedges to fly through the landscape. The landscape plan includes the protection of the majority of hedgerows along the boundary with future replanting of mature trees in the south 15m industrial buffer zone.;
- Felling of moderate roost potential trees should be only undertaken in the period late August to late October/early November;
- Felled trees should be left for 48 hours, to allow for any potential bats to escape;
- See Bat Conservation Ireland Guidelines on hedgerow management for bats
<https://www.batconservationireland.org/wp-content/uploads/2022/07/Managing-Hedgerows-for-Bats.pdf>

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Artificial Lighting during construction phase;

- Construction works in the hours of darkness, when bats are active (April – October); will be kept to a minimum;
- Lighting of hedgerows / treelines will be avoided where possible;
- Should lighting be required during construction works, it will be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used;
- Directional lighting will be used where possible, by use of louvres or shields fitted to the lighting;

White light emitting diode (LED) will be used where possible, which is considered to be low impact in comparison to other lighting types

Artificial Lighting during operational phase;

Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).

The lighting design by MANDE Consulting Engineers Ltd. will include the following mitigation measures:

- Lighting will be directed to where it is required only, rear shields shall be used;
- Lighting of hedgerows / treelines will be avoided where possible. The PL shall be positioned to avoid unnecessary light over spill around the retained hedgerows;
- Buildings, roads and site entrance lighting will be angled away from hedgerows and treelines;
- The PL shall be limited to roadways to retain darkness above;
- All lanterns calculated at 0° tilt
- Lighting will be 6m height as per KCC guidelines;
- Where possible and practicable to do so, timers or motion sensors will be used;
- White LED (temperature is 3000K) or amber coloured LED outdoor lighting would be used where possible, which is considered to be low impact in comparison to other lighting types;
- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used;
- Light spill into the surrounding fields to the east and north is to be minimal, this would include the Curragh Buffer zone;
- Each light fitting shall be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile, 35 lux on/18 lux off

Birds And Other Fauna

- No hedgerow or tree removal works to take place during the bird breeding season;
- Bird boxes should be installed within the development site;
- Stormwater from the proposed development would comprise of clean rainwater run-off from roof and paved areas and would be directed to the drainage network and attenuation system within the proposed development, this system will be SuDS compliant and discharge to ground;

Invasive Species

The following controls for the prevention / treatment of invasive flora species would be implemented throughout the construction phase of the development:

- Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;
- The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to, and leaving from, the development site;
- All relevant construction personnel would be trained in invasive flora species (main species of concern) identification and control measures;
- In the unlikely event of an invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of to a suitably licenced facility, in accordance with Regulation 49 of the 2011 Regulations;
- Cognisance would be taken of the National Roads Authority's Guidelines on "The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads".

Aquatic Ecology

Stormwater from the proposed development would comprise of clean rainwater run-off from roof and paved areas and would be directed to the drainage network and attenuation system within the proposed development.

A nature-based solution has been designed to ensure the proposed development is more ecologically beneficial to the environment by including bioretention areas, swales, green roofs and attenuation tanks with ponds.

Ground Water

The following mitigation measures would be proposed to ensure there is no significant impact upon the groundwater:

- The construction works contractor will adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "Control of Water Pollution from Construction Sites; guidance for consultants and contractors" 2001 and "Control of Water Pollution from Construction Sites – Guide to Good Practice", 2002;
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter any drainage system;
- Silt control features would be inspected on a daily basis and maintained as appropriate;
- Manhole covers and stormwater gullies along the R445 will be protected by silt blankets;
- Stripping of topsoil will be coordinated with the proposed staging for the development;
- Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- Silt fencing would be placed around spoil areas until such time as the excavated soil has been used in landscaping / re-instatement works;
- The R445 road would be inspected and regularly cleaned to prevent sediments being transported along roads;
- The use of pre-cast concrete where possible;
- The delivery and pouring of concrete would be supervised;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;
- Where re-fuelling of construction plant is required to take place onsite, re-fuelling would take place within a bunded area. Under no circumstances would re-fuelling take place within the vicinity of a treeline/ hedgerow or on exposed soil;
- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be available onsite;
- In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor;
- Should water be encountered during excavation works, water would be pumped to a constructed silt control feature, such as a settlement pond or detention pond. A filter would be provided at the pump inlet and, where required, dewatering bags or silt fences would be used at the outlet to retain any potential silt entrained in the water. Pumping operations would be supervised at all times;
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds;
- There would be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities would be stored for removal off site for disposal and treatment;
- Any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers;
- Deliveries of fuels and oils to the site would be supervised;
- Fuels / oils would be handled and stored with care to avoid spillage or leakage;

- Where appropriate, small construction plant equipment would be placed on drip trays;
- Any waste fuel / oils would be collected in bunded containers at a designated area and properly disposed of to an authorised waste contractor;

5.12 Residual Impacts

Terrestrial Biodiversity Protection Protocol

Assuming all mitigation measures are put in place, there would be no significant residual impacts to the terrestrial ecology from the proposed development.

Badger

The proposed development would limit foraging habitat for badgers if active in the vicinity of the site. The site is on the edge of the town with residential/industrial developments surrounding most of the site to the west and south. Badgers in the area could forage in agricultural land/hedgerows to the north west of the site. No sett was found, or evidence of badger activity noted during the site. Therefore, any badgers active to the north east of the site will likely not be disturbed during the operation phase of the proposed development.

Bats

Three species of bat were detected within the site with bat activity concentrated along the mature treelines and hedgerows in particular Hedge 1. Bat activity was high along the R445 boundary. The light pollution was high here given the main and road and industrial development across the road. Insect activity is likely to be high in this area given the abattoir across the road. Removal of linear habitats and loss of foraging and commuting habitat will be a minor local impact as only boundary hedgerow and treelines along the R445 and southwest section (at proposed site entrance) will be removed. Other trees will be removed within the development but will not break linear lines. Additional landscaping along the boundary of the site will include mature trees and native species. As part of the drainage plans at the site, attenuation ponds will be incorporated into the design. These ponds are to enable the development to be compliant with SuDS but also enable the development to increase the ecological value of the site. A pond can significantly increase invertebrate activity at a site and in turn this will increase foraging areas for bats. The ponds are located in areas of open amenity greens however they are also in close proximity to the boundary hedgerows, or the treeline located within the middle of the development. The installation of sympathetic lighting in the vicinity of the proposed attenuation ponds and along the boundary hedgerows/treelines will enable these landscape features to become foraging areas for bats or continue to be used by bats, post construction. In addition, bat boxes can be placed on mature trees along the site boundary.

Birds And Other Fauna

Assuming all mitigation measures are put in place, there would be no significant residual impacts to any other protected fauna from the proposed development. Bird surveys were carried out in Summer and Winter with no rare or Annex 1 species observed within or along the boundary of the site. Golden Plover (*Pluvialis apricaria*) and Lapwing (*Vanellus vanellus*) were not observed within the site boundary or within the Curragh pNHA during the site assessment. Vantage point surveys of the Curragh were done to determine if wintering birds such as the Golden Plover and Lapwing were elsewhere on the Curragh plains. Areas observed were the Little Curragh, Racecourse, Donnelly's Hollow, Cemetery and around McGuire's Hill. The only wintering bird of note was Redwing. The majority of birds observed at the site are common species and the development would not significantly impact on their range. The large amenity grasslands areas and additional meadow and wetland areas will ensure that there is a mixture of habitats for bird species within the development

site. The addition of ponds to the development can also extend the range of birds not currently found within the site and may potentially offer suitable habitat for waterfowl.

Invasive Species

The proposed development includes a landscape plan that will use native and non-invasive ornamental species. It is an offence to transport Third Schedule invasive species and in the unlikely event an invasive species is found at the site during the operation phase an Invasive Species Management Plan will be put in place.

Aquatic Ecology

Assuming all mitigation measures are put in place, there would be no significant residual impacts to any other protected fauna from the proposed development.

Ground Water

Assuming all mitigation measures are put in place, there would be no significant residual impacts to the groundwater from the proposed development.



IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
Habitat Loss	Construction & Operational	Slight significance	- The inclusion of less intensively managed areas (meadows and wetlands) will allow for increased biodiversity within the proposed development; - The landscaping plan for the development take into consideration the outer urban setting and use of native species. - The hedgerow along the north east boundary will largely remain intact with significant planting of native trees and understory shrubs to screen the Curragh Buffer Zone;	Minor	Neutral
Introduction of Invasive Flora Species	Construction	Slight significance	- Construction plant would be inspected and washed prior to arriving onsite; - Regular site inspections for the presence of invasive species would be undertaken; - Should invasive species appear onsite, works would immediately cease until the plant was appropriately treated and disposed of; - Only qualified personnel to used herbicides on any invasive species; - Excavated soils would be segregated into subsoil and topsoil and reused in reinstatement and landscaping works. Where possible, seeding of stockpiled topsoil to ensure stability and limit the potential for invasive flora seeding; - If an Third Schedule invasive species is found within the site then an Invasive Species Management Plan will be in place by the Contractor;	Minor	Neutral
Fauna Disturbance	Construction	Moderate significance	Where possible, no construction works would be conducted outside of normal working hours;	Moderate	Minor

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			- All plant machinery and equipment would be maintained in good working order and regularly inspected - Where possible, vehicles would be equipped with mufflers to suppress noise - As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal - Should a protected fauna species be found during the construction phase, the NPWS would be notified prior to the resumption of construction works; - If a Badger Sett is found during construction then guidelines by NPWS and NRA must followed. - Fencing to limit access to the site.		
	Operational	Not significant	None required	Imperceptible	Neutral
Fauna Mortality	Construction	Moderate significance	- As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal - Where hedgerow / tree removal works are required during the bird nesting season (1st March to 31st August), the sections / trees for removal would be inspected by an ecologist for the presence of breeding birds. Where nests are present, a decision would be made as to whether a licence is required from the NPWS, or whether a suitable buffer zone could be established around the active nest with removal works rescheduled until chicks have fledged.	Minor	Minor

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
Bats – Disturbance / Severance of Habitat	Construction	Moderate significance	- Before site clearance works a preconstruction badger survey must be carried out to ensure badgers are not active within the site. - Landscape plan has taken into consideration the mature treelines and hedgerows and enhance this boundary with suitable additional planting; - Lighting measures have been implemented to reduce the potential for light pollution; - Construction works in the hours of darkness would be kept to a minimum; - Mature trees should be felled between late August to late October/early November; - Felled trees will be left for 48 hours, to allow for any potential bats to escape.	Minor	Neutral
	Operational	Moderate significance	- Lighting design measures to be implemented to reduce the potential for light pollution along hedgerows/treelines; - The inclusion of ponds will increase foraging habitats for bats.	Minor	Neutral
Groundwater Quality Deterioration	Construction	Moderate significance	- Standard construction control measures for the protection of groundwater would be implemented; - Concrete works would be supervised; - Appropriate storage and handling of fuels and oils; - Provision of spill kits	Minor	Neutral
	Operational	Not significant	Ensure maintenance of drainage system	Minor	Neutral
Designated Sites	Construction	Moderate significance	- Standard construction control measures for the protection of groundwater would be implemented; - Concrete works would be supervised; - Appropriate storage and handling of fuels and oils;	Minor	Neutral

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			Provision of spill kits		
	Operational	Not significant	None required	Imperceptible	Neutral

Table 5.20: Summary of Residual Impacts Post-Mitigation



5.13 Cumulative Impacts

The residual impact of this proposed development is anticipated to be slight negative local effect. Cumulative effects from a development in general can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018).

Considering the nature of the development and the adjacent urban town, the main potential cumulative impact upon biodiversity would be a deterioration in groundwater quality during the operational phase resulting in an impact upon the Curragh Aquifer and loss or fragmentation of natural habitat.

It is not anticipated that there would be any significant impact upon groundwater quality during the operational phase, given that stormwater from the site would be directed to the drainage network and attenuation system. All foul and domestic wastewater will connect with to Kildare Town Wastewater Treatment Plant (D0178-01). Irish Water have upgraded the sewerage network within Kildare Town which will serve and allow for the sustainable development of its residential and commercial sectors. The drainage system has been designed to ensure the infiltration to groundwater is controlled and will not contain hydrocarbons. As the development is residential there are no significant potential impacts from industrial pollutants.

Mature trees and hedgerows are to be maintained as part of this development that will enable the connectivity of the site to remain for ecological corridors. As noted in the Bat Survey the trees for removal do not contain bat roosts. The mature trees of note along the Curragh Buffer zone will not be removed and will this limit disturbance to this area. The proposed development has included a Landscape Plan and Arborist Report for the protection of trees. As part of the nature-based solutions for the proposed drainage system is the inclusion of attenuation ponds. A water feature such as a pond has the potential to significantly increase the ecological value of the proposed development. Aquatic habitats have the potential to increase amphibians and invertebrates within the site boundary. The site does not contain any aquatic habitats (including drainage ditches) therefore these ponds would be of benefit to the wider ecological environment. The ponds are positioned within a large green space with an existing treeline and hedgerow to the northeast and southeast to remain largely intact. This will allow for bats to forage and commute within the proposed development and limit the impact to the local population.

In addition, green roofs will be added to the crèche and apartment buildings. Green roofs are beneficial to slow down the flow of stormwater within a development but also have the potential to increase biodiversity. These areas can be used by nesting birds given the remote location, increase invertebrate activity and provide ecological connectivity with the wider environment. The addition of bioretention areas and swales will allow the proposed development to conserve stormwater and slow the rate of flow and keep the soil infiltration capacity of the site.

With regards potential habitat loss or fragmentation of habitat, the proposed development is not anticipated to result in a significant impact upon habitat loss / fragmentation during either the construction or operational phases, given that the majority of the land take would comprise of modified habitats of low ecological value, and given that the landscape plan for the development will take into consideration the setting and use of native species. The mature hedgerow along the north and northeast boundary will not be removed and consideration for the species found here have been included in the landscape plan. Therefore, there would be no cumulative habitat loss or fragmentation impacts which could pose a significant risk to biodiversity. Potential cumulative lighting impacts from

external lighting for the development has been addressed in the mitigation measures proposed in Section 5.11 for this development therefore cumulative impacts as a result of external lighting should not arise.

5.14 "Do Nothing" Scenario

The footprint of the proposed development is mainly comprised of habitats which are modified and of low ecological value. The majority of the site is improved agricultural grassland (GA1) habitat with limited flora diversity found here. The boundary of the fields are made up of hedgerows and mature trees (Ash predominately). It is likely if this development did not proceed the site would remain in agricultural use. As the site is on the edge of an urban town (KDP - Level 3) and contains no habitats or species of note and is not within the Curragh Buffer zone (as per the Draft Kildare LAP 2023-2029) it is likely that this site will be developed for residential or commercial use in the future or remain as agricultural land.

5.15 "Worst Case" Scenario

If the proposed development proceeded without the mitigation measures outlined in Section 5.11 there would be a potential low impact upon bat species due to the removal of commuting and foraging habitat, in addition to limited lighting impacts during the construction phase and potential for light spill into the Curragh Buffer Zone if lighting scheme if not implemented with the mitigation measures detailed in Section 5.10. There would also be a potential moderate impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. However, this is unlikely to occur, given that there are legal restrictions under the Wildlife Act 1976 as amended, with regards the removal of vegetation.

During construction works, there would be potential to inadvertently introduce invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. It is likely that minimal topsoil will be required to be imported into the site given the large site area of existing agricultural grassland. In addition, the site is managed agricultural grassland that is controlled to prevent the spread of unwanted flora that would reduce the grazing rates of livestock.

The landscape plan has been reviewed for potential invasives species and the inclusion of the native species where practical in an urban design. If the root protection zones are not adhered to then there is the potential for mature trees and hedgerows to be impacted during construction works. The hedgerows are well established and managed (except for Hedge 1 that is not fully managed as per the Appendix 5.6 Tree Constraints Plan).

Any localised impact on the hedges would be minor as replanting with native species would restore the connectivity of the hedgerows. If substantial sections of the hedgerow are impacted, then this would be considered a moderate impact. Mature Ash trees that are not protected would likely die if the root zone is impacted. The presence of Ash Dieback in Ireland is currently being researched by Teagasc to determine if there is resistance in native Ash trees. Currently research has determined that young trees are impacted more, with Ash in wet sites also showing more severe symptoms.

5.16 Difficulties Encountered in Compiling

There were no difficulties encountered in compiling any specific information regarding biodiversity.



5.17 Conclusions

It is the conclusion of this report that there would be no potential for any significant impact on protected species as a result of the proposed development. Mitigation measures put in place ensure the protection of flora and fauna will ensure there are no potential for significant effects, and the project is recommended to proceed as proposed.

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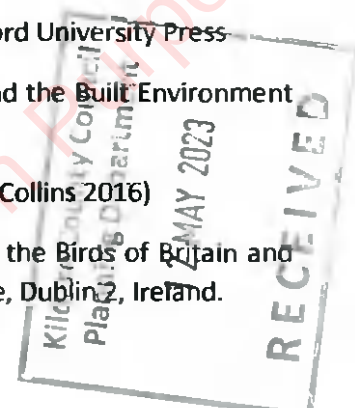
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6. Land, Soil & Geology

6.1 Introduction

This chapter of the EIAR was undertaken by PUNCH Consulting Engineers to assess the impact of the proposed Ruanbeg development on the surrounding soils, geology and groundwater environment.

This chapter was prepared by Mark Richardson BA BAI(Hons) CEng and Donal Moreton MEng (Hons) MIEI of PUNCH Consulting Engineers. Mark Richardson is an Associate with PUNCH Consulting with over 18 years' experience in experience in drainage and civil engineering, in Ireland and abroad, is a member of Engineers Ireland and is a chartered engineer in Ireland. Donal Moreton is a graduate engineer with PUNCH Consulting and has 1 years' experience in the industry and is a member of Engineers Ireland.

The potential impacts and mitigation measures the construction and post development activities may have on soils, geology and groundwater environment are set out in the following sections. In summary, there are no likely significant impacts predicted on the soils, geology and groundwater environment associated with the proposed development of the site.

The proposed development site location and brief description is described in Chapters 1 & 3 of this EIAR and as set out in the statutory notice.

6.2 Methodology

The assessment of the potential impact of the activity on water and hydrology was carried out according to the methodology specified in the following documents:

1. Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Statements (2022);

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

1. Geological heritage sites in the vicinity of the perimeter of the subject site;
2. Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
3. The quality, drainage characteristics and range of agricultural uses of soil around the subject site;
4. Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
5. The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery;
6. High yielding water supply springs/ wells in the vicinity of the subject site to within a 2 km radius and the potential for increased risk presented by the proposed development;
7. Classification (regionally important, locally important) and extent of aquifers underlying the study area perimeter and increased risks presented to them by construction and operation related activities associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
8. Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the proposed development site; and

9. Groundwater-fed ecosystems and the increased risk presented by the construction and operational phases of the proposed development both spatially and temporally.

The following sources of information were consulted to establish the baseline environment:

1. The Geological Survey of Ireland (GSI) online well card and groundwater records for the area were inspected, with reference to hydrology and hydrogeology;
2. EPA water quality monitoring data in the area;
3. EPA Geoportal website;
4. Ground Investigation, Causeway Geotech, Ruanbeg, Report Reference No. 22-0819, dated 10th October 2022.
5. Ground Investigation, Causeway Geotech, Ruanbeg Phase 2, Report Reference No. 22-1436, dated 27th January 2023.
6. Hydrogeological Site Assessment Report, BlueRock Environmental Ltd, Ruanbeg Residential Development, Report Reference No. BRE22014Rp01A02, dated 3rd May 2023.

From the GSI/ EPA website, the following information was obtained:

1. Soil Map;
2. Bedrock Geology Maps;
3. Quaternary (Subsoils) Maps;
4. Well Card Database (Groundwater Wells);
5. Historical Geological 6 inch:1-mile maps;
6. Database of Site Investigations/Surveys;
7. Waste sites, mine sites and industrial locations;
8. Geological heritage locations; and
9. Water features.



6.3 Receiving Environment

Soils

There are 2 no. soil types noted at the proposed development site, as per Teagasc soil classification mapping accessible from Geological Survey Ireland Spatial Resources. These are Shallow well drained material (Mainly basic) and Made ground. Refer to Error! Reference source not found. below.

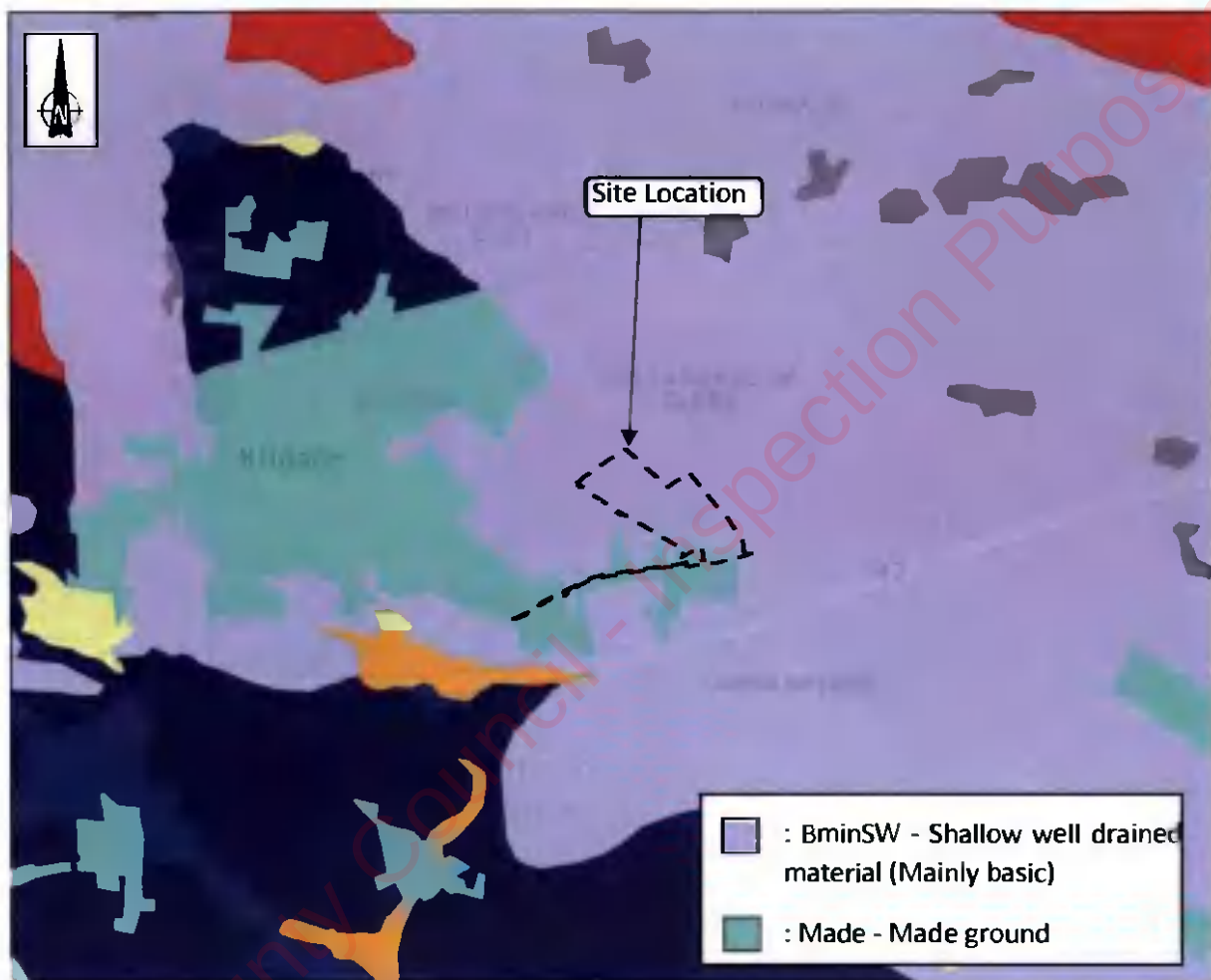


Figure 6.1: Teagasc soil classification mapping (<http://www.gsi.ie>)



Geology

The GSI quaternary maps for the region indicate that the soil type for the region is gravels derived from limestones. Refer to Figure 6.2 below.



Figure 6.2: Quaternary sediments (<http://www.gsi.ie>)

The site investigation records for the site also indicate that the natural soils on site are generally clay, with a mixture of gravelly silts and clays underlain by very dense gavel with boulders.

The national draft generalised bedrock map shows that the underlying bedrock for the site is 'cherty often dolomitised limestone', as shown in Figure 6.3.

The lands are not located in a GSI or Environmental Protection Agency (EPA) source protection area.



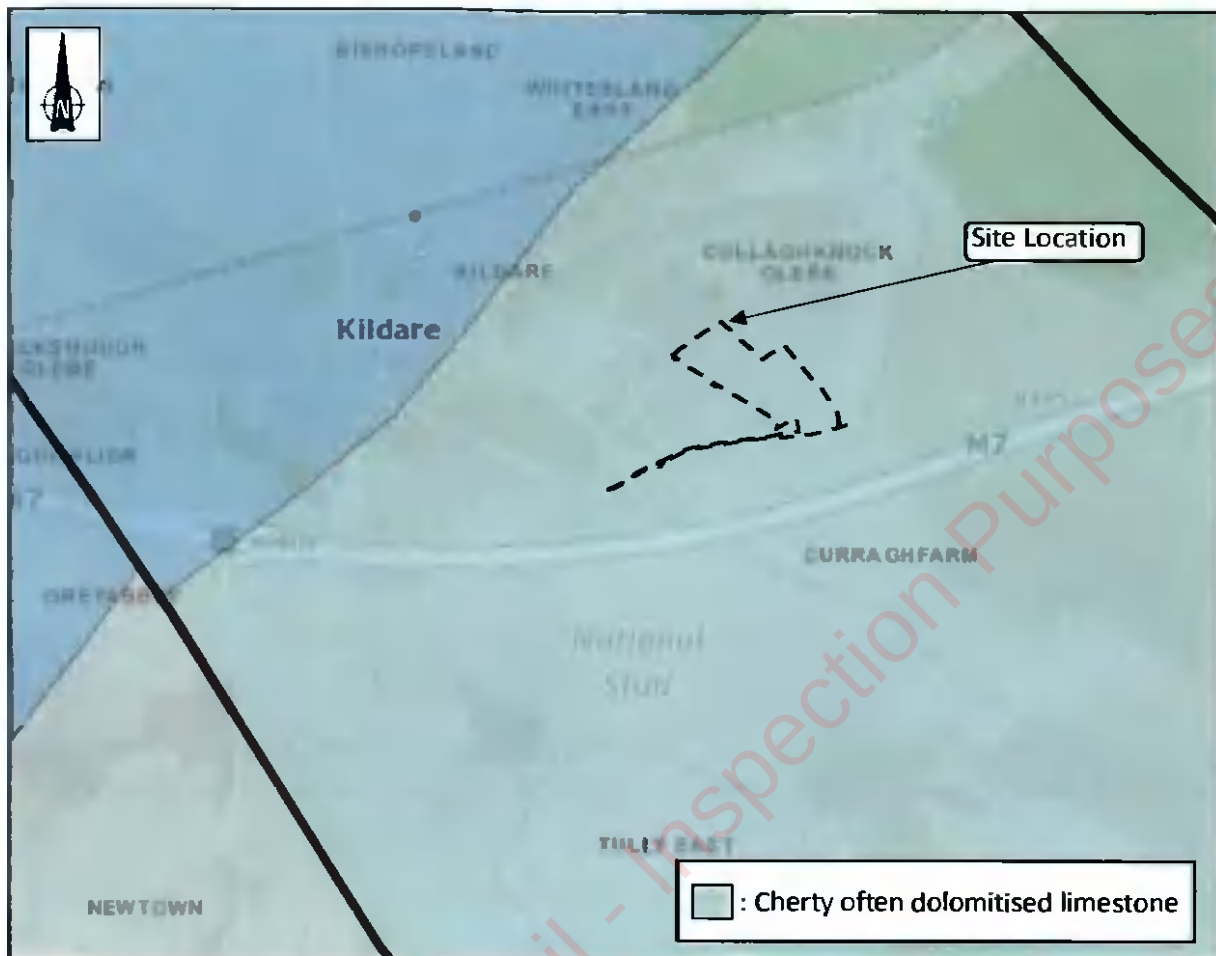


Figure 6.3: GSI Bedrock Map (<http://www.gsi.ie>)

EPA data shows that there are no watercourses with the Ruanbeg site. Please refer EIAR chapter 7 for further information regarding water including groundwater.



GSI data show that the Ruanbeg site is within an area of high groundwater vulnerability, as shown in Figure 6.4. This indicates that the area has a high likelihood of groundwater contamination and deters development that carries significant potential to contaminate to water within the area. In this instance the proposed development, which is wholly residential in nature, does not represent a significant potential to contaminate water within the area.

For details of surface water contamination mitigation measures during the construction and operation phases, please refer to Chapter 7 of this EIAR.

Kildare County Council
Planning Department

12 MAY 2023

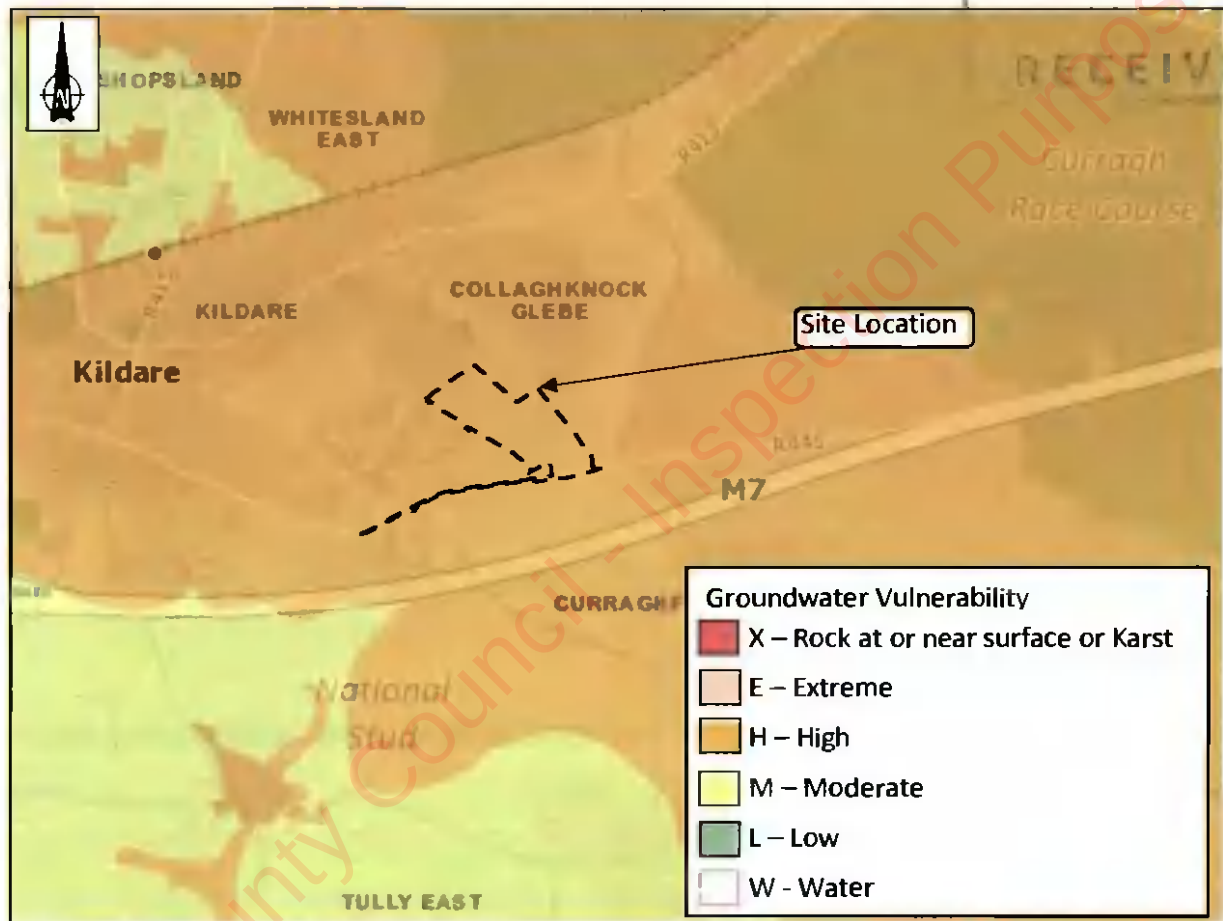


Figure 6.4: National Vulnerability Map (<http://www.gsi.ie>)

6.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the R445 and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

The proposed development in relation to soils and geology will comprise:

- Removal of existing topsoil and subsoil
- Site grading
- Reprofilling and importing fill to build levels on site
- The construction of residential buildings, creche, and associated foundations
- Construction of vehicle access via connection to the existing Ruanbeg Park residential development to the northwest, and a main access point off the R445 located to the south of the site.
- Excavation for installation of services, pavements and landscaping on existing and imported fill.

6.5 Potential Impacts

Construction Phase

Removal of Topsoil and Subsoil

Removal of the existing topsoil layer will be required. Stripping of topsoil will 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.

Excavation of existing subsoil layers will be required in order to allow road and foundation construction, drainage and utility installation. In addition, the installation of the sustainable urban drainage systems will require a significant quantity of subsoil to be excavated to provide attenuation storage volumes for extreme weather events. The construction of bioretention areas would also require an excavation. The above ground ponds proposed will be constructed using suitable excavated material, with topsoil finish to form an above ground berm to shape the pond/basin for storage purposes.

The approximate volume of removed topsoil is 8,500 m³. This will need to be disposed off site.

The approximate volume of subsoil to be excavated is 10,600 m³.

Imported Fill

The site is generally proposed to be filled above existing levels and will require fill material to provide proposed levels.

Materials imported to site will be natural stones sourced from locally available quarries, greenfield / inert soil imported as materials that have been determined as by-products in accordance with the EPA's criteria for determining a material is a by-product or not a waste, per the provisions of articles 27(1) or 28 of the European Communities (Waste Directive) Regulations, 2011-21, or under a Waste Permit issued by the local authority, where required.

Imported materials will be granular in nature and used in the construction of road pavement foundations, buildings, drainage and utility bedding and surrounds. Imported fill will also be required for the raising of the site levels locally and constructing the retention basins to the south of the development site. Materials will be brought to site and placed in their final position in the shortest

possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely co-ordinated to ensure no surplus material is brought to site beyond the engineering requirement. Please note further site investigation will be conducted to confirm the suitability and quantity of material for reuse and imported fill.

The approximate volume of additional fill material to underside of pavement and building structural level is 64,030 m³

The approximate volume of reused subsoil is 10,600 m³.

Kildare County Council
Planning Department

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Construction Traffic

Earthwork's plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. road aggregates, deliveries etc.) have potential to cause rutting and deterioration of the topsoil layer and any exposed subsoil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network).

Dust generation can also occur during extended dry weather periods as a result of construction traffic.

Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

- Storage of oils and fuels on site
- Oils and fuels leaking from construction machinery
- Spillage during refuelling and maintenance of construction machinery
- Use of cement and concrete during construction works

Accidental spillages may impact on the aquifer. Please refer to EIAR chapter 7 for commentary regarding groundwater vulnerability.

Geological Environment

Any excavations associated with development of the site are expected to be moderate for the most part with the deepest excavations associated with construction of the attenuation tanks.

Some localised sections of drainage pipe work will require deep excavations.

It is possible that underlying geology may be disturbed in areas of deep excavation. Any potential impacts to underlying geology as a result of these excavations will be further assessed following more detailed site investigation works prior to any construction work.

Please refer EIAR chapter 7 for further information regarding groundwater impacts.

Operational Phase

Once the construction stage is complete and the development is in-situ and operational, the geology beneath the proposed site will remain unchanged. Subsoil will either be covered by surface hardstanding, building footprint or landscaped areas.

Foul effluent will be discharged to the Irish Water sewer drainage network following the required treatment measures.

Surface water runoff will discharge to ground water.

There will be no significant storage or use of hazardous materials during the operational phase that could adversely impact subsoil, groundwater or surface water in the vicinity of the site. Accidental losses of oil, petrol or diesel on roadways or in car parks could cause contamination if these elements entered the underlying soil and groundwater.

In the absence of mitigation measures, should accidental losses of oil, diesel, or petrol to ground occur, they would be considered direct, negative impacts of temporary duration, given that they would be confined to one-off releases. This would be considered a medium impact to a medium-extreme sensitivity environment, and the significance of the impact would be moderate.

Please refer EIAR chapter 7 for further information regarding groundwater impacts.

6.6 Potential Cumulative Impacts

The cumulative effects of development on land and soils have been assessed taking other planned, existing and permitted developments in the surrounding area into account. Such developments include:

- An additional 2.52 Ha site comprising of 88 no. dwellings has been allowed for to the north of the development site.
- Proposed development at the Former Magee Barracks, Hospital Street, Kildare, Co. Kildare (ABP-305007-19) was granted permission on 24/10/2019.

The works associated with these developments would be similar in nature to the proposed development and would involve additional similar impacts.



6.7 Mitigation Measures

Construction Phase

Stripping Topsoil

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed phasing of 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 not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil stockpiles will also be located so as not to necessitate double handling.

Surface water runoff from areas stripped of topsoil will be directed to temporary on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate. On-site settlement ponds are to include geotextile liners and rippaped inlets and outlets to prevent scour and erosion.

Excavation of Subsoil Layers

Excavation of existing subsoil layers has been minimised as far as reasonably practicable. Cut type earthwork operations will be required to achieve designed site levels. Cut material is considered likely to be suitable to be reused as non-structural fill elsewhere on site. Confirmation of general suitability will be determined at detailed design stage, and individual loads will undergo sporadic testing to confirm uncontaminated status prior to widespread use on site. Dependent on the results of the detailed site investigation, any subsoil proposed for structural fill will undergo soil improvement work required at the direction of an appointed geologist.

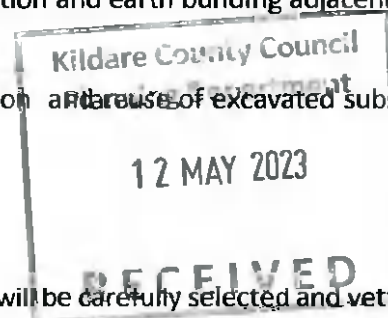
Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

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. Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

Mitigation of soil volumes could be undertaken by soil stabilisation and reuse of excavated subsoil layers and reuse in proposed pavement and building areas.

Imported Fill

The source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is "clean" (i.e. will not contaminate the environment). Project contract and procurement procedures will be developed to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.



No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area. Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling

Construction Traffic

A construction traffic management plan will be developed and implemented in order to minimise the disturbance caused by large vehicles. This management plan shall include and detail:

- Predetermined haul routes for earthworks plant and vehicles delivering construction materials to site.
- Vehicle wheel wash facilities in the vicinity of any site entrances and road sweeping to maintain the road network in the immediate vicinity of the site.
- Dust suppression measures (e.g. dampening down).

Accidental Spills and Leaks

It will be necessary to employ mitigation measures at the construction site in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts. These measures will be outlined in the Construction & Environmental Management Plan (CEMP) and are summarised here as follows:

- Over Ground Oil / Diesel Storage – Only approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally);
- The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site, however minor, by containment /removal from site;
- All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism;
- Fixed plant shall be self-bunded; mobile plant must be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge; and,
- Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points.

Geological Environment

There are no likely significant impacts on the geological environment associated with the proposed development of the site.

Please refer EIAR chapter 7 for further information regarding groundwater impacts.

Operational Phase

Considering the proposed surface water drainage discharges to groundwater, mitigation of surface water quality is provided by:

- SUDS measures located throughout the site, including bioretention areas serving roads and roofs, pervious pavements for all car parking areas providing filtration for hydrocarbons, green roofs for some roofs and ponds serving local areas near to open spaces
- Petrol interceptors upstream of all connections to the infiltration tanks

Please refer EIAR chapter 7 for further information regarding groundwater impacts.

6.8 Predicted Impacts

Construction Phase

The predicted impact on land, soil and geology at construction phase is limited to the excavations required to construct the foundations and install the proposed works. If mitigation elements are implemented, then the risk of impact is negligible.

Operational Phase

As long as relevant impact mitigation measures are implemented, the impact on the operational phase would be limited.

6.9 'Do Nothing' Scenario

Under a 'Do Nothing' scenario, there would be no change in the site's current use, and there would no change to the impacts to the soil and geological environment over the existing scenario.

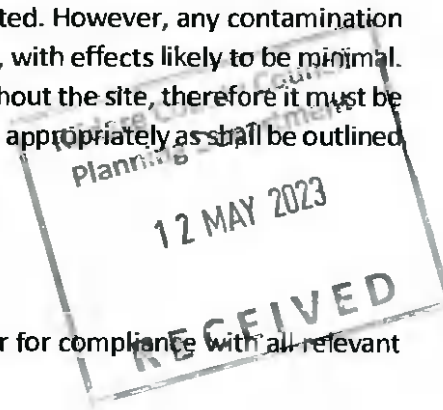
6.10 Worst Case Scenario

No significant effects on land, soils, subsoils or bedrock are anticipated. However, any contamination instances during construction will likely occur in localised areas only, with effects likely to be minimal. Due to nature of the subsoil, permeability varies significantly throughout the site, therefore it must be assumed to be a worst-case scenario and all spillages to be dealt with appropriately as shall be outlined in the construction and environmental management plan.

6.11 Monitoring & Reinstatement

Construction stage elements should be monitored by the contractor for compliance with all relevant standards.

The operational phase of the proposed development should be monitored by the relevant management organisation for all areas, either Kildare County Council, a private management company or private owners.



Any environmental impact should be rectified as soon as is practical.

6.12 Difficulties in Compiling Information

No particular difficulties were encountered in completing this section.

6.13 References

1. Ground Investigation, Causeway Geotech, Ruanbeg, Report Reference No. 22-0819, dated 10th October 2022.
2. Ground Investigation, Causeway Geotech, Ruanbeg Phase 2, Report Reference No. 22-1436, dated 27th January 2023.
3. Hydrogeological Site Assessment Report, BlueRock Environmental Ltd, Ruanbeg Residential Development, Report Reference No. BRE17020Rp01F02
4. GSI online Mapping.
5. EPA online Mapping.



7. Hydrology and Water Services

7.1 Introduction

This chapter of the EIAR was prepared by both Punch Consulting Engineers and Bluerock Environmental Ltd. Punch Consulting contributed to the site drainage and flood risk assessment elements of the chapter whereas BREL contributed to the hydrogeological aspects of the site. The Punch Consulting authors included Mark Richardson BA BAI(Hons) CEng and Clare Shannon BEng (Hons) MIEI of PUNCH Consulting Engineers. Mark Richardson is an Associate with PUNCH Consulting with over 18 years' experience in experience in drainage and civil engineering, in Ireland and abroad, is a member of Engineers Ireland and is a chartered engineer in Ireland. Clare Shannon is a Project Engineer with PUNCH Consulting and has over 11 years' experience in the industry. Clare's particular area of expertise is in flood risk assessment and management.

The Bluerock Environmental Ltd author was Niall Mitchell BE, MSc, CEng MIEI, PGeo. Niall is a Chartered Engineer and Professional Hydrogeologist with over 22 years' experience in the field of hydrogeology, contaminated land, environmental impact for a range of medium to large-scale infrastructural projects across the island of Ireland. He has extensive experience in the assessment impacts on the water environment from landfills, residential and commercial developments, quarries and proposed groundwater abstractions.

This chapter provides an assessment of the likely impact of the proposed development on the surrounding hydrology, hydrogeology, existing surface and foul water drainage and water supply.

The proposed development site location and brief description are described in Chapters 1 (introduction) and 3 (description of development) of this EIAR and as set out in the statutory notices.

7.2 Methodology

The assessment was undertaken to assess potential environmental impacts on the hydrological and hydrogeological environments by undertaking the following:

- A desk-based study of all available hydrological and hydrogeological information in relation to the site and its general environs;
- A review of the spatial layout and characteristics of the proposed development;
- An assessment of construction and operational phase activities associated with the proposed development; and,
- Details of appropriate mitigation measures to demonstrate no significant adverse impact on the hydrological and hydrogeological environments.

This chapter was undertaken in accordance with the following guidelines and guidance documentation:

- Geology in Environmental Impact Statements, A Guide, (IGI, 2002),
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, NRA Document.
- Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013),

- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, (EPA, 2022).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (published in August 2018).
- Guidelines on Environmental Impact Assessment issued by the European Commission in 2017.

The following sources of information were used in the compilation of this assessment:

- Ordnance Survey of Ireland (OSI), Discovery Series, Sheet 55;
- Ordnance Survey of Ireland online historical maps and aerial photographs;
- Geology Kildare - Wicklow, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16;
- GSI - On-line Geology Database. Aquifer Classification, Aquifer Vulnerability;
- GSI - GWDTE-Pollardstown Fen (SAC000396) and Curragh Gravels West (GWB);
- GSI - Groundwater Source Protection Zones - Rathangan PWS, MONASTEREVIN PWS and Curragh Camp PWS;
- Soil Map of Ireland (Second Edition, 1980), National Soil Survey of Ireland, An Foras Talúntais;
- National Parks and Wildlife Service (NPWS) on-line database (www.npws.ie);
- Environmental Protection Agency (EPA) online water quality mapping; (<https://gis.epa.ie/EPAMaps/>);
- Water Framework Directive (WFD) <http://wfdireland.ie/maps.html>;
- OPW hydro-data (<http://www.opw.ie/hydro-data>);
- Flood Hazard Maps and flooding information for Ireland, www.floodmaps.ie - Office of Public Works (OPW);
- CFRAM/ PFRA Maps (OPW);
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
- Public Foul Drainage (Irish Water and KCC Records);
- Public Water Main Networks (Irish Water and KCC Records);
- Public Surface Water Drainage (Irish Water and KCC Records);
- Office of Public Works flood mapping data (www.floodmaps.ie);
- Met Éireann monthly climatological data (<https://www.met.ie/>);
- Previous Site Investigation reports as detailed in Section 7.3.3;
- Punch Consulting Engineers Site Specific Flood Risk Assessment 222143-PUNCH-XX-XX-RP-C-0004 April 2023; and,
- Ruanbeg Residential Development, Hydrogeological Site Assessment, BRE22014Rp01A01, 3rd May 2023 (Appendix 7.1).

7.3 Receiving Environment

Site Location and Context

The subject site is located 1.5 km east of Kildare town centre, Co. Kildare. The proposed site currently consists of 3no. agricultural fields. The site is accessed by the regional road (R445), the surrounding area is characterised by residential estates to the west and north and the Curragh Racetrack and associated surrounding Curragh plains to the east. The R445 bounds the southern boundary of the site. The site location is shown in **Error! Reference source not found.** below.

The boundary treatment around the site comprises of mature trees, hedging and surface ditches. Agricultural farms lie in close proximity to the east and the town of Kildare lies to the immediate west. A beef and lamb food processing facility lies immediately to the south of the site on the southern side of the R445, the M7 motorway also lies in close proximity to the southern boundary of the site.



Figure 7.1: Site Location.

Topography

A topographical survey of the site and its environs was completed by CSS Land Surveys Ltd., in May 2022. The topography of the site varies, ranging between 92.00m AOD and 98.50m AOD, with pronounced hillocks located in the southerly areas of the site. Shallow lower levels also within the area adjacent to the R445.

Site Investigations Undertaken

Detailed site investigations were undertaken by Causeway Geotech across the site in September 2022 and January 2023. Please see site investigation reports, appended to Chapter 6 as below:

- Appendix 6.1 - Ground Investigation Report No: 22-0819, October 2022; and,
- Appendix 6.2 – Ground Investigation: Report No: 22-1436, January 2023.

The investigations included the following:

- Drilling of 7 no. light cable percussion boreholes;
- Drilling of 3 no. rotary boreholes;



- Monitoring well installations within each borehole i.e. 7 no. within the shallow subsoils and 3 no. within the deeper gravels;
- Excavation of 10 no. trial pits;
- Completion of 10 no. infiltration tests within trial pits;
- Completion of 10 no. variable head tests within all monitoring wells;
- Recording of groundwater levels within both shallow and deeper monitoring wells using automated dataloggers and manual dipping over a period of 6 months.
- Geotechnical testing.

The locations of each investigation location are presented in **Error! Reference source not found.** below.



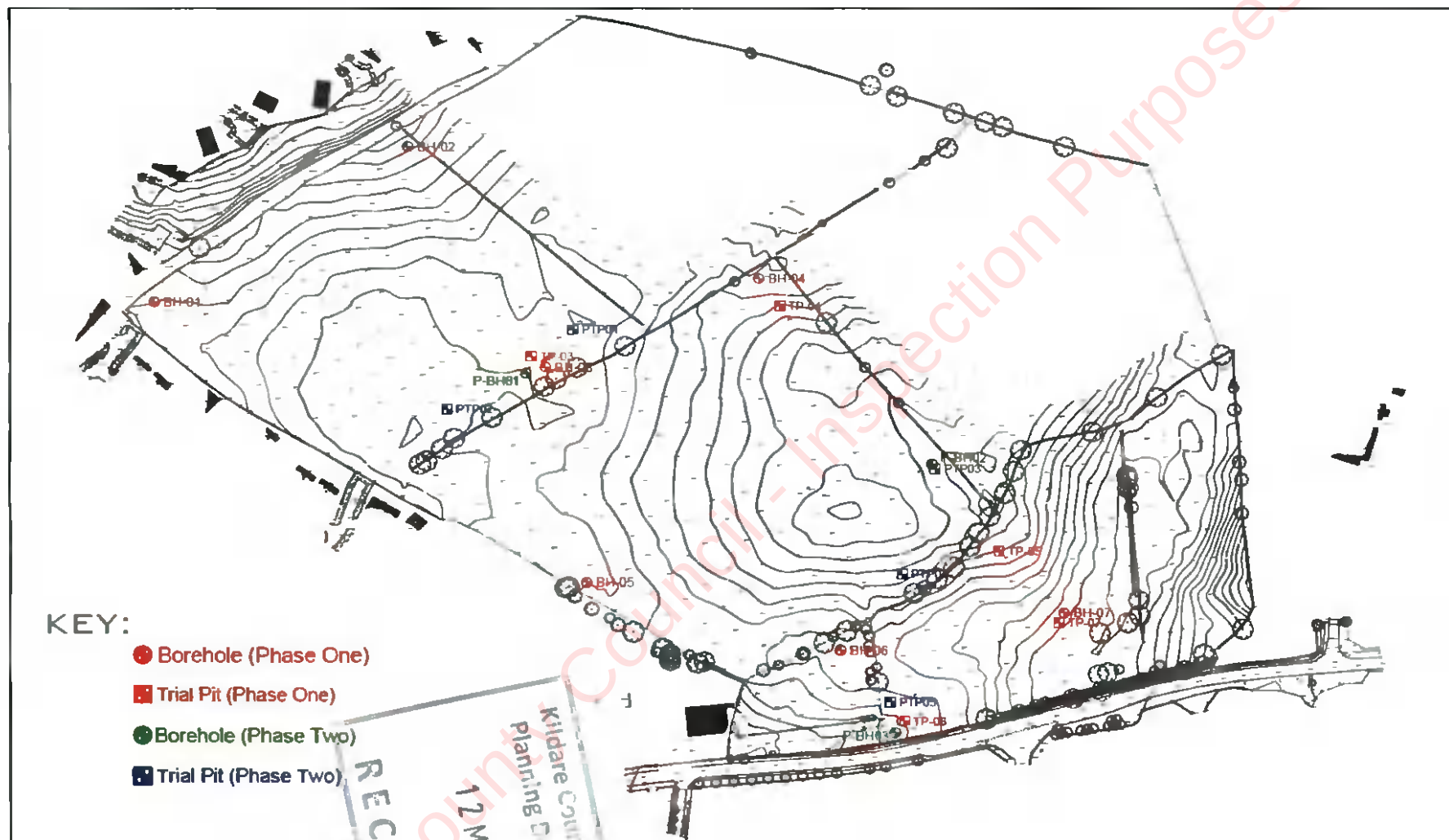


Figure 7.2: Site Investigation Locations

Subsoils and Bedrock

The GSI subsoils map (www.gsi.ie) describes the soils of the general area of Kildare town and county as till derived from limestone with overlying cut-over raised peat. Within the Kildare town area glacial till derived from Lower Palaeozoic and Devonian sandstones are recorded. A large gravel body (circa. 50km²) is recorded to the south and west of Kildare town and underlies the subject site. These gravels area also delineated with associated peripheral alluvial deposits, minor peat and lacustrine sediments and gravel eskers indicated to the south of the deposit.

The Teagasc soils map of Kildare specifies a general overburden of grey-brown podzols. Rarer Acid Brown Earths and Brown Podzolics, associated with lower Palaeozoic deposits, are found north of Kildare town and also west of the Wicklow mountains. Isolated section of Basin Peats and Blanket Peats are also recorded and generally accumulate in size towards the east of Co. Kildare. The gravel deposits are described with an overlying soil group of Renzinas/Lithosols with minor shallow Peaty Gleys. There are also limited areas of alluvium associated with the fluvio-glacial gravel deposits and more recent River Liffey deposits.



Figure 7.3: Quaternary sediments (<https://www.gsi.ie>)

The ground conditions recorded by Causeway Geotech across the site are summarised below in Table 7-1.

General Subsoil conditions

Topsoil	Identified throughout the extents of the site. Thickness ranges from 200mm to 300mm	
Cohesive Deposits	Encountered in all exploratory location.	Interdispersed layers of medium dense sands and gravels with firm to stiff sandy gravelly clay/silt
Granular Deposits	Encountered below the Cohesive deposits	Very dense brownish grey sandy GRAVEL above very dense/dense Gravels with boulders. Intermittent sand lenses are located within the upper cohesive deposits and are describes as silty very gravelly fine to coarse SAND. The dense gravels were encountered at depth ranging between 10.7 and 11.5 mbgl in PBH01 and PBH02 respectively. However, the dense gravels were encountered at shallow depth within PBH03 between 2.3 and 13.1 mbgl.
Bedrock	Not – encountered	

Table 7.1: Ground Conditions

Bedrock

The bedrock geology beneath Kildare town consists of Carboniferous limestone deposits. According to GSI sheet 16, "Geology of Kildare-Carlow" (McConnell, 1994), land subsidence, which occurred during the Carboniferous period in the Upper Palaeozoic, led to extensive ingress of seawater into the low-lying areas which led to an accumulation of marine sediment deposits comprising intertidal laminated mud and sand. The type of sediment being accumulated was governed by the depth of the sea, and therefore progressive subsidence resulted in shallow water sediments to be deposited below the deep water marine sediments.

According to GSI sheet 11, the main rock units underlying the study area is the Rickardstown Formation (RK) – see **Error! Reference source not found.** The Rickardstown Limestone is cherty and often dolomitised. The GSI have identified two distinct horizons within this formation. The lower horizon is varied and includes thin interbedded units of nodular crinoidal, cherty micrite and fossiliferous shale. The upper part consists primarily of quite uniform, moderately dark grey, fine grained dolomite with abundant chert.

Other formations in proximity to the site include the Boston Hill Formation which includes major units of very distinctive, laminated limestone, which distinguish this formation from the Ballysteen Formation.

The area surrounding Kildare town is cut with faults running predominantly in northwest-southeast direction. The site lies between two of these faults, one located approximately 1.55 km southwest and the other approximately 2.5 km northeast.

No bedrock outcrops have been mapped across or in the vicinity of the site.



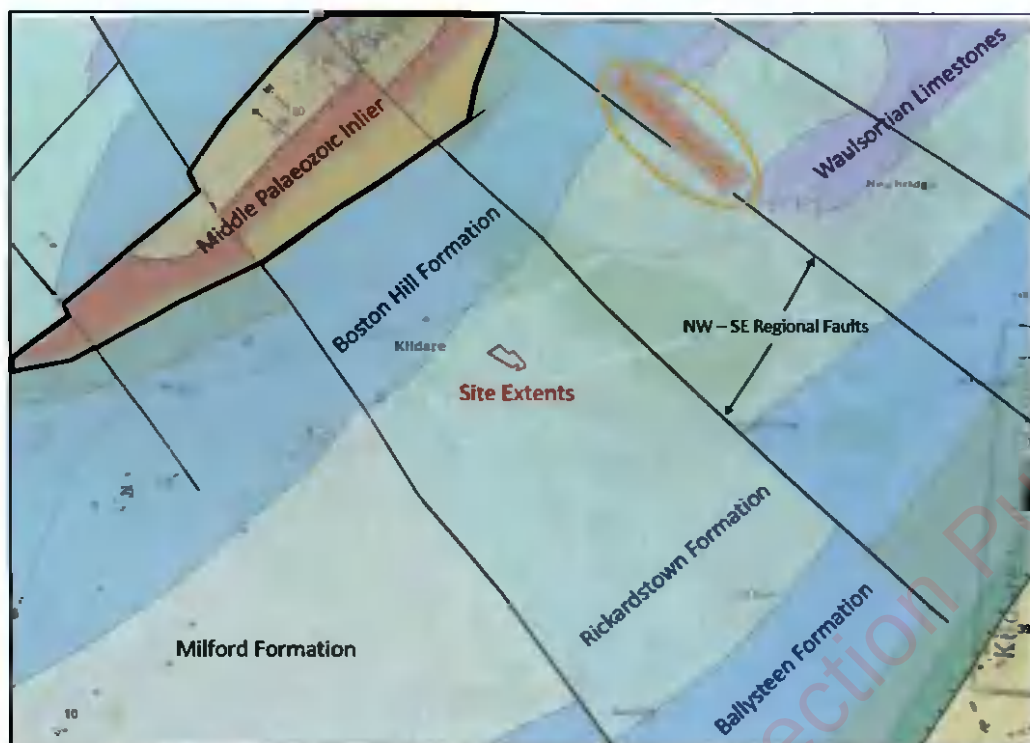


Figure 7.4: Bedrock Geology

Aquifer Classification

The site is underlain by the Regionally Important (Rg) Curragh Gravel Aquifer West Groundwater Body (GWB). This aquifer lies in a shallow trough, oriented NE-SW, at the surface of the limestone bedrock. The topography of the bedrock surface primarily controls the depth of this aquifer with the areas of greatest thickness to the northeast along the drainage divide where it can be up to 70 metres in thickness with reduced thickness away from this area of higher elevation.

The GWB is recharged from rainwater percolating through the topsoil and unsaturated sand and gravel deposits. The main discharge mechanisms present are baseflow discharge to rivers, seepages at the extremities of the body and discharge via springs. Where the water table is sufficiently close to the surface such that the riverbed elevation is lower than it is, the aquifer will contribute groundwater to the river. The occurrence of springs in a gravel aquifer is unusual, as these are more commonly associated with karstic aquifers. It is considered that the discharges from such areas were initially small seepages, which were then altered by man to increase the flow. Natural processes can also lead to the convergence of flow at these springs.

The GWB is a feeder for the Grand Canal and an important source of baseflow for the major river catchments in Kildare, namely the Liffey, the Barrow and the Boyne. This is supported by the estimated flow from the aquifer to the Milltown Feeder at Pollardstown Fen, which is approximately 25,000 m³/day (Daly, D. 1981).

The Curragh GWB has a large catchment area. Its hydrogeology is significant as it is an important source of baseflow for rivers and streams, it influences the ecology of a number of interesting habitats and it is the main source of water for Pollardstown Fen. In terms of groundwater body classifications for the Water framework directive (WFD), a separate groundwater body has been delineated within the Curragh GWB for Pollardstown Fen (Error! Reference source not found.).

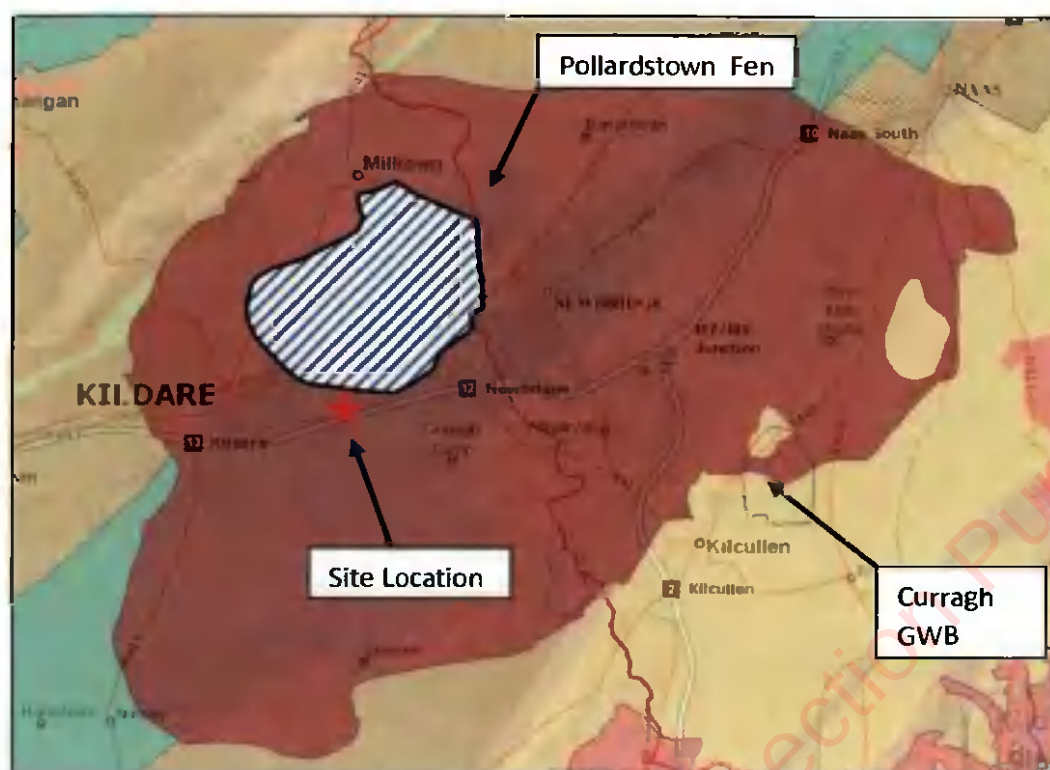


Figure 7.5: Aquifer Classification

The limestone bedrock aquifer underlying the gravel aquifer comprises a Regionally Important Aquifer – Karstified (diffuse) Rkd. A more detailed description of this aquifer is provided in the Hydrogeological Site Assessment completed for the site (see Appendix 7.1)

Characteristics and Properties of Pollardstown Fen Aquifer

Pollardstown Fen is situated on the northern margin of the Curragh of Kildare, approximately 3km west north-west of Newbridge and 4.5 km northeast of Kildare town. It lies in a shallow depression, running in a north-west/south-east direction. About 40 springs provide a continuous supply of water to the Fen, rising chiefly at its margins, along distinct seepage areas of mineral ground above the Fen level. The continual inflow of calcium-rich water from the south of the Fen, primarily from the Curragh, and from the limestone ground to the north, creates waterlogged conditions which lead to peat formation. There are layers of calcareous marl in this peat, reflecting inundation by calcium-rich water. This peat-marl deposit reaches some 6 m at its deepest point and is underlain by clay.

Pollardstown Fen is unusual in Ireland as it is an extensive area of primary and secondary Fen peat, lacking scrub vegetation on its surface. The vegetation is quite varied and species-rich with numerous well-defined plant communities and several rare or scarce floral species. Species and communities characteristic of more nutrient-rich conditions occur on the Fen margins where the water first emerges from the ground, while the central Fen area is dominated by more uniform and less nutrient-demanding vegetation types. Damp pastures occur on wet mineral soils and partly-drained peats on the Fen margins, which are reasonably species-rich, with particularly good displays of orchids in some areas.

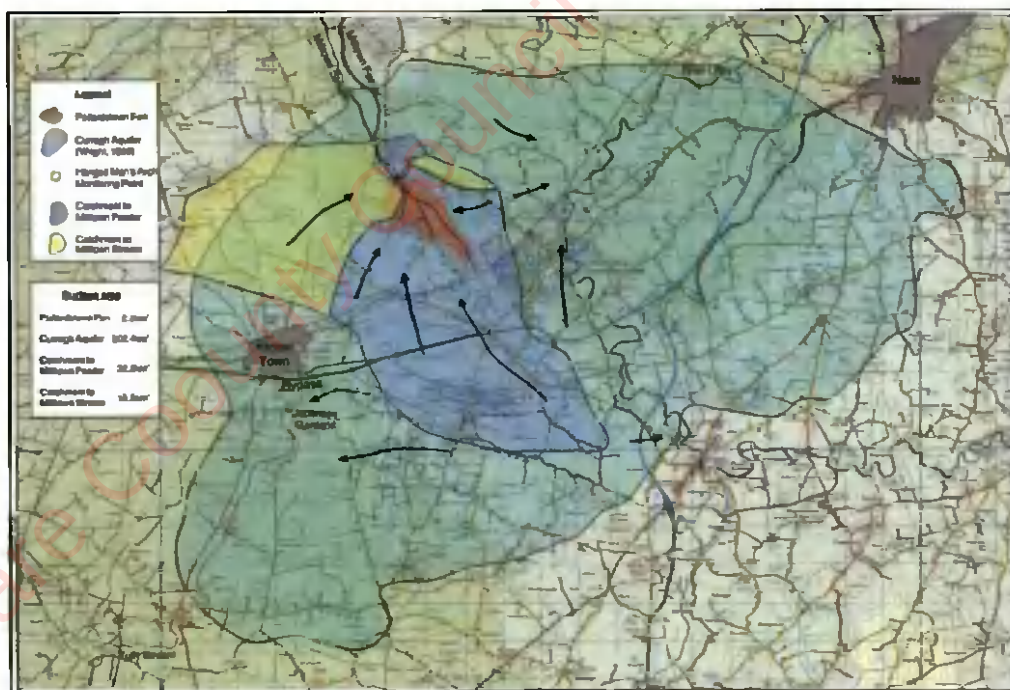
The Fen has ornithological importance for both breeding and wintering birds. An area of reclaimed land was re-flooded in 1983 and has now reverted to open water, swamp and regenerating Fen. Since

the re-flooding of the Fen and the development of the shallow lake, wintering waterfowl have been attracted in increased numbers.

Otter and Brook Lamprey (*Lampetra planeri*), two species listed in Annex II of the EU Habitats Directive, occur at Pollardstown. Various groups of the invertebrate fauna have been studied and the system has been shown to support a true Fen fauna. The species complexes represented are often rare in Ireland, with the sub-aquatic organisms particularly well represented. A number of internationally important invertebrates (mostly Order Diptera, i.e. two-winged flies) have been recorded from the site. Of particular conservation importance, however, is the occurrence of all three of the Whorl Snails (*Vertigo* spp.) that are listed on Annex II of the EU Habitats Directive. Pollardstown is the only known site in Ireland (or Europe) to support all three species (*Vertigo geyeri*, *V. angustior*, *V. moulinsiana*) (NPWS, 2003).

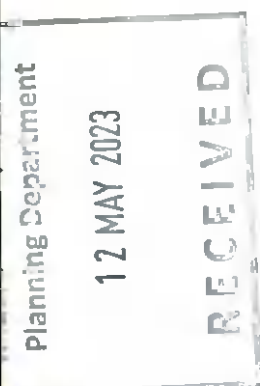
There are a number of drains cross cutting the Fen which discharge to the Milltown feeder. The Milltown Feeder joins the Grand Canal near Robertstown Co. Kildare, and it is the main source of water for the canal. Daly (1981) estimated that approximately 25,000 m³ per day was discharging through the Milltown feeder from the Fen. Approximately 92% of the discharge from the Fen emanates from the southern part of the catchment, while the remaining 8% is sourced from the smaller northern portion of the catchment, the spring at the public entrance to the Fen and direct precipitation (Kuczynska, 2008).

A schematic catchment map of the Curragh aquifer was historically prepared by Dr. Les Brown (2008), which indicates groundwater flow direction and is presented in Error! Reference source not found.. This map was prepared based on topography only and not on any groundwater hydraulic pressure records.



Source (Dr. Les Brown, 2008b)

Figure 7.6: Groundwater Flow Direction from Curragh Aquifer to Pollardstown Fen



As is evident from the above, groundwater was interpreted to discharge to Pollardstown Fen in the north, while in the south groundwater discharges via a number of springs (including those in the Japanese Gardens) and provides baseflow to the Tully River (a tributary of the River Barrow). To the east of the aquifer, groundwater provides baseflow to the River Liffey. A groundwater divide located northeast of Kildare town is clearly evident.

Aquifer Vulnerability

The GSI classify aquifer vulnerability as the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability of groundwater depends on the ability of contaminants to migrate to the underlying aquifer which is dependant predominantly on the permeability and thickness of the subsoils overlying the groundwater body and the types of recharge source (i.e. diffuse or point source). Under the GSI groundwater vulnerability classification scheme the mapped vulnerability at a location applies to the shallowest groundwater target (i.e. aquifer) at the location.

Aquifer vulnerability is largely dependent on overburden thickness and the inherent permeability of the bedrock. If bedrock is near or exposed at the surface the groundwater classification will be extreme. A detailed description of the groundwater vulnerability categories can be found in the Groundwater Protection Schemes document (DELG / EPA / GSI, 1999) and in the draft GSI Guidelines for Assessment and Mapping of Groundwater Vulnerability to Contamination (Fitzsimons et al, 2003). A regional groundwater vulnerability map can be viewed online (<http://www.gsi.ie/Mapping>).

The GSI maps indicate that the groundwater vulnerability across the majority of the site is mapped as High (H) Vulnerability based on depths to bedrock and permeability of the overburden, (Error! Reference source not found.).

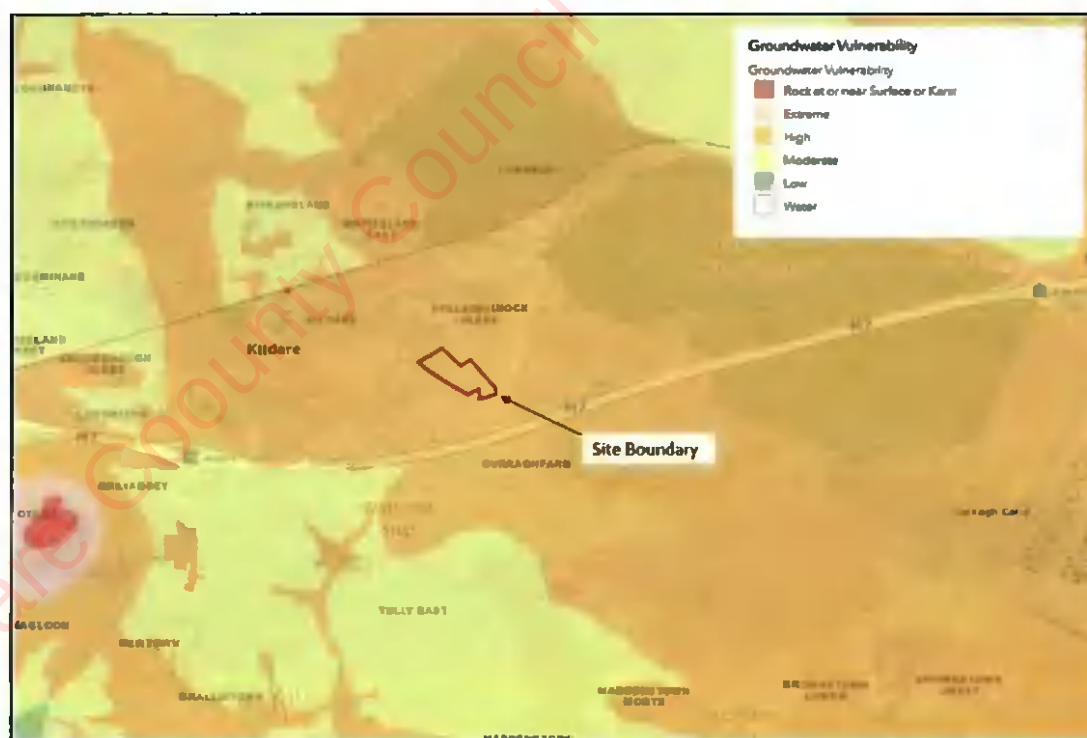


Figure 7.7: Groundwater Vulnerability Mapping

Water Framework Directive (WFD) Status – Groundwater

Groundwater quality and quantity must be protected in their own right under the requirements of the WFD (2000/60/EC). The Groundwater Directive (80/68/EEC) and the WFD are the relevant pieces of EU legislation relating specifically to groundwater. The current standards related to groundwater in Irish legislation are the environmental quality standards set for Schedule 1 and Schedule 2 substances in the water pollution regulations (S.I. 271 of 1992) and the Groundwater Regulations 2010 (source: EPA Website).

The Water Framework Directive has assigned 'Status' to surface waters and groundwater (www.EPA.ie - watermaps) throughout Ireland. The Water Framework Directive Status of the Curragh GWB, which is linked to Pollardstown Fen SAC, is rated as "Good" for 2016 – 2021.

In terms of groundwater body classification for the WFD, a separate groundwater body has been delineated within the Curragh GWB for Pollardstown Fen, as shown in Figure 7.5. The WFD status currently for the Pollardstown Fen is classified as "Good status".

The regionally important aquifer that underlies the Pollardstown Fen GWB is a Karstified (Diffuse) aquifer: the Bagenalstown Upper Aquifer and it has an overall GW_Status of "good".

7.3.10 Regional Groundwater Levels and Flow Direction

The Curragh gravel aquifer has relatively large intergranular primary porosity allowing for increased waterflow. However the aquifer is reportedly unconfined across most of the GWB.

The Mid-Kildare aquifer is a feeder for the Grand Canal and is an important source of baseflow for the streams and rivers. This is supported by the estimated flow from the aquifer to the Milltown Feeder at Pollardstown Fen of approximately 25,000 m³/day (Daly, D. 1981). The aquifer provides baseflow for the major river catchments in Kildare, namely the Liffey, the Barrow and the Boyne. Pollardstown Fen, an important Natural Heritage Site, also derives its water from the aquifer.

Regional groundwater flow directions estimated by Wright (1988) and Misstear (2008b) is outlined in Figure 7.6. However, subsequent detailed groundwater level mapping was undertaken by Mr. Richard Langford in 2011 in conjunction with Trinity College, Dublin.

Groundwater monitoring was undertaken by Langford, 2011 at a local scale for intensive monitoring of water levels at the Fen margin, and at a regional scale for intensive monitoring of the groundwater flow regime across the Curragh Aquifer. The groundwater monitoring network (27 no. monitoring boreholes in total) were set up previously by White Young Green (WYG) Environmental Consultants and Kildare County Council as part of the monitoring programme established during the construction of the Kildare town by-pass (Error! Reference source not found. and Error! Reference source not found.).

The assessment, which is considered to be more accurate than Error! Reference source not found. as it is based on actual groundwater heads within numerous monitoring wells across a significant area, confirms that regional groundwater flow direction to the south of Pollardstown Fen to be generally in a north-easterly direction towards the Fen. However a groundwater divide was confirmed and mapped to the northeast of Kildare town. South of this divide, groundwater was interpreted to flow in a southwesterly direction across Kildare town. The proposed residential development site is located southwest of this divide and therefore groundwater is interpreted to flow locally in a southwesterly direction across the site and not towards Pollardstown Fen.

The monitoring borehole locations utilised by Langford, 2011 are presented in Error! Reference source not found. and Error! Reference source not found. with a cross section of the aquifer and interpreted ground flow directions provided in Error! Reference source not found..

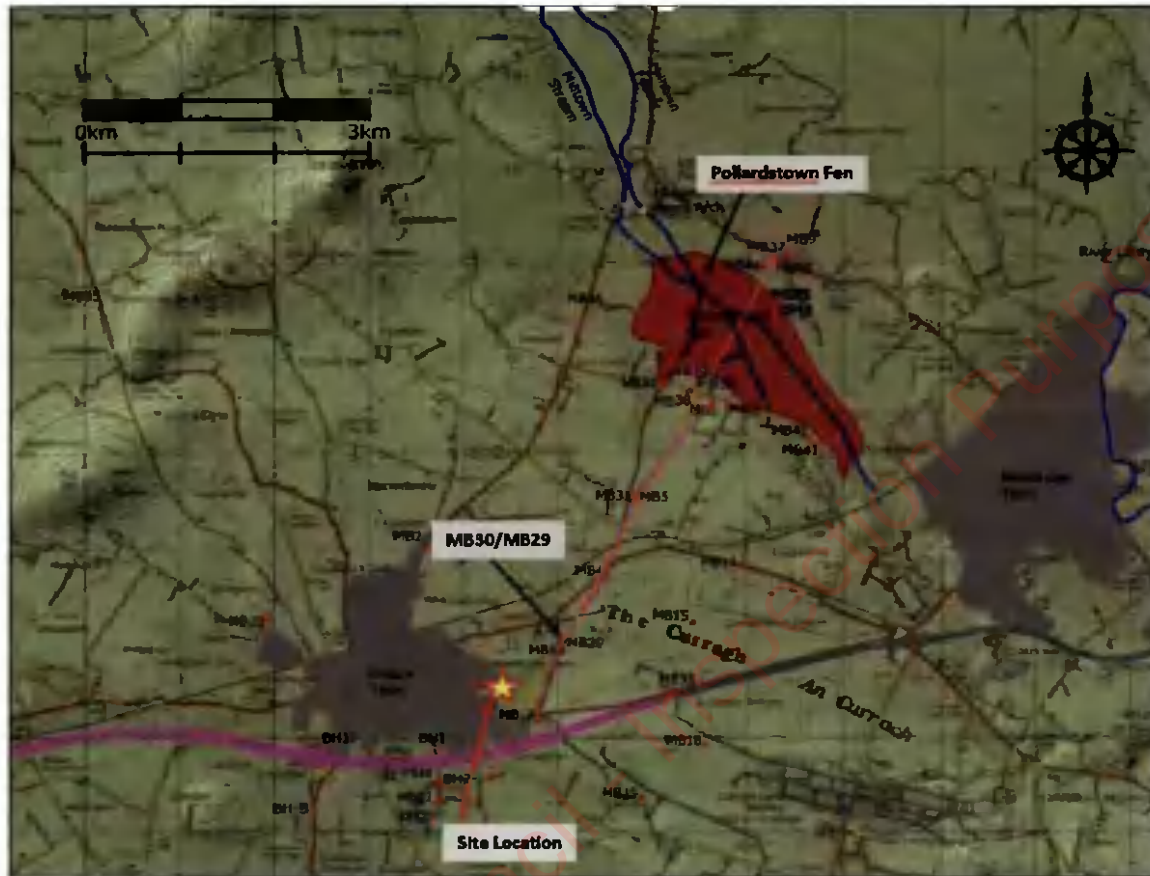


Figure 7.8: Transect through Curragh Aquifer & Pollardstown Fen



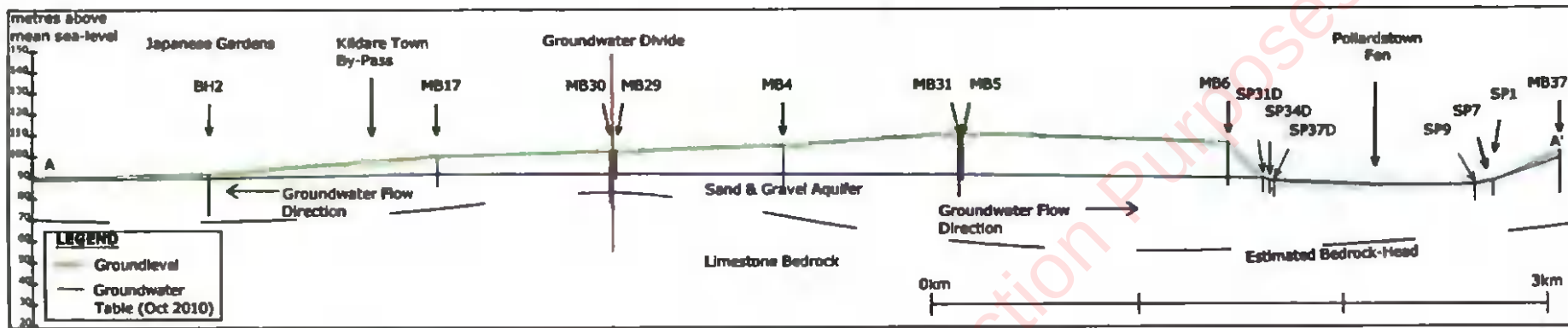


Figure 7.9: Section through Curragh Aquifer & Pollardstown Fen



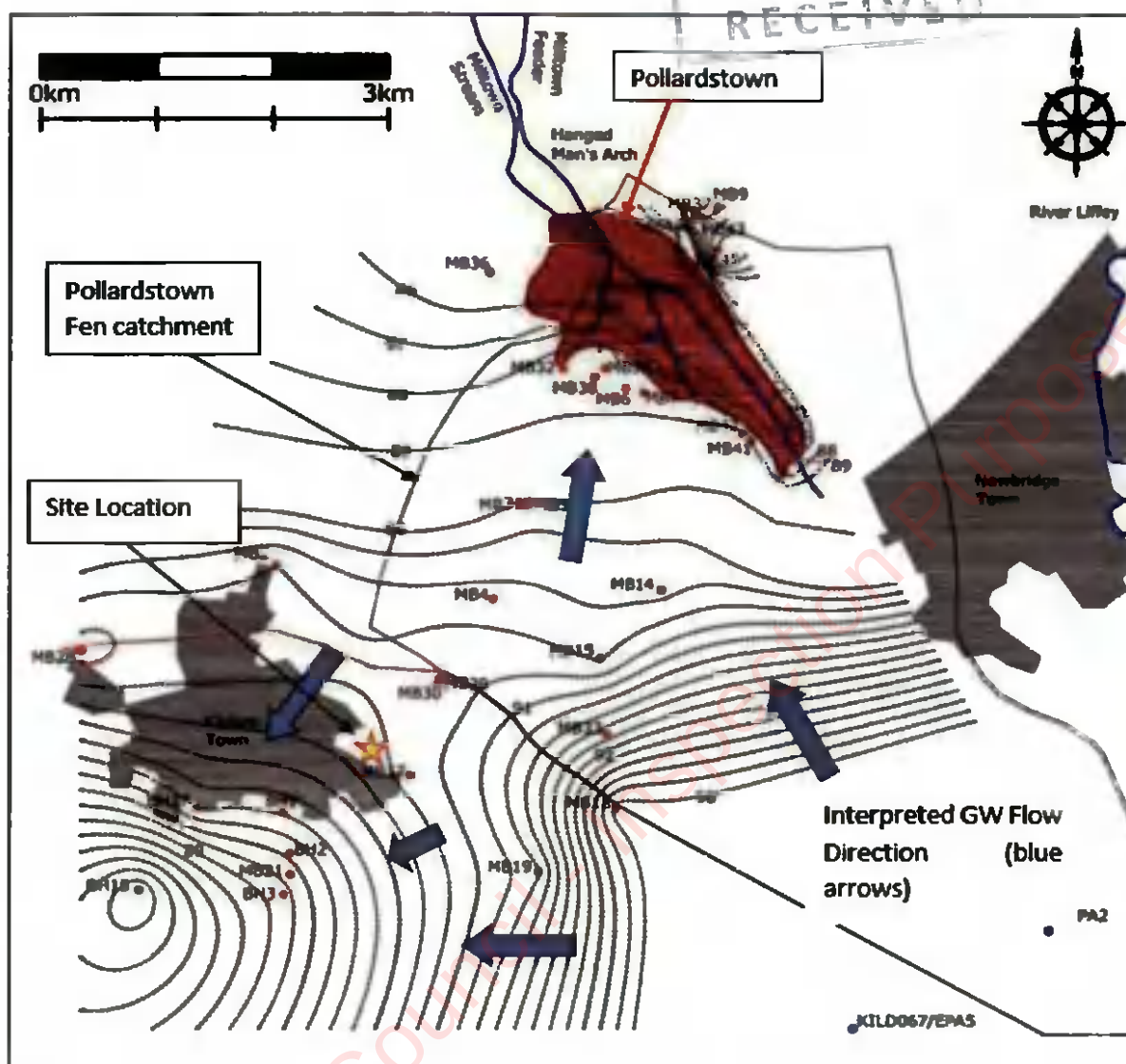


Figure 7.10: Regional Interpreted Groundwater Contours and Fen Catchment

Onsite Groundwater Level Monitoring

Groundwater levels monitoring was undertaken within all shallow and deeper groundwater monitoring wells across the site between the 19th September 2022 and the 4th April 2023. The 7 no. monitoring wells (i.e. BH01 to BH07) were installed within the shallow subsoils to identify any shallow groundwater present and to assess the infiltration characteristics of this horizon to facilitate the design of the proposed drainage system. The 3 no. deeper monitoring wells were installed within the deeper gravel body to assess groundwater levels and groundwater flow direction across the site and to assess the hydraulic connection between the proposed development and the groundwater-dependant ecosystem of Pollardstown Fen

Groundwater levels were monitoring using both automated groundwater level dataloggers and manual dipping.

The automated dataloggers were initially installed within BH01 – BH07 on the 16th September for a period of 3 months i.e. until the 9th January 2023. All wells with the exception of BH07 were recorded as dry throughout this period. The dataloggers from selected dry shallow wells were transferred to

the deeper monitoring wells for a further 3 months with on-going manual groundwater level undertaken in BH01 to BH07 during this time.

The resulting water levels recorded in monitoring wells within groundwater present are summarised in Table 7-2 and outlined in **Error! Reference source not found.** A more detailed description is provided in the 2023 Bluerock Environmental Hydrogeological Assessment Report for the site (see Appendix 7.1). A summary of the recorded groundwater levels is outlined below:

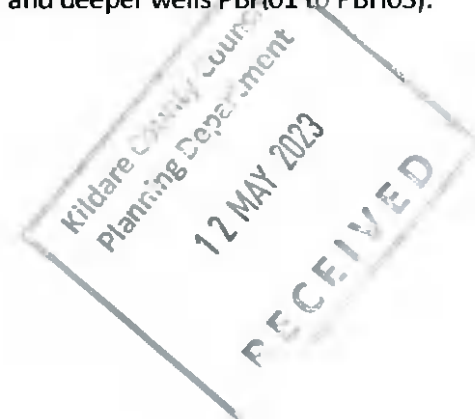
- All shallow groundwater monitoring wells were recorded as dry throughout the 6 months of monitoring with the exception of BH07 where groundwater was recorded at levels ranging between 4.24 and 4.83 mbgl (i.e. between 88.46 and 87.83 mOD). Water levels ranged over a 1.2 metre interval between September 2022 and April 2023. Well BH07 is located in the lowest region of the site.
- Groundwater levels recorded within the deeper gravel monitoring wells were recorded at levels ranging between 5.34 and 8.95 mbgl (i.e. between 88.34 - 88.83mOD). Groundwater levels within this horizon varied over an ~0.5 metre interval between September 2022 and April 2023.
- The highest groundwater levels were recorded on the 4th April 2023 following sustained rainfall events throughout March 2023. These levels are expected to reduce with notable reduced rainfall levels recorded in April 2023.

The spike in water levels on BH07 in January 2023 is attributed to the effects of a falling head test and is not considered representative of equilibrium groundwater levels.

Monitoring Well ID	Max Water Level (mbgl)	Max Water Level (mOD)	Min Water Level (mbgl)	Min Water Level(mOD)
BH01	dry	dry	dry	dry
BH02	dry	dry	dry	dry
BH03	dry	dry	dry	dry
BH04	dry	dry	dry	dry
BH05	dry	dry	dry	dry
BH06	dry	dry	dry	dry
BH07	4.24	88.46	4.83	87.83
P-BH01	5.34	88.72	5.65	88.41
P-BH02	8.57	88.83	8.95	88.45
P-BH03	7.31	88.34	7.64	88.67

Table 7.2: Maximum and Minimum Groundwater Levels

Error! Reference source not found. represents the recorded groundwater levels from 4 no. monitoring wells within the site boundary (i.e. shallow well BH07 and deeper wells PBH01 to PBH03).



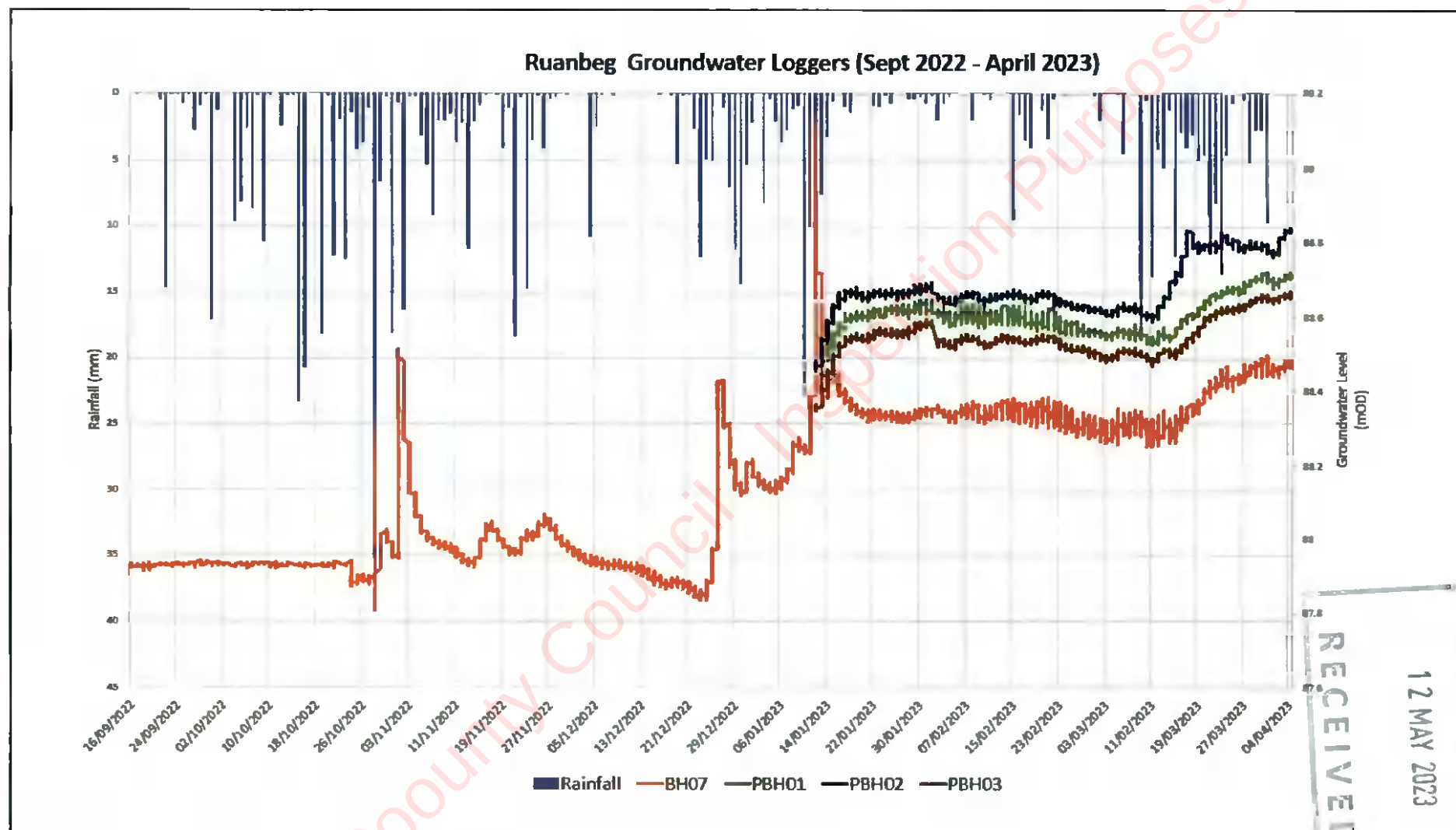


Figure 7.11: Ground water Levels September 2022 – April 202

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Figure 7.12: Ground water Flow Direction 31st February 2023

As detailed in the 2023 Bluerock Environmental Ltd Hydrogeological Assessment report, groundwater flow within the deeper dense gravel body is interpreted to be consistently flowing in a south to southwesterly direction across the site i.e. in the opposite direction to Pollardstown Fen (Error! Reference source not found.). This interpretation was based on the triangulation of groundwater levels across the site with groundwater flowing from areas of elevated groundwater to lower groundwater levels. The lowest groundwater levels were recorded in the southern region of the site. The interpreted flow direction is consistent with the regional groundwater flow pattern mapped by Trinity College and previous studies referenced in the 2023 Hydrogeological Assessment report. Groundwater flow recorded on the 31st January 2023 is presented and is consistent with interpreted groundwater flow direction during the period when groundwater levels were at their highest i.e. 4th April 2023.

Groundwater within shallow monitoring well BH07 is considered to be hydraulically connected with the deeper gravel aquifer with groundwater flowing as a single hydraulic unit across the site. Groundwater is interpreted to be flowing under unconfined conditions across the site.

The highest recorded groundwater level was recorded in well PBH02 at a level of 8.58mbgl (i.e. 88.83 mOD).

A cross section of the site is presented in Error! Reference source not found..

Groundwater Recharge, Infiltration and Permeability

The GSI groundwater recharge map provides an estimate of the average amount of rainwater that percolates down through the subsoils to the water table over a year. The groundwater recharge map is derived from existing hydrogeological and meteorological spatial datasets. The main hydrogeological controls on groundwater recharge include the permeability and thickness of

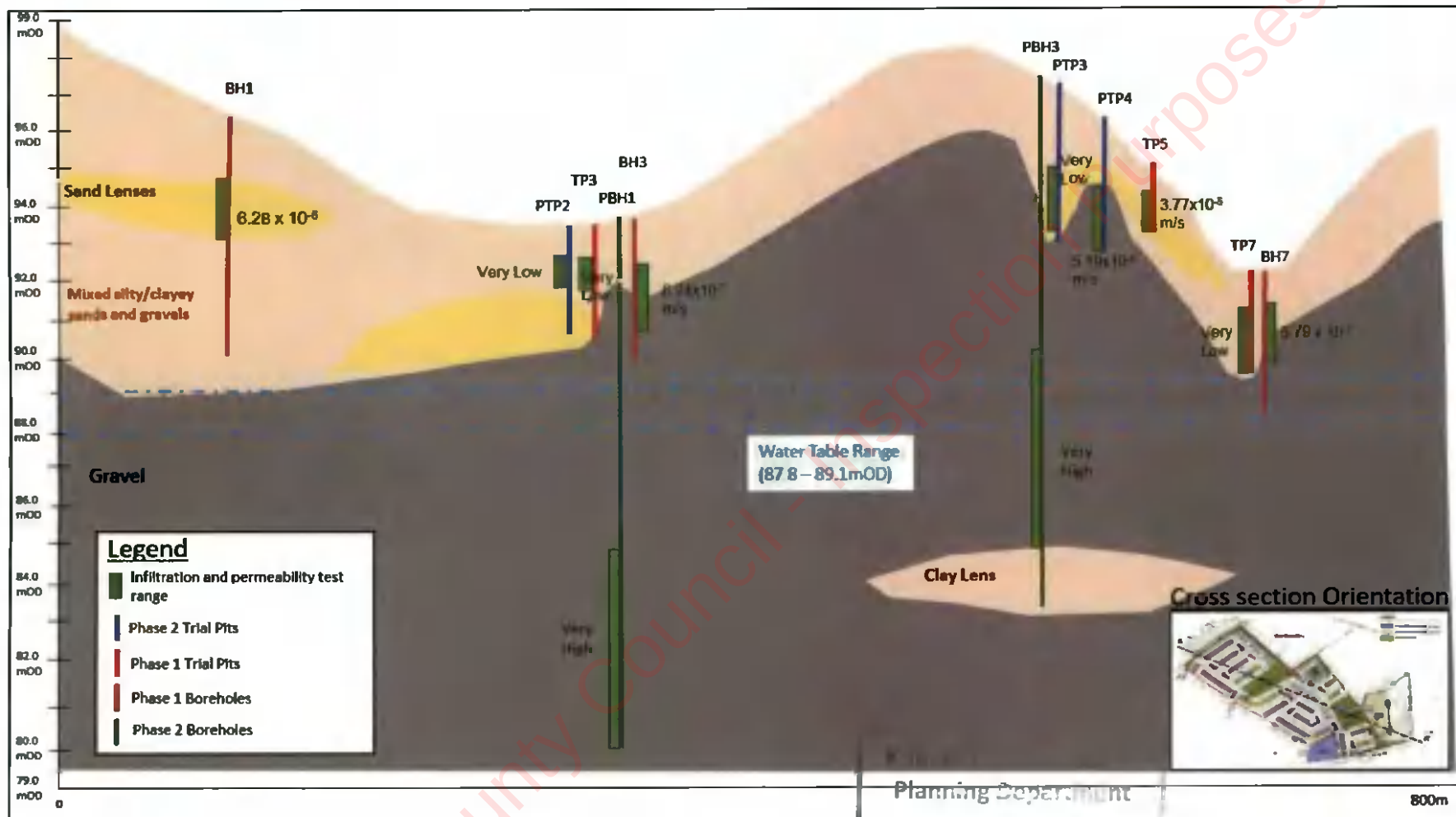
superficial deposits, the presence of saturated soils, and the ability of the underlying aquifer to accept percolating waters. Combinations of these factors are assessed, and a 'recharge coefficient' established for different hydrogeological scenarios.

The GSI recharge map indicates the average recharge from the subject lands is 406 mm/year with a recharge coefficient of 85% (due to high permeability subsoil overlain by well-drained soil). The recharge will be diffuse in nature due to the permeability of the topsoil and subsoil.

Soil infiltration rates were calculated assessed as part of the site investigation activities in accordance with BRE Digest 365 and CIRIA SuDS Manual C753. In addition, a series of variable head permeability tests were conducted within all monitoring wells across the site to determine permeabilities within the overburden strata.

For all shallow subsoils, infiltration/permeability rates ranged between very low to 5.19×10^{-5} metres/second with highly permeable conditions recorded within the deeper gravels.





Note: Vertical Scale exaggerated by 40:1 approx

Figure 7.13: Cross section of Site.

GSI Well Database

Groundwater wells and springs within 1km of the site are outlined in Table 7-3

GSI Name	Well Type	Drill Date	Depth of Hole (m)	Depth to rock (m)	Distance to subject site (km)	Source Use
2621SWW137	Borehole	1980	56.6	48.8	0.77	Unknown
2621SWW240	Borehole	1899	22.4	Unknown	0.83	Unknown
2621SWW241	Dug well	1899	14.8	Unknown	0.73	Unknown
2621SWW194	Unknown	1899	13.5	Unknown	0.96	Unknown
2621SWW193	Unknown	1899	21	19.5	0.89	Unknown
2621SWW243	Borehole	1899	13.4	Unknown	0.84	Unknown
2621SWW242	Dug well	1899	11.4	Unknown	0.84	Unknown
2621SWW116	Borehole	1899	30.5	Unknown	0.81	-
2621SWW244	Dug well	1899	5.8	Unknown	0.46	Unknown
2621SWW245	Borehole	1899	16.2	Unknown	0.42	Unknown
2621SWW246	Dug well	1899	4	Unknown	0.31	Unknown
2621SWW195	Borehole	1998	15	Unknown	0.33	Other
2621SWW167	Borehole	1992	13.5	Unknown	0.54	Unknown
2621SWW165	Borehole	1992	13.5	Unknown	0.57	Unknown
2621SWW168	Borehole	1992	10	Unknown	0.61	Unknown
2621SWW169	Borehole	1992	11.6	Unknown	0.61	Unknown
2621SWW196	Borehole	1998	18.6	Other	0.9	Other
2621SWW111	Unknown	1899	13.4	Unknown	0.54	-

Table 7.3: GSI Well Database Within 1km of the Site

EPA/GSI Source Protection Zones

As reported by the EPA and GSI, groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. Consequently, the objective of source protection zones is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source.

There are no source protection areas mapped within 3km of the site. Two public water supply (PWS) schemes are mapped by the GSI as follows (**Error! Reference source not found.**):

- Curragh Camp PWS – Area of 0.13 km² – (Code IE_SE_G_133) – located within the Curragh Gavel West GWB – Ruanbeg Residential Development site is located approximately 3.4 km northwest of the outer extent of the closest Inner Protection Zone (IPZ) of the supply.
- Monasterevin/Rathangan PWS – Area of 2.92 km² – Code (IE_SE_G_153) – located within the Bagenalstown Upper GWB – Ruanbeg Residential Development is located approximately 4.2 km southeast of outer extent of the Outer Protection Zone (OPZ) and greater than 6 km southeast of the closest part of the IPZ of the supply.

The GSI online map does not identify any significant or notable abstraction wells within 1 km of the proposed development. All 11 no. GSI wells mapped within 1 km are summarised in Table 7-3.



Figure 7.14: Rathangan and Curragh Camp Public Water Supply Protection Zones

Hydrology

The subject lands are located within the Barrow Catchment in Hydrometric Area 14. This catchment includes the area drained by the River Barrow upstream of the River Nore confluence and all streams entering tidal water between the Barrow railway bridge at Great Island and Ringwood, Co. Kilkenny, draining a total area of 3,025km².

The subject lands are located within the subcatchment Barrow_SC_060 (Code 14_18), which covers an area of 273km² and has a WFD status of "good".

The subject site shows no immediate drainage ditches along the site boundaries. The boundary is lined with trees and grass/shrubs earth mounds to the north and east and to the south and west it is bounded by a partition wall.

Teagasc soils map categorises the soil area within the site as *shallow well drained minerals (mainly basic)*. This indicates that the majority of surface water runoff is likely to migrate vertically downward directly into groundwater. The lack of immediate surface water rivers and streams supports this.

Water Framework Directive (WFD) Status – Surface Water

The River Waterbody WFD Status 2016-2021 represents all the River Waterbody Status results recorded in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003). The regulation objectives include the attainment of good status in waterbodies that are of lesser status at present and retaining good status or better where such status exists. The WFD River Waterbodies Risk represents the risk for each waterbody of failing to meet their Water Framework Directive (WFD) objectives by 2027.

There are no identifiable waterbodies in the immediate vicinity of the site. Three (3 no.) surface water bodies closest to the site include the Tully stream (1.67km to the southwest of the site), the river Liffey (6.8km to the east of the site) and the Grand Canal Milton Feeder (4.51km to the northeast of the site). Only the Tully stream lies downgradient of the subject site (Error! Reference source not found.).

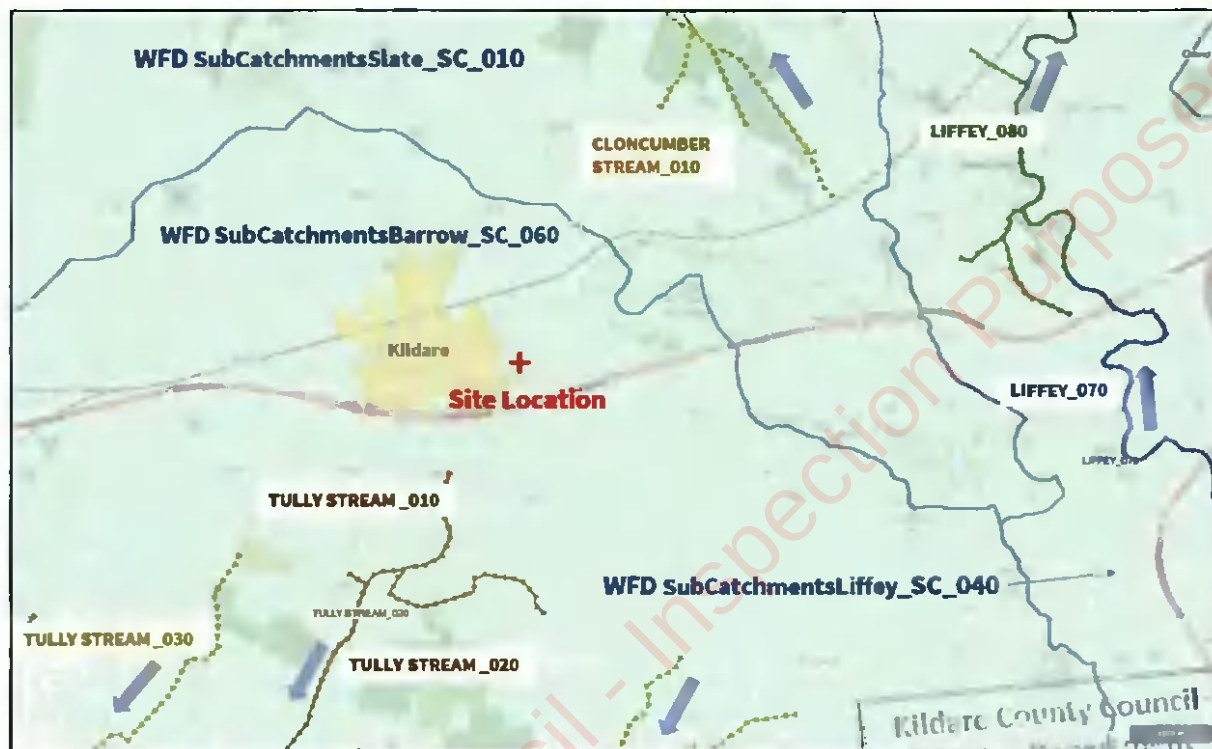


Figure 7.15: Hydrology Map

The WFD status of each water body is outlined below:

- The River Waterbody WFD Status of the Tully stream (TULLYSTREAM)_020, European Code (IE_SE_14T020409), is classified as a water body with a 'Poor' Status.
- The River Waterbody WFD Status 2016-2021 for the (LIFFEY_080) European Code (IE_EA_09L011000) is 'High' between Newbridge town and Kilcullen. It changes to a 'good' status once it enters Newbridge town.
- The Canal Waterbody WFD Status 2016-2021 for the (Grand Canal Milltown Feeder (Barrow) European Code (IE_14_AWB_GCMF) is 'good' as it exits the Pollards town Fen nature reserve.

Site Drainage

Based on the site investigation data, the subsoils present are considered sufficiently permeable to facilitate the discharge of treated wastewater to ground. It is acknowledged that the lack of any surface water features in proximity to the site and the lack of any ponding of water to ground to-date confirms the permeable conditions of the area.

On the basis of available records provided by Irish Water / Kildare County Council, there is no stormwater drainage present within the development site. Record drawings provided by Irish Water/KCC indicate the presence of an existing 225mm uPVC surface water sewer outside the western

boundary of the site. Error! Reference source not found. presents an extract from maps received from Irish Water/KCC.

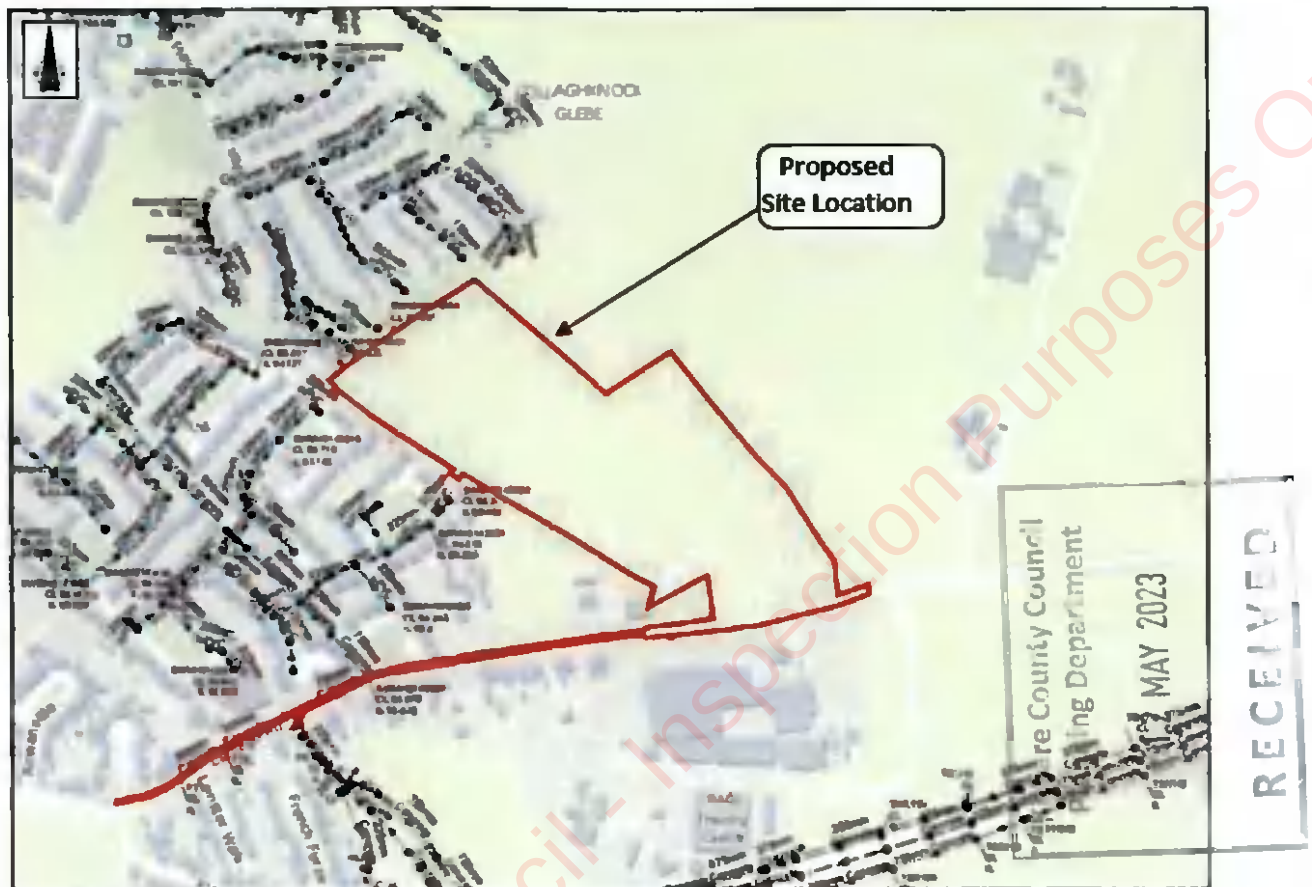


Figure 7.16: Extract from Irish Water Record Drawings (© Irish Water)

The proposed surface water drainage system for the development has been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GDSDS) and the Kildare County Development Plan (2023-2029) and DRAFT Kildare Town Local Area Plan (2023-2029).

A new surface water sewer network shall provide for the proposed development which will be entirely separated from the foul water sewer network. All surface water run-off from roof areas and hardstanding areas are designed to be collected by a gravity pipe network.

Designated Protected Areas

The nearest site designated for nature conservation is the Curragh proposed Natural Heritage Area (pNHA), (site code 000392) approximately 0.5km to the northeast the site. The Grand Canal pNHA (002104) is 5km to the northwest.

The nearest Special Areas of Conservation (SAC), are Pollardstown Fen SAC (000396), approx. 3.8km to the northeast, the River Barrow and River Nore SAC (002162), approx. 11.8km to the west and Mouds Bog SAC (002331), approx. 6.5km to the northeast. Ballynafagh Lake SAC (001387) and Ballynafagh Bog SAC (000391) are approx. 14.5km to the northeast.

A number (7 no.) of proposed Natural Heritage Areas (pNHAs) within 15 km of the proposed development are summarised in Table 5.18. The locations of designated sites are shown in **Error! Reference source not found.** below. No Natural Heritage Areas occur within 15 km of the proposed development.

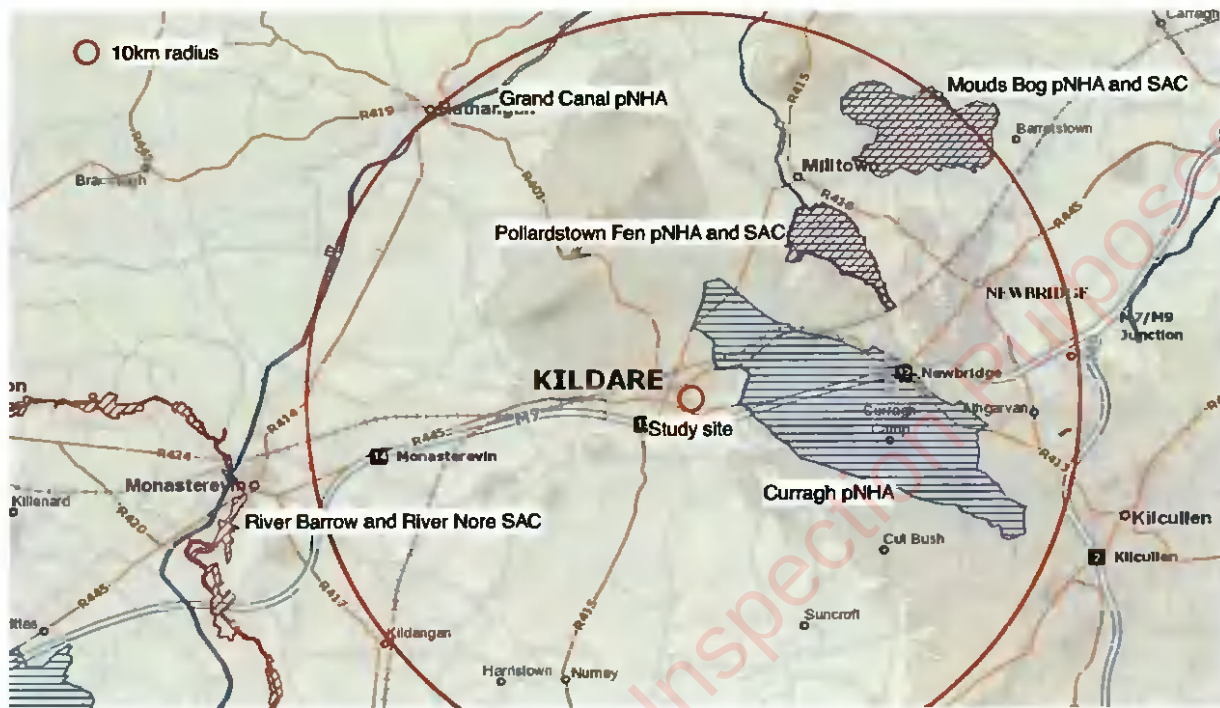


Figure 7.17: Designated Protected Areas

Flood Risk

The GSI groundwater flood probability map indicates there is no risk to the subject lands from seasonal groundwater flooding. The OPW Flood Maps indicates that the Kildare area is currently under review (<https://www.floodinfo.ie/map/floodmaps/>).

A site-specific flood risk assessment was completed for the site by Punch Consultant Engineers (Site Specific Flood Risk Assessment, Proposed Residential Development at Ruanbeg, Kildare Town, Co. Kildare, Ref: 222143-PUNCH-XX-XX-RP-C-0004, dated April 2023) and is appended to this EIAR (see Figure 7.2).

The Site-Specific Flood Risk Assessment was carried out in accordance with "The Planning System & Flood Risk Management Guidelines" published by the Department of the Environment, Heritage and Local Government in November 2009 and the Kildare County Council Local Area Plan.

A review of the flood risk in the area was carried out for the site. Flood Maps produced as part of the NIFMS were consulted to establish the Flood Zone. It was determined that the proposed development site is currently located in Flood Zone C for fluvial flooding (**Error! Reference source not found.**).

The proposed development was therefore deemed to be at low risk of flooding and is deemed appropriate for the site.



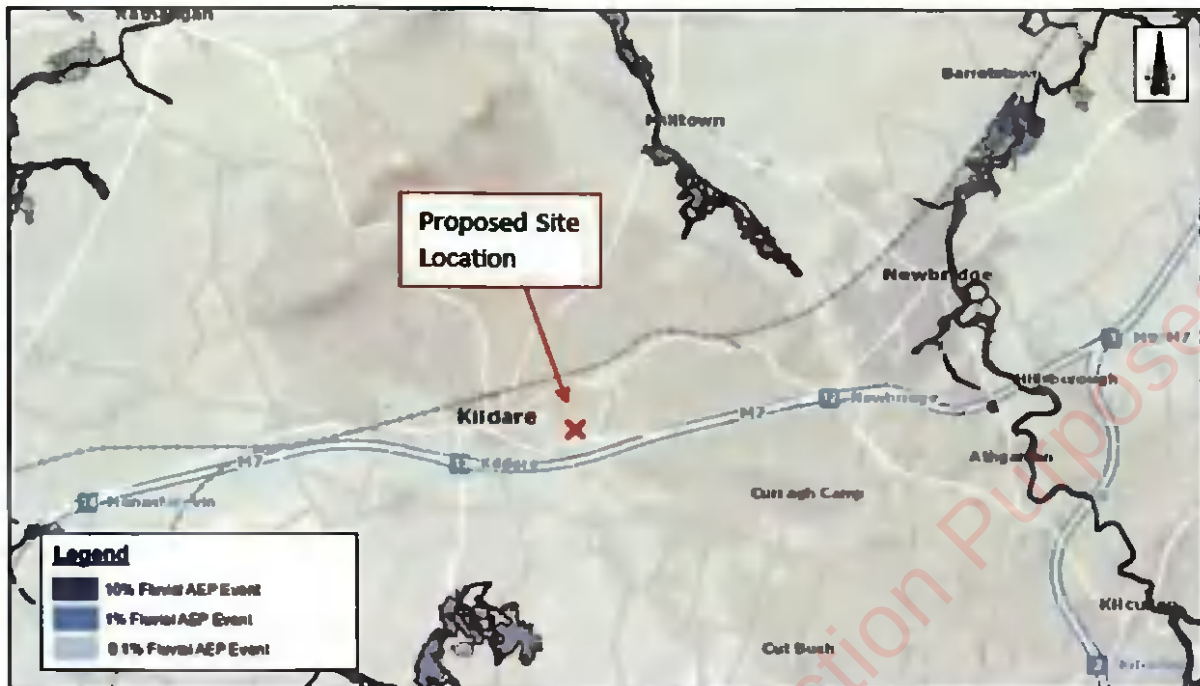


Figure 7.18: Extract from the National Indicative Fluvial Mapping (Low and Medium Probability)

Water Supply

Irish Water record drawings indicates the following watermain infrastructure to exist adjacent to the site.

- 1) 3" cast iron watermain located on the R445 towards the southern border of the site.
- 2) 101.6mm uPVC watermain located on the R445 towards the southern border of the site.
- 3) 100mm uPVC watermain located in the residential developments to the west of the site.

Please refer to **Error! Reference source not found.** for an extract of the existing record drawings illustrating the existing stormwater drainage arrangement.





Figure 7.19: Extract from Irish Water Record Drawings (© Irish Water)

Foul Drainage

On the basis of available records provided by Irish Water / Kildare County Council, there are no foul water drainage present within the development site. The following foul water drainage exists adjacent to the development site:

- 1) 150mm uPVC dedicated foul sewer flowing east-west on the northern border of the site. This sewer connects to Collaghknock Gardens Wastewater Pumping Station (WWPS), as indicated in **Error! Reference source not found.** below.
- 2) 225mm uPVC dedicated foul sewer north of the site, which connects to Collaghknock Glebe Wastewater Pumping Station (WWPS), as indicated in **Error! Reference source not found.** below.
- 3) 225mm uPVC dedicated foul sewer flowing east-west adjacent to Ruanbeg Ave located to the west of the site.
- 4) 150mm uPVC dedicated foul sewer flowing east-west adjacent to Ruanbeg Park located to the west of the site.

Please refer to **Error! Reference source not found.** for an extract of the existing record drawings illustrating the existing stormwater drainage arrangement.

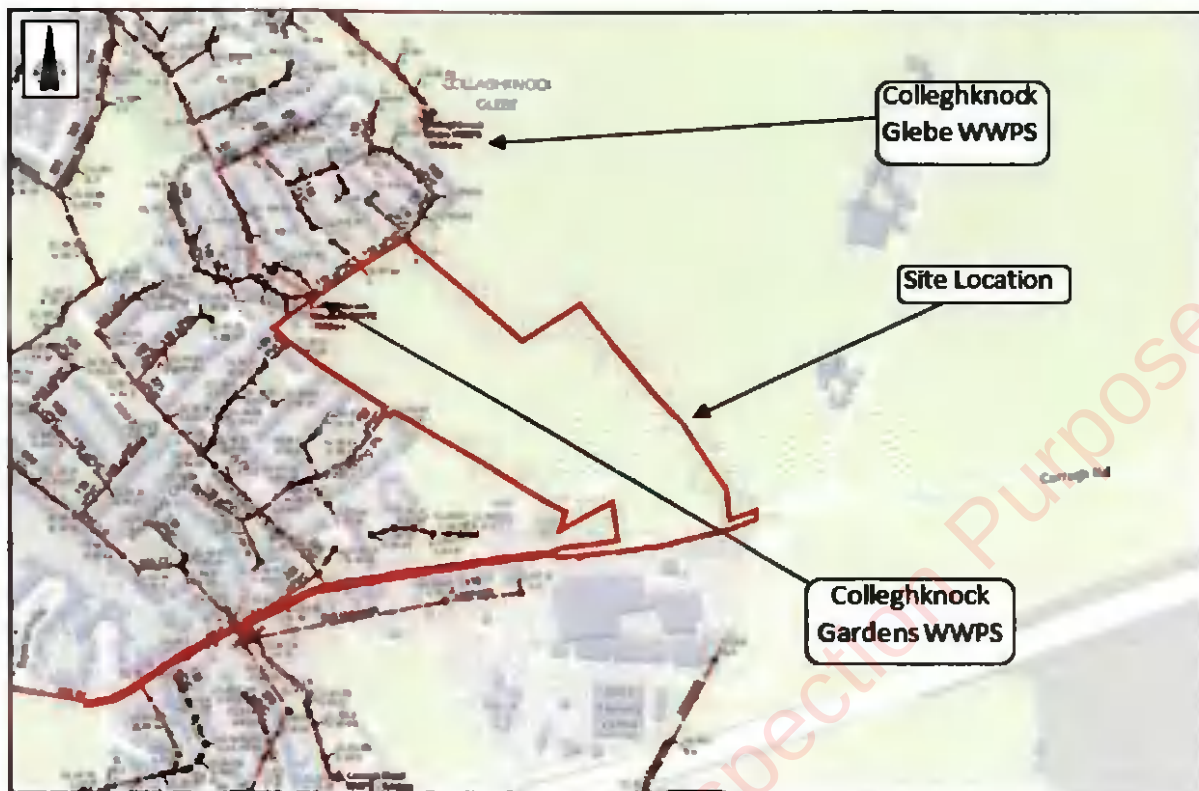


Figure 7.20: Extract from Irish Water Record Drawing (© Irish Water)

7.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development

The proposed drainage system for the site incorporates a surface and foul sewer system. The proposed surface water and foul water drainage pipes align with the overlying road network and services the residential dwellings as well as the age friendly accommodation and creche areas – refer to Punch Consulting drainage drawings for the proposed development.

Initial runoff from all areas is to be directed to dedicated SuDS measures such as:

- a. Bioretention areas
- b. Green Roofs
- c. Landscape Areas
- d. Permeable Pavements
- e. Pond Areas



f. Rainwater Butts

Overflows from these areas will be directed to overflow gullies within or adjacent to the treatment area, with overflow to road gully drainage and then to the infiltration attenuation tank.

The proposed infiltration tank is designed for 1 in 100-year storm (plus climate change). If the design capacity for infiltration of the infiltration tanks is exceeded, water levels will rise and water will be conveyed via pipes through the tank and manholes to water storage areas above the tanks. This overflow water is to be drained by infiltration to the infiltration tank and evapotranspiration. The lowest invert of the proposed attenuation tanks is 90.0 mOD. Based on the highest groundwater levels recorded across the site (i.e. 88.83 mOD within PBH02), this equates to an unsaturated zone of 1.2 metres between groundwater and the invert of the lowest proposed drainage tank.

Please refer to Architectural Documents for full proposed site layout.

7.5 Description and Significance of Impacts

The terminology set out in Table 3.4 of the EPA 2022 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' are used where appropriate – see Chapter 1, Section 1.8.

The style of assessment using hydrogeological type attributes and measures to determine the magnitude of the impact on the attribute are outlined in Table 7.4 and 7.5 below.

Table 7.4 illustrates the criteria for determining the importance of sensitive receptors at the site, Table 7.5 demonstrates the criteria for estimating the magnitude of the impact on an attribute and Table 7.6 presents the resulting estimation of the significance of potential impacts.

Importance	Criterion	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale	River, wetland or surface water or groundwater body ecosystem protected by EU legislation. Aquifer providing a regionally important drinking water resource or supporting site protected under wildlife legislation
High	Attribute has a high quality and rarity on local scale	Aquifer providing locally important resource or supporting peat ecosystem (undesigned)
Medium	Attribute has a medium quality and rarity on local scale	Aquifer providing water for agricultural or industrial use with limited connection to surface water. Eroding bog
Low	Attribute has a low quality and rarity on local scale	Non-aquifer. Cutover blanket bog.

Table 7.4: Estimation of Importance of Sensitive Attributes

Magnitude	Criterion	Typical Example
Major Adverse	Results in loss of attribute and/or quality and integrity of attribute. Severe.	Loss of aquifer water supply by dewatering or major contamination event. Potential high risk of pollution to groundwater from routine run-off.

Magnitude	Criterion	Typical Example
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute. Major.	Partial loss or change to aquifer characteristics Potential medium risk of pollution to groundwater from routine run-off. Loss in peat margins or loss in recharge to a potential SAC Annex 1 habitat.
Minor Adverse	Results in some measurable change in attributes quality or vulnerability. Minor.	Potential low risk of pollution to groundwater from routine run-off Risk of pollution from accidental spillages Localised peat extraction on bog
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. Not significant.	No measurable impact upon aquifer and no perceivable risk of pollution from accidental spillages Slight impact on peat by animal hoofs etc
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	Insignificant risk of contamination to groundwater due to surface sealing.

Table 7.5: Estimation of the Magnitude of a Potential Impact on an Attribute

A qualitative approach was used in this evaluation, generally following the significance classification in Table 7.6 and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect.

Importance of Attribute	Magnitude of Potential Impact			
	Negligible	Minor Adverse	Moderate Adverse	Major Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very high	Imperceptible	Significant / Moderate	Profound/ Significant	Very Large
High	Imperceptible	Moderate / Slight	Significant/ Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 7.6: Estimation of the Significance of Potential Impact

Examples of the categories of impact significance are outlined below in accordance with EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, (EPA, 2022).

- Imperceptible - An effect capable of measurement but without significant consequences.

- **Slight Effects** - An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate Effects** - An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- **Significant Effects** - An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- **Profound Effects** - An effect which obliterates sensitive characteristics.

Terms relating to the duration of impacts are as described in the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, (EPA, 2022) and detailed in chapter 1. as:

The prediction of potential impacts by the proposed development are summarised in the following sections and tables. The impacts are separated into construction stage impacts and operational stage impacts.

7.6 Potential Impacts

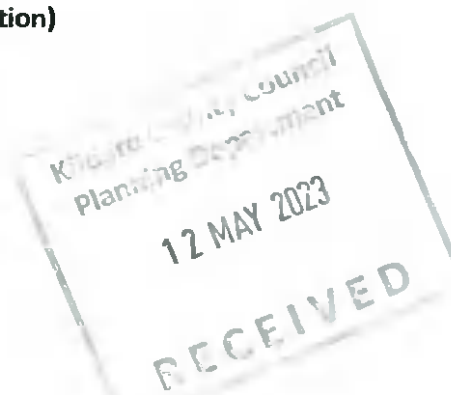
Construction Phase

Without mitigation, the main environmental factors associated with the risk to the hydrogeological and hydrological environments relate to general construction activities within the footprint of the site including uncontrolled sediment runoff from exposed soils, fuel and chemical storage and localised excavation of subsoils increasing the vulnerability of the aquifer to pollution events and the associated risk to Pollardstown Fen.

Contaminated soils/groundwater or buried waste material, which could pose a risk to the underlying aquifer and surface waters, have not been identified at the site nor are anticipated based on the site history and all previous site investigations completed across the site. If any unexpected, contaminated soils/groundwater or buried waste material is encountered during the excavation works, it is anticipated to be localised and will be appropriately mitigated as detailed in Table 7.7.

Table 7.7 and Table 7.8 outline the range of potential impacts associated with the construction and operational phases of the proposed development, in the absence of mitigation measures.

Construction Works Potential Impacts (in the absence of mitigation)



No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see table 7.21)	Magnitude of Potential Impact (see table 7.22)	Significance of Potential Impact (see table 7.23)
1	Excavation Activities	Groundwater	It is anticipated that the development site works will involve some excavation of soils/subsoils for the various aspects of the development including foundations, underground services and site drainage. The site is mapped as a location of high groundwater vulnerability. The depth of excavation is anticipated to be limited and therefore the reduced thickness of overburden will not significantly effect the vulnerability of the underlying groundwater in the event of a pollution event such as a fuel spillage during the construction works.	High	Minor Adverse	Moderate/ Slight
		Surface Water	The removal of established vegetative cover and construction work activities (e.g. vehicle movements) could lead to the loss of large quantities of soil particles through uncontrolled sediment erosion and silty/hydrocarbon-laden runoff from vehicles, particularly during periods of high rainfall. However, given the distance to the closest surface water features, the potential impact is considered to be low.	High	Negligible	Imperceptible
2	Fuel storage/usage on site	Groundwater Surface Water	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to groundwater and surface water if not stored and used in an environmentally safe manner.	High	Major Adverse	Profound/ Significant
3	Waste Arisings	Groundwater Surface Water	Waste material generated from construction activities may require disposal off-site if not suitable for reuse on site. Temporary storage on site may be required and	High	Minor Adverse	Moderate /Slight

No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see table 7.21)	Magnitude of Potential Impact (see table 7.22)	Significance of Potential Impact (see table 7.23)
			impacts to groundwater and surface water from possible contaminated direct runoff during rainfall events could potentially occur.			
4	Contaminated land / buried waste	Groundwater Surface Water	No contaminated material or buried waste has been reported during the site investigation completed across the site. However, it is noted that no site investigation can be thorough enough to investigate every area of the site and therefore in the event of encountering unexpected ground contamination or buried waste material, it is anticipated to be very localised with an associated low level of risk posed to the environment	High	Minor Adverse	Moderate /Slight
5	Vandalism	Groundwater Surface Water	Pollution due to vandalism of stores or plant poses a risk to groundwater and to future site users.	High	Major Adverse	Profound/ Significant
6	Contaminated imported fill	Groundwater Surface Water	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works or access roads may pose a risk to the groundwater aquifer and surface waters in proximity to the site.	High	Moderate Adverse	Significant/ Moderate
7	Construction Traffic	Groundwater Surface Water	There may be a risk of groundwater pollution from site traffic through the accidental release of oils, fuels and other contaminants from vehicles.	High	Minor Adverse	Moderate /Slight
8	Increased risk of flooding and soil erosion	Surface Water	The creation of hard standing areas and compaction of soil may increase levels of surface water run-off resulting in localised flooding and subsequent soil erosion.	High	Minor Adverse	Moderate /Slight

Table 7.7: Potential Impacts during construction Phase

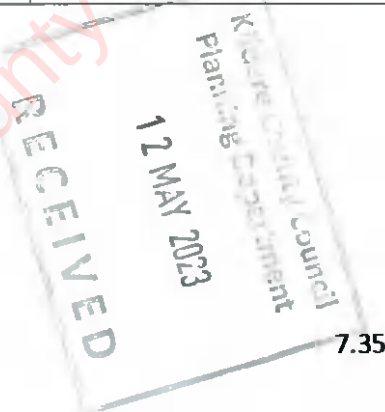
7.7 Operational Phase

Potential Operational Impacts (in the absence of mitigation)

No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see table 7.1)	Magnitude of Potential Impact (see table 7.2)	Significance of Potential Impact (see table 7.3)
1	Surface water runoff from footpaths, roads, walkways, carparks and general hardstanding	Groundwater Surface Water	Surface runoff being channelled to groundwater and surface water could result in contamination of the water bodies	High	Minor Adverse	Moderate /Slight
2	Reduced infiltration of rainwater to the underlying aquifer	Groundwater Surface Water	The increased presence of hard standing across a large area could potentially reduce the amount of infiltration of rainwater to the underlying aquifer and potential impact on the hydrogeological and hydrological regimes. However, the implementation of a SuDs system for the entire development with all rainfall being ultimately reintroduced back into the ground will ensure this potential impact will have an imperceptible impact.	High	Negligible	Imperceptible
3	Foul water Disposal	Groundwater Surface Water	All foul water is proposed to be discharged to mains sewer network with no discharge to groundwater proposed. Therefore, there is no anticipated impact on groundwater or surface waters.	High	Negligible	Imperceptible

No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see table 7.1)	Magnitude of Potential Impact (see table 7.2)	Significance of Potential Impact (see table 7.3)
4	Contaminated imported material	Groundwater	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works or access roads may pose a risk to the underlying aquifer.	High	Moderate Adverse	Significant / Moderate
5	Water Supply	Water Mains Network	Increased potable water consumption (Average Daily Domestic Demand = approx. 276m³) will result in an increased demand on the mains water supply of the area. However, Uisce Eireann have advised that the development is feasible without upgrade to their networks. Thus, no ameliorative, remedial or reductive measures are required.	High	Negligible	Imperceptible

Table 7.8: Potential Operational Impact



7.8 Potential Cumulative Impacts

The assessment of cumulative impacts considers the total impact associated with the proposed construction phase of the proposed development and the operation phase when combined with other past, present, and reasonably foreseeable future development.

The proposed development that this document addresses has been reviewed in conjunction with the existing infrastructure and commercial and residential developments in the general area to assess any cumulative impacts:

These developments have been considered and are not considered to have a cumulative impact during the construction phase of the development. Should the construction phase of any developments coincide with development of the site, potential cumulative impacts are not anticipated provided similar mitigation measures are implemented as detailed in Table 7-7.

During the operational phase of the proposed development, increased hardstanding across the site will potentially reduce the natural infiltration for rainwater to the underlying groundwater body. However, with appropriately designed sustainable urban drainage system for the proposed development, it is considered that the overall development will have a long-term but imperceptible cumulative impact on the underlying hydrogeology and hydrology.

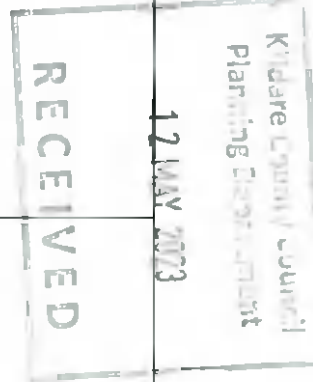
7.9 Mitigation Measures

Construction Phase

The following mitigation measures (Table 7-9 and Table 7-10) shall be implemented to ensure all risks identified are appropriately mitigated. Any risks identified as imperceptible in Tables 7-7 and 7-8 are not considered further.



No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
1	Excavation Activities	Groundwater	It is anticipated that the development site works will involve some excavation of soils/subsoils for the various aspects of the development including foundations, underground services and site drainage. The site is mapped as high vulnerability. The depth of excavation is anticipated to be limited and therefore the reduced thickness of overburden will not significantly effect the vulnerability of the underlying groundwater in the event of a pollution event such as a fuel spillage during the construction works.	The limited depth of excavation activities will minimise the risk of increasing groundwater vulnerability at the site. Appropriate groundwater protection/mitigation measures in relation to fuel storage and construction traffic are detailed in the following sections and will ensure the risk posed is low, temporary, and neutral.	Imperceptible
2 & 7	Fuel storage/usage on site Construction Traffic	Groundwater Surface Water	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to groundwater and surface water if not stored and used in an environmentally safe manner. There may be a risk of groundwater pollution from site traffic through the accidental release of oils, fuels and other contaminants from vehicles.	Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 25m of	Imperceptible



No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				drainage ditches, surface waters or open excavations. All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) shall be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank of 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray must be capable of holding 25% of the aggregate capacity of the drums stored. Regular monitoring of water levels within drip trays and bunds due to rainfall shall be undertaken to ensure sufficient capacity is maintained at all times. A bunded hardstanding area for refuelling shall be constructed at the site. Surface water runoff from this concrete surface will discharge to a drain via a full retention petrol interceptor or to the on-site	

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				WWTP. Prior to the interceptor, a silt trap will be installed in order to remove the majority of suspended solids. The provision of wheel wash facilities close to the site entrance shall reduce the deposition of mud, soils and other substances on the surrounding road network. Oil which accumulates within the petrol interceptor shall be regularly removed by an appropriately licensed contractor. In addition, the petrol interceptor shall be appropriately maintained in accordance with the manufacturer's specification. Monitoring prior to, during and post construction works of groundwater quality testing shall be undertaken to ensure minimum disturbance of water quality in the underlying groundwater body in compliance with the Construction Environmental Management Plan. Hazardous waste shall be dealt with in accordance with the Waste Management (Hazardous Waste) Regulations.	

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				An Emergency Operating Plan (EOP) to deal with the possibility of contamination or fuel spills, e.g., pumping of wells or sumps to collect contaminated groundwater or surface water for treatment shall be developed and incorporated into an overall Construction Environmental Management Plan (CWMP) for the development to include a Waste Management Plan (WMP). The CIRIA document (2001) recommendations for developing a contingency plan for pollution emergencies shall be implemented and include the following: • Containment measures. • Emergency discharge routes. • List of appropriate equipment and clean-up materials. • Maintenance schedule of equipment. • Details of trained staff. • Details of staff responsibilities. • Notification procedures to inform the relevant environmental protection authority. • Audit and review schedule; and, • List of specialist pollution clean-up companies and their telephone numbers.	

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				Any vehicles utilised during the operational phase shall be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. The potential impacts are limited by the size of the fuel tank of the largest plant / vehicles used on the site. Precautions shall be taken to avoid spillages. These include: • Use of secondary containment e.g. bunds around oil storage tanks; • Use of drip trays around mobile plant; • Supervising all deliveries and refuelling activities; and, • Designating and using specific impermeable refuelling areas isolated from surface water drains. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral.	
3.	Waste Arisings	Groundwater Surface Water	Waste material generated from construction activities may require disposal off-site if not suitable for reuse on site. Temporary storage on site may be required and impacts to groundwater and surface water from	Appropriate safe storage of all waste materials shall be implemented during the construction works in accordance with the CEMP for the works. Measures include: • Covering of stockpiles to minimise surface water runoff,	Imperceptible

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
			possible contaminated direct runoff during rainfall events could potentially occur.	• Creation of berms around stockpiles to contain runoff during heavy rainfall events. • Waste segregation and storage in dedicated sealed skips. The implementation of the above-described mitigation measures shall ensure the risk posed by the identified potential impact will be low, temporary and neutral.	
4.	Contaminated land / buried waste / waste soils	Groundwater Surface Water	No contaminated material or buried waste has been reported during the site investigation. Therefore, at this stage, if encountered, it is anticipated to be localised and with a low level of risk posed to the environment.	Special environmental and human health contingency plans and procedures, following best-practice guidance, will be developed for the unexpected discovery of contaminated or illegally deposited waste materials. In the event of encountering contaminated ground or buried waste, an appropriately scoped contaminated land site investigation will be undertaken by a contaminated land consultant comprising soil monitoring, water monitoring, gas and vapour monitoring and groundwater level monitoring. All works will be undertaken in accordance with best practice and EPA Guidance on The Management of Contaminated Land and Groundwater at EPA Licensed Sites, 2013.	Imperceptible

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				On completion of the above, a suitably detailed remediation program of works will be undertaken under the direction and supervision of a contaminated land consultant. The outcome of the investigation will dictate the most appropriate remedial solution for the development. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral.	
5.	Vandalism	Groundwater Surface Water	Pollution due to vandalism of stores or plant poses a risk to groundwater and to future site users.	Adequate security measures shall be installed on the construction site. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials and sufficient warning signage. The implementation of the above-described mitigation measures shall ensure the risk posed by the identified potential impact will be low, temporary and neutral.	Imperceptible
6.	Contaminated imported fill	Groundwater Surface Water	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works or access roads may pose a risk to the groundwater aquifer and surface waters in proximity to the site.	All imported fill material shall be sourced from approved sources and appropriately certified and fit for purpose. All fill material will be confirmed to be inert prior to importation to the site including confirmation of the chemical testing and a visual assessment. Fill sourced from non-licensed/non-	Imperceptible

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				permitted facilities will require prior authorisation under Article 27 legislation.	
8.	Increased risk of flooding and soil erosion	Surface Water	The creation of hard standing areas (access roads) will be minimal as will the compaction of soil which increases the levels of surface water run-off resulting in flooding and/or soil erosion.	An appropriately designed site drainage system for the construction stage shall be developed across the site to ensure that any surface water runoff from the site is appropriately controlled and treated before discharging to ground or to land drains. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the onsite drainage ditch. This fencing shall be in place as one of the first stages on site and prior to the full site clearance. The silt fencing shall act as a temporary sediment control device to protect the watercourse from sediment and potential site water runoff. The fencing shall be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits. Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out	Imperceptible

No.	Construction Activity	Attribute	Character of Potential Impact	Mitigation	Post Mitigation Impact
				area greater than 50m from sensitive receptors including drains and drainage ditches. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral.	

Table 7.9: Predicted Construction Phase Mitigation Measures

Operational Phase

No.	Construction Activity	Attribute	Character of Impact	Mitigation	Post Mitigation Impact
1	Surface water runoff from footpaths, roads, walkways, carparks and general hardstanding	Groundwater Surface Water	Surface runoff being channelled to groundwater and surface water could result in contamination of the water bodies.	An appropriately designed drainage system has been designed for the subject site. The system was designed in accordance with the CIRIA 5UDS Manual and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. It is proposed to use a sustainable urban drainage systems (SuDS) approach to stormwater management throughout the site, the overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates,	Imperceptible

			Kildare County Council Planning Department 12 MAY 2023 RECEIVED	volumes and frequency, reducing pollutant concentrations in stormwater, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. The lowest invert of the proposed attenuation tanks is 90.0 mOD. Based on the highest groundwater levels recorded across the site (i.e. 88.83 mOD within PBH02), this equates to an unsaturated zone of 1.2 metres between groundwater and the invert of the lowest proposed drainage tank. In addition, all infiltration systems have been designed and located taking account of the infiltration rates recorded across the site both within the shallow and deeper subsoils.	
4	Contaminated imported material	Groundwater	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works on access roads may pose a risk to the underlying aquifer.	All imported fill shall be confirmed as inert and suitable for reuse on site by an appropriately qualified engineer/consultant.	Imperceptible
	General			Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures as specified the Engineering Assessment Report and in accordance with CIRIA SuDS Manual C753 which will be incorporated into the overall management strategy for the Proposed Development. This will ensure no impacts on water quality and quantity	

				(flow regime) for the Operational Phase of the Proposed Development. There is no other requirement for mitigation measures for the Operational Phase of the Proposed Development.	
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Table 7.10: Predicted Operational Stage Mitigation Measures



7.10 Predicted Impacts

Construction Phase

Implementation of the best practice construction measures in addition to the mitigation measures detailed in Table 7-7 will ensure any impacts on the hydrogeological and hydrological environments will be imperceptible.

Operational Phase

All mitigation measures outlined in Table 7-8 shall be implemented to ensure any impacts during the operations phase of the development are minimised and considered to be imperceptible.

7.11 'Do Nothing' Scenario

If the proposed development did not proceed the site would remain as an undeveloped site and likely continue in agricultural use.

7.12 Worst Case Scenario

In the event that the proposed development was to proceed, and the proposed mitigation measures substantially fail, then it is likely that there would be a significant impact on the hydrogeological environment with the potential for contamination of groundwater and downgradient surface waters.

7.13 Monitoring & Reinstatement

Monitoring of surface water discharges is not deemed necessary. Maintenance of the proposed drainage network will be carried out as part of the overall maintenance programme for the proposed development. Normal post construction reinstatement of trenches for drains and watermains will take place after pipe laying.

Monitoring of foul effluent discharges is not deemed necessary.

Monitoring of the water supply will be implemented via a bulk meter located at the connection point of the water supply to the proposed development.

All temporary construction compounds and site entrances will be removed upon completion of the construction phase. Such areas shall be reinstated in accordance with the landscape architect's plan and engineer's drawings.

All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase and disposed of at an appropriately authorised facility.

Oil, fuel etc. storage areas will be decommissioned on completion of the construction phase. Any remaining liquids will be removed from site and disposed of at an appropriate authorised facility.

All sediment control measures (for example sediment retention ponds) shall be decommissioned on completion of the construction phase. Such areas will be reinstated in accordance with the landscape architect's plan and engineer's drawings.



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7.14 Difficulties in Compiling Information

No significant difficulties were encountered while undertaking this assessment.

7.15 References

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EPA (2010) *Classification of Hazardous and Non Hazardous Substances in Groundwater*. Dr. Matthew Craig, Hydrometric and Groundwater Section, Aquatic Environment, Office of Environmental Assessment. Environmental Protection Agency, Wexford, Ireland.

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<http://www.springerlink.com/content/051216t6t121g915/fulltext.pdf>.

MISSTEART, B.D.R., BROWN, L. AND JOHNSTON, P.M. (2008b) Estimation of groundwater recharge in a major sand and gravel aquifer in Ireland using multiple approaches, *Hydrogeology Journal*, **17(3)**, pp. 693-706.

Statutory Instrument 439/2000 European Communities (Drinking Water) Regulations 2000.

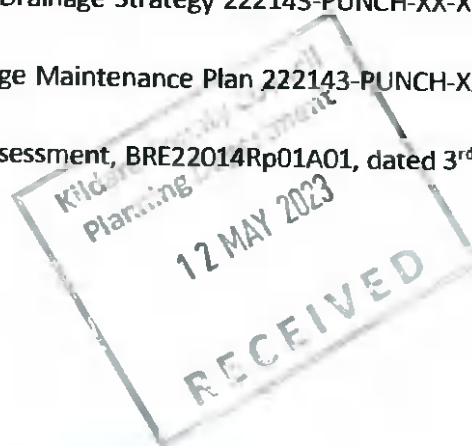
Statutory Instrument 378 of 2006 European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2006

Toner P., Bowman J., Clabby K., Lucey J., McGarrigle M., Concannon C., Clenaghan C., Cunningham P., Delaney J., O'Boyle S., MacCárthaigh M., Craig M. & Quinn R. (2005). *Water Quality in Ireland 2001-2003*. Environmental Protection Agency, Johnstown Castle, Wexford.

Wright., G. (1988) 8th Annual Seminar, IAH (Irish) Group. Portlaoise, Ireland.

The following sources of information were used in the compilation of this assessment:

- Ordnance Survey of Ireland (OSI), Discovery Series, Sheet 55;
- Ordnance Survey of Ireland online historical maps and aerial photographs;
- Geology Kildare - Wicklow, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16;
- GSI - On-line Geology Database. Aquifer Classification, Aquifer Vulnerability;
- GSI - GWDTE-Pollardstown Fen (SAC000396) and Curragh Gravels West (GWB);
- GSI - Groundwater Source Protection Zones - Rathangan PWS, MONASTEREVIN PWS and Curragh Camp PWS;
- Soil Map of Ireland (Second Edition, 1980), National Soil Survey of Ireland, An Foras Talúntais;
- National Parks and Wildlife Service (NPWS) on-line database (www.npws.ie);
- Environmental Protection Agency (EPA) online water quality mapping; (<https://gis.epa.ie/EPAMaps/>);
- Water Framework Directive (WFD) <http://wfdireland.ie/maps.html>;
- OPW hydro-data (<http://www.opw.ie/hydro-data>);
- Flood Hazard Maps and flooding information for Ireland, www.floodmaps.ie - Office of Public Works (OPW);
- CFRAM/ PFRA Maps (OPW);
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities - Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
- Public Foul Drainage (Irish Water and KCC Records);
- Public Water Main Networks (Irish Water and KCC Records);
- Public Surface Water Drainage (Irish Water and KCC Records);
- Office of Public Works flood mapping data (www.floodmaps.ie);
- Met Eireann monthly climatological data (<https://www.met.ie/>);
- Causeway Geotech – Ruanbeg, Kildare – Ground Investigation October 2022;
- Causeway Geotech – Ruanbeg, Kildare Phase 2 – Ground Investigation January 2023; and,
- Punch Consulting Engineers 222143 Ruanbeg, Kildare, Co. Kildare, Specification for Site investigation.
- Punch Consulting Engineers Proposed Residential Development at Ruanbeg, Kildare Town, Co. Kildare Engineering Planning Report 222143-PUNCH-XX-XX-RP-C-0003 April 2023
- Punch Consulting Engineers Site Specific Flood Risk Assessment 222143-PUNCH-XX-XX-RP-C-0004 April 2023
- Punch Consulting Engineers Sustainable Urban Drainage Strategy 222143-PUNCH-XX-XX-RP-C-0007 April 2023
- Punch Consulting Engineers Stormwater Drainage Maintenance Plan 222143-PUNCH-XX-XX-RP-C-0008 April 2023
- Bluerock Environmental Hydrogeological Site Assessment, BRE22014Rp01A01, dated 3rd May 2023 (FINAL)



8. Noise and Vibration

8.1 Introduction

This section of the EIAR has been prepared by Traynor Environmental Ltd to identify and assess the potential noise impacts associated with the proposed development of lands for Large-Scale Residential Development (LRD) at Kildare town, Co. Kildare during both the construction and operational phases of the development.

This chapter includes:

- A description of the receiving ambient noise climate in the vicinity of the subject site.
- An assessment of the potential noise and vibration impact associated with the proposed development during
 - The short-term construction phase and
 - The long-term operational phase on its surrounding environment.
- The assessment of direct, indirect, and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

Proposed Development Site Location and Brief Description

Full development description is outlined in Chapter 3 of this EIAR and in the statutory notices.

Statement of Competence

In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".

In accordance with Environmental Protection Agency (EPA) guidance "All competent persons must possess a combination of technical knowledge, experience, and skills, and must be able to demonstrate both practical and theoretical competence and should participate in continual professional development. Competence may be demonstrated through reference to an appropriate qualification and/or professional membership of a recognised acoustic organisation (e.g., the Institute of Acoustics) and/or appropriate experience."

The monitoring and analysis of the data was conducted by Nevin Traynor of Traynor Environmental deemed to be a "competent person" as per criteria outlined by the EPA. The monitoring programme, data and report was carried out by Nevin Traynor who is certified as been competent in Environmental Noise Measurement by the Institute of Acoustics (IOA) with over 15 years' experience in Environmental and Acoustic Consultancy.





Figure 8.1: Proposed Site Layout

8.2 Methodology

Typical ambient noise levels across the local area were measured, and these were used to identify appropriate construction phase noise criteria. Likely construction plant was identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels were assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase were identified, and impacts assessed by reference to commonly applied criteria.

Noise sources associated with the operational phase of the Proposed Development were reviewed, and potential impacts assessed. Such impacts relate predominantly to traffic and industry. An assessment of inward noise impacts was undertaken, and the requirement for enhanced façade treatments was assessed.

The assessment was undertaken having regard to guidance set out in Guidelines on The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2022).

Documents consulted:

- British Standard BS 7385-2:1993 Evaluation And Measurement For Vibration In Buildings - Part 2: Guide To Damage Levels From Ground borne Vibration (1993).
- Guidelines On Community Noise (World Health Organisation, 1999).

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- Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise (2002), Transposed Into Irish Law By The European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018).
- NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows (prepared by the Napier University Building Performance Centre for DEFRA, 2007).
- Guidance Note For Noise Action Planning (Environmental Protection Agency, 2009).
- Night Noise Guidelines For Europe (World Health Organisation, 2009).
- Design Manual For Roads And Bridges (UK Highways Agency, 2011).
- Measurement And Assessment Of Ground borne Noise And Vibration (Association Of Noise Consultants (2012).
- Specialist Services Health Technical Memorandum 08-01: Acoustics (UK Department of Health, 2013).
- British Standard BS 4142:2014 Methods For Rating And Assessing Industrial And Commercial Sound (2014).
- British Standard BS 5228-1:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 1: Noise (2014).
- British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014).
- British Standard BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings (2014).
- Good Practice Guidance For The Treatment Of Noise During The Planning Of National Road Schemes (National Roads Authority (Now Transport Infrastructure Ireland), 2014).
- Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department of Education & Skills, 2015).
- NG4 Guidance Note For Noise: License Applications, Surveys And Assessments In Relation To Scheduled Activities (Environmental Protection Agency, 2016).
- ProPg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (Association Of Noise Consultants, Institute Of Acoustics & Chartered Institute Of Environmental Health, 2017).
- Environmental Noise Guidelines For The European Region (World Health Organisation, 2018).
- Third Noise Action Plan 2019-2023 (Kildare County Council, 2019).
- Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2022).
- Kildare County Development Plan

Guidance And Criteria - Construction Phase Noise

There are no national mandatory noise limits relating to the construction phases of projects. In granting planning permission, a local authority may stipulate construction phase noise limits applicable to daytime, evening, night-time, and weekend hours as appropriate. There are no national guidelines available regarding the selection of such limits. Many local authorities chose to apply a 65 dB LAeq T limit.

The chief noise guidance document applied in Ireland and the UK in construction phase noise assessments is British Standard BS 5228:2009+A1:2014 Code of Practice for Noise And Vibration

Control On Construction And Open Sites Part 1: Noise (2014). Annex E of the document sets out several methods to draw up suitable noise criteria applicable to the construction phase of a project. The most appropriate method here is the 'ABC method,' which provides for the selection of criteria based on existing ambient noise data. On the basis of noise data recorded locally, as discussed below, a daytime $LA_{eq\ 1h}$ criterion of 65 dB is identified. This criterion is identical to that typically applied by local authorities and is thus applied in this assessment. The $LA_{eq\ 1h}$ parameter describes the total noise emissions from all construction sources occurring during any 1 h period, averaging over that hour.

BS 5228:2009+A1:2014 states that the 65 dB criterion is applicable to the periods Monday-Friday 0700 - 1900 h and Saturday 0700-1300 h. Construction operations will not be undertaken during evening or night-time hours, or on Sundays or Bank holidays. This assessment therefore applies the 65 dB criterion in respect of all construction works.

The 65 dB criterion is considered applicable to surrounding receptors, in their immediate curtilage. In this regard, the Environmental Protection Agency (EPA) document NG4 Guidance Note For Noise: License Applications, Survey And Assessments In Relation To Scheduled Activities (2016) defines a noise sensitive location as:

'Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.'

As construction projects tend to be relatively short, and as construction works areas are usually localised and mobile, the 65 dB limit is usually not subject to any additional criteria such as tone and impulse restrictions.

Guidance And Criteria - Construction Phase Vibration

As with noise, there are no national limits relating to ground borne vibration, and reference is usually made to guidance set out in British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014). Table 8-1 presents guidance included in the document with respect to human perception of peak particle velocity (PPV), the most commonly applied descriptor of ground borne vibration.

PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	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.
10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Table 8.1: Human perception of vibration, from BS 5228-2:2009+A1:2014

During construction projects, reference is usually made to criteria relevant to buildings, in order to avoid potential cosmetic or structural damage. The National Roads Authority document identified above has seen increasing application to non-road projects due to the absence of any other Irish guidance. National Transport Authority criteria, listed in Table 8-2, are informed by documents such as British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground borne Vibration (1993).⁵ The criteria apply to the closest part of any relevant building or structure.

Frequency	<10 Hz	10-50 Hz	>50Hz
PPV	8 mm/s	12.5 mm/s	20 mm/s

Table 8.2: Building vibration criteria, from the National Roads Authority (2014)

Limits set out above are considerably lower than criteria presented in Table 8-3. The criteria presented are those below which cosmetic damage (hairline cracking, etc.) to buildings is unlikely to occur. Limits relating to structural damage are significantly higher.

Structure	Lower frequencies	Higher frequencies	Source
Modern dwellings	<40 Hz: 19 mm/s	>40 Hz: 51 mm/s	1
Older dwellings	<40 Hz: 12.7 mm/s	>40 Hz: 51 mm/s	1
Industrial & heavy commercial	4-15 Hz: 50 mm/s	>15 Hz: 50 mm/s	2&3
Residential & light commercial	4-15 Hz: 15-20 mm/s	>15 Hz: 20-50 mm/s	2&3

Table 8.3: Recommended vibration limits

Guidance And Criteria - Operational Phase Noise

General

There are no national mandatory noise limits applicable to operational developments. Two elements of the commissioned development may give rise to noise emissions (outside of those associated with external residential activities such as children playing and grass cutting): specifically, the proposed non-residential elements (termed 'commercial' for the purposes of this assessment), and traffic. These are typically assessed differently.

Traffic Emissions

Local offsite receptors are currently subject to existing traffic noise levels on the surrounding road network and background noise levels from the existing Kildare Chilling Meat factory. The Proposed Development will increase traffic volumes locally, with a consequent increase in traffic noise levels. The Design Manual for Roads and Bridges (UK Highway Agency, 2011) notes that the resulting noise impact is linked to the magnitude of the noise increase. Table 8-4 sets out the DMRB guidance. Included in the table are impact categories listed by the EPA in their 2022 document Guidelines on The Information to be Contained in Environmental Impact Assessment Reports.

Noise level increase	Subjective reaction	DMRB impact	EPA impact
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0 dB	None	No change	Neutral
0 – 3 dB	Imperceptible	Negligible	Imperceptible to not significant
3 – 5 dB	Perceptible	Minor	Not significant to slight
5 – 10 dB	Up to a doubling of loudness	Moderate	Slight to moderate
>10 dB	Doubling of loudness or greater	Major	Significant to profound

Table 8.4: DMRB assessment guidance

Non-Residential Emissions

Most environmental noise guidance documents issued across Europe ultimately derive limits from guidance issued by the World Health Organisation (WHO). The WHO document Guidelines on Community Noise (1999) sets out guideline values considered necessary to protect communities from environmental noise. With respect to residential settings, the document notes that an outdoor $L_{Aeq, 16h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their 1980 document Environmental Health Criteria 12.

Since 1980, the 55 dB criterion has become the de facto daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits as $L_{Aeq, 15 min}$, $L_{Aeq, 30 min}$ and $L_{Aeq, 1 h}$ are variously applied. In issuing licences to industrial facilities, the EPA typically specifies a daytime $L_{Aeq, T}$ limit of 55 dB at receptors. The EPA currently considers daytime to refer to 0700-1900 h. A similar daytime limit is usually included in noise conditions attached to planning permission issued by local authorities. Kildare Chilling are required to carry out a noise survey of the site operations annually to ensure their activities are not causing noise issues off site. Kildare Chilling are required to comply with their EPA licence (P170-01) in full which includes noise and air emissions

Noise Emissions Limits Relating to Kildare Chilling

Daytime dB Lar,T (30 minutes)	Evening Time dB Lar,T (30 minutes)	Night- Time dB Lar,T (30 minutes) ^{Note1}
55	50	45

Note 1: During Night time hours, there shall be clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document Night Noise Guidelines For Europe (2009) refers to a 40 dB night-time criterion, this relates to the L_{night} outside parameter, which is the long-term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq, 15 min}$, $L_{Aeq, 30 min}$ and $L_{Aeq, 1 h}$ intervals are variously applied by regulatory authorities, rather than the 8-hour period to which the WHO's 45 dB criterion applies. The EPA considers that night-time refers to 2300-0700 h.

Neither of the WHO documents identified above refers to evening periods, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening impacts is currently evident, partly driven by EPA document NG4 Guidance

Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (2016). The original 2012 version of the document introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable externally at receptors.

Many authorities require that a penalty be added to measured noise levels where emissions are tonal and/or impulsive. NG4 specifies the addition of a 5 dB penalty to site specific $L_{Aeq\tau}$ levels measured during daytime or evening hours. During night-time hours, the EPA prohibits tones and impulses entirely, stating that such characteristics should not be 'clearly audible or measurable'. With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours. No L_{Amax} limit is recommended for daytime periods.

The above criteria, summarised in Table 8-5, are considered relevant to commercial sources at the Proposed Development. A measurement interval of 15 minutes is considered appropriate. Rather than allowing daytime and evening levels to be rated for tonal or impulsive features, the table assumes that such features are avoided at all times. Criteria apply externally at receptors.

Period	Parameter	Limit
0700 - 1900h	$L_{Aeq\ 15\ min}$	55dB
1900 - 2300h	$L_{Aeq\ 15\ min}$	50dB
2300 - 0700h	$L_{Aeq\ 15\ min}$	45dB
2300 - 0700h	L_{AFmax}	60dB

Table 8.5: Noise criteria appropriate to commercial emissions

The WHO document Environmental Noise Guidelines for The European Region (2018) updates their guidance with respect to certain sources. Of relevance here are updated guidelines in relation to traffic. In this regard, the document states:

'For average noise exposure, the GDG (Guideline Development Group) strongly recommends reducing noise levels produced by road traffic below 53 decibels (dB) L_{den} , as road traffic noise above this level is associated with adverse health effects. For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night-time below 45 dB L_{night} , as night-time road traffic noise above this level is associated with adverse effects on sleep.'

It is noted that the 53 A_{den} and 45 dB L_{night} criteria recommended in the 2018 document are lower than criteria set out in other documents. In this regard, the 2018 guidelines are considered aspirational, and are likely to form the basis of national and local policy over the next two decades.

In addition to the absolute criteria above, the impact of noise emissions from non-residential sources may be assessed by reference to relative criteria. The most commonly applied standard here is British Standard BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound (2014) which provides for the comparison of specific $L_{Aeq\tau}$ levels (i.e., noise levels attributable to the source in question) with background levels and provides an indication of impact depending on the difference. Specific levels may be rated to take tonal, impulsive, and other characteristics into account. The standard notes that the background noise environment may include existing industrial emissions unrelated to the specific source.

BS 4142:2014 states that a difference between specific and background levels of 10 dB or more is indicative of a significant adverse impact. A difference of 5 dB suggests an adverse impact, with lower differences suggesting reduced impacts. The standard adds that the perception of impact will be increased or reduced depending on local context.

Inward Noise Impacts

Inward noise

The assessment of inward noise impacts on proposed residential developments is a relatively new feature in the Irish planning system, and no national guidance has been issued to date. In the absence of Irish guidance, assessments are typically undertaken in accordance with UK guidance. Most UK assessments are now carried out using Propg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (2017), jointly issued by the Association of Noise Consultants, the Institute of Acoustics, and the Chartered Institute of Environmental Health. ProPG provides for good acoustic design through a five-step process:

- Stage 1: Initial noise risk assessment of the proposed development site.
- Stage 2 element 1: Demonstrating a good acoustic design process.
- Stage 2 element 2: Observing internal noise level guidelines.
- Stage 2 element 3: Undertaking an external amenity area noise assessment.
- Stage 2 element 4: Consideration of other relevant issues.

Internal noise guidelines recommended by ProPG, drawn from British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014), are presented in Table 8-6.

Activity	Location	(07:00 to 23:00)	(23:00 to 07:00)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping or daytime resting	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Table 8.6: Recommended internal criteria from BS 8233:2014 and ProPG

BS 8233:2014 adds that:

'Regular individual noise events can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.'

ProPG adds further advice here:

'In most circumstances in noise-sensitive rooms at night (e.g., bedrooms) good acoustic design can be used to that individual noise events to not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability, and regularity of noise events.'

With respect to external amenity areas such as gardens in the curtilage of dwellings, BS 8233:2014 states:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq T}$, with an upper guideline value of 55 dB $L_{Aeq T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas

adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.'

With respect to the proposed creche, there are no specific creche criteria in force. Reference may be made to Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department of Education & Skills, 2015). The document recommends an indoor ambient $L_{Aeq 30 min}$ level of 35 dB. This criterion is applied in this assessment. The document adds that where the external $L_{Aeq 30 min}$ level does not exceed 51-55 dB (range dependent on ventilation type) at the façade, opening windows and vents may be suitable.

BS 8233:2014 includes recommendations regarding noise levels in office buildings. An internal $L_{Aeq T}$ level of 45-50 dB is recommended with respect to open plan offices.

Specialist Services Health Technical Memorandum 08-01: Acoustics⁸ (UK Department of Health, 2013) recommends several noise criteria for healthcare room types. The strictest daytime criterion is 40 dB $L_{Aeq 1 h}$. The lowest night-time criterion is 35 dB $L_{Aeq 1 h}$, with an L_{AFmax} recommendation of 45 dB.

Achieving compliance with the above recommendations in internal spaces at the Proposed Development will require consideration at detailed design stage, particularly in relation to internal transmission between rooms. The chief consideration with respect to the planning application stage is to identify if external noise levels due to road traffic are elevated, thus indicating that enhanced building fabric treatments including glazing will be required.

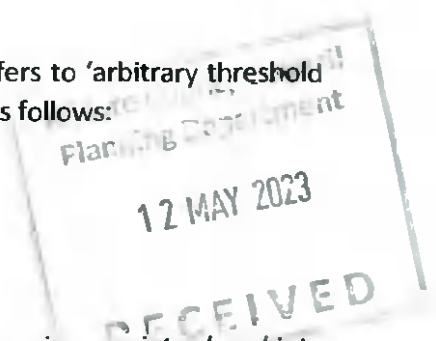
Kildare Noise Action Plan

The Third Noise Action Plan 2019-2023 (Kildare County Council 2019) refers to 'arbitrary threshold values' taken from Guidance Note For Noise Action Planning (EPA, 2009) as follows:

- 70 dB L_{den} .
- 57 dB L_{night}

The plan also states:

'In the scenario where new residential properties or other noise sensitive premises are introduced into an existing climate of environmental noise, there is currently no clear notional planning guidance on noise from the Department of Housing, Planning and Local Government. Kildare Local Authority may develop and publish its own set of guidance on noise assessment and control which would be applicable throughout the county. In the interim, Kildare Local Authority shall require quantifiable noise assessments to be carried where any part of the residential developments is located within 150m of a rail corridor or adjacent to the 'Major Roads' within the county. The quantifiable assessment of



environmental noise shall include, inter alia, the situation internally with open windows and externally in the amenity areas of development.'

Whilst the control of external levels of environmental noise constitutes one aspect of noise management within planning and aims to provide benefit to amenity spaces, the control of noise levels within residential properties and other noise sensitive premises also plays an important role. In the scenario where new noise sensitive premises are introduced to locations already exposed to significant levels of long-term environmental noise as set out in the Environmental Noise Regulations, i.e., 70 dB (A) L_{den} and 57 dB (A) L_{night} , it is considered appropriate to consider aiming to achieve target internal noise levels within noise sensitive rooms, such as living rooms and bedrooms.'

Summary of Criteria

Noise and vibration criteria relevant to the construction phase are summarised in Table 8-7.

Type	Parameter	Criterion	Period	Comment
Noise	L_{Aeq} 1 h	General: 65 dB	M-Sa working hours	Externally at offsite receptors
Vibration	PPV	<10 Hz: 8 mm/s 10-50 Hz: 12.5 mm/s >50 Hz: 20 mm/s	Working hours	Offsite buildings & structures

Table 8.7: Summary of construction phase noise and vibration criteria

Noise criteria relevant to the operational development are listed in Table 8-7. Vibration criteria are not relevant as the Proposed Development once operational will not result in any increased vibration impacts.

Type	Parameter	Criterion	Period	Comment
Traffic	$L_{Aeq T}$	Minimal increase over existing	All periods	Externally at offsite receptors
Inward	L_{Aeq} 16 h	35 dB	0700-2300 h	Internally in proposed living rooms
Inward	L_{Aeq} 16 h	40 dB	0700-2300 h	Internally in proposed dining areas
Inward	L_{Aeq} 16 h	35 dB	0700-2300 h	Internally in proposed bedrooms
Inward	L_{Aeq} 8 h	30 dB	2300-0700 h	Internally in proposed bedrooms

Inward	L _{AFmax}	45 dB	2300-0700 h	Preferably <10 such events in proposed bedrooms at night
Inward	L _{Aeq 16 h}	50 - 55 dB	0700-2300 h	External amenity areas
Inward	L _{Aeq 30 min}	35 dB	Daytime	Internal creche rooms
Inward		51 – 55 dB	Daytime	External creche facade
Inward	L _{den}	70 dB	24 h	Noise action plan mitigation external criterion for road noise
Inward	L _{night}	57 dB	2300-0700 h	Noise action plan mitigation external criterion for road noise
Traffic	L _{Aeq T}	Minimal increase over existing	All periods	Externally at offsite receptors
Non-Residential	L _{Aeq 15 min}	55 dB	0700-1900 h	Externally at offsite receptors
Non-Residential	L _{Aeq 15 min}	50 dB	1900-2300 h	Externally at offsite receptors
Non-Residential	L _{Aeq 15 min}	45 dB	2300-0700 h	Externally at offsite receptors
Non-Residential	L _{AFmax}	60 dB	2300-0700 h	Externally at offsite receptors
Non-Residential	L _{Aeq T}	Minimal increase over existing	All periods	Externally at offsite receptors

Table 8.8: Summary of operational phase noise criteria

8.3 Receiving Environment

Location and land use

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be

provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

The site is currently under a mixture of pasture and hedgerows. The area to the east is also under pasture. To the north and west, the landscape quickly becomes urban. A commercial unit lies to the south of the proposed site. Kildare Chilling also lies to the south of the proposed site, on the opposite side of the R445.

Noise Monitoring Equipment

The equipment used during the baseline noise and environmental noise survey was installed and removed by Traynor Environmental. The noise measurements were carried out using the following equipment mentioned in Appendix 8.1. The instruments were checked and calibrated before and after the survey with no significant drift noted.

Receptors

There are no dwellings on the development site.

Offsite, receptors exist in several directions as follows:

- Connagh residential housing estate is located to the northwest of the proposed site. These lie within 100 m of the site boundary.
- One off houses are located to the north and east of the proposed site. The closest one of house lies within 150 m of the site boundary.
- Ruanbeg residential housing estate is located to the east of the proposed site. These lie within 100 m of the site boundary.
- A Commercial unit and Kildare Chilling are located to the south of the proposed site. These also lie within 100 m of the site boundary.

The nearest offsite receptors are shown in Figure 8-2.





Figure 8.2: Nearest offsite receptors

Noise mapping

The Kildare County Council noise action plans include maps relating to the road network in the vicinity of the proposed site (R445 and M7), as required by Directive 2002/49/EC Relating to The Assessment And Management Of Environmental Noise. Relevant traffic mapping is shown in Figures 8-3 and 8-4.

The maps indicate that L_{den} levels along the M7. The 55-59 dB contour extends into the proposed site. The R445 to the south boundary of the site was not modelled. The 50-54dB L_{night} contour extends approximately 10 m into the Proposed Development site. Mapping undertaken by Iarnrod Éireann with respect to the national rail network does not extend to the proposed site.





Figure 8.3: Road traffic Lden contours (Indicative site boundary)

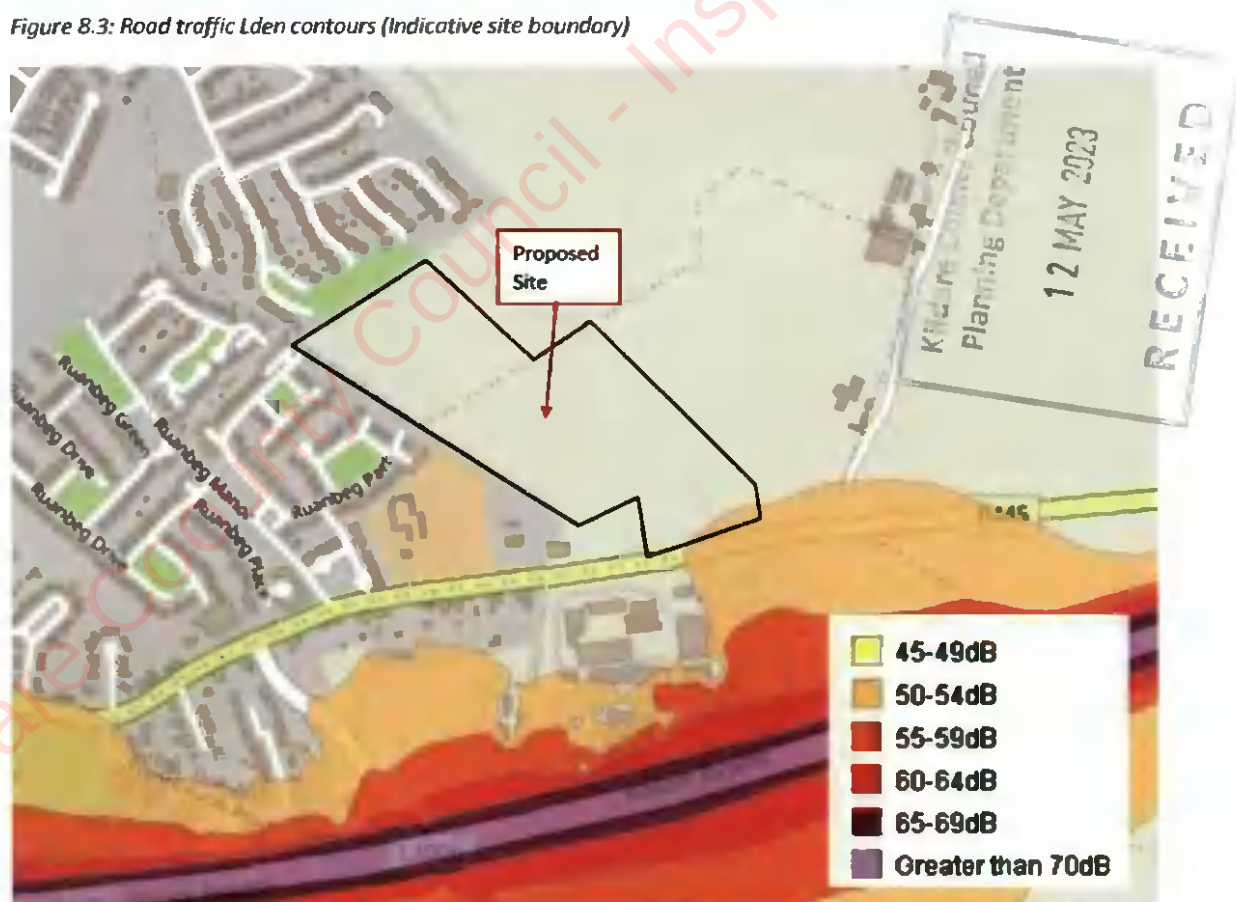


Figure 8.4: Road traffic Lnight contours (Indicative site boundary)

Noise Survey

A baseline noise survey was carried out at the proposed development site over a 24 h period beginning 23/01/23. The purpose of the survey was to provide up to date ambient noise data, and to allow subsequent calibration of the noise model. Monitoring was carried out at three onsite locations shown in Figure 8-5 and Plates 8-1 to 8-3 and described in Table 8-9. Survey methodology, equipment specifications and weather conditions are listed in Appendix 8.1. Recorded time history profiles are shown in Figures 8-7 to 8-9. Noise data are presented in Appendix 8-2 and summarised in Table 8-10.



Figure 8.5: Baseline noise stations



Plate 8.1: A, looking north





Plate 8.2: B, looking south



Plate 8.3: C, looking west





Figure 8.6: Baseline noise monitoring locations

Station	NGR	Measurement Locations
A	274508 212291	located on the south of the site
B	274489 212446	located on the northeast boundary
C	274143 212512	located on the northeast boundary

Table 8.9: Baseline noise stations



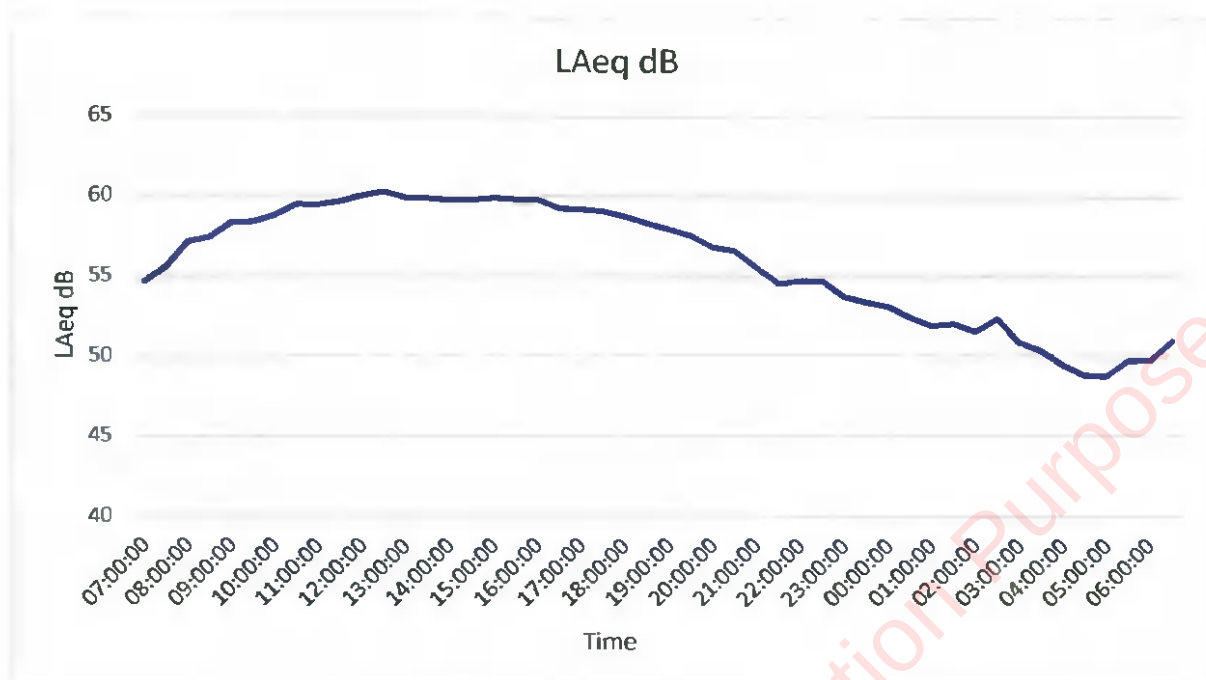


Figure 8.7: LAeq profile at A, beginning 23/01/23

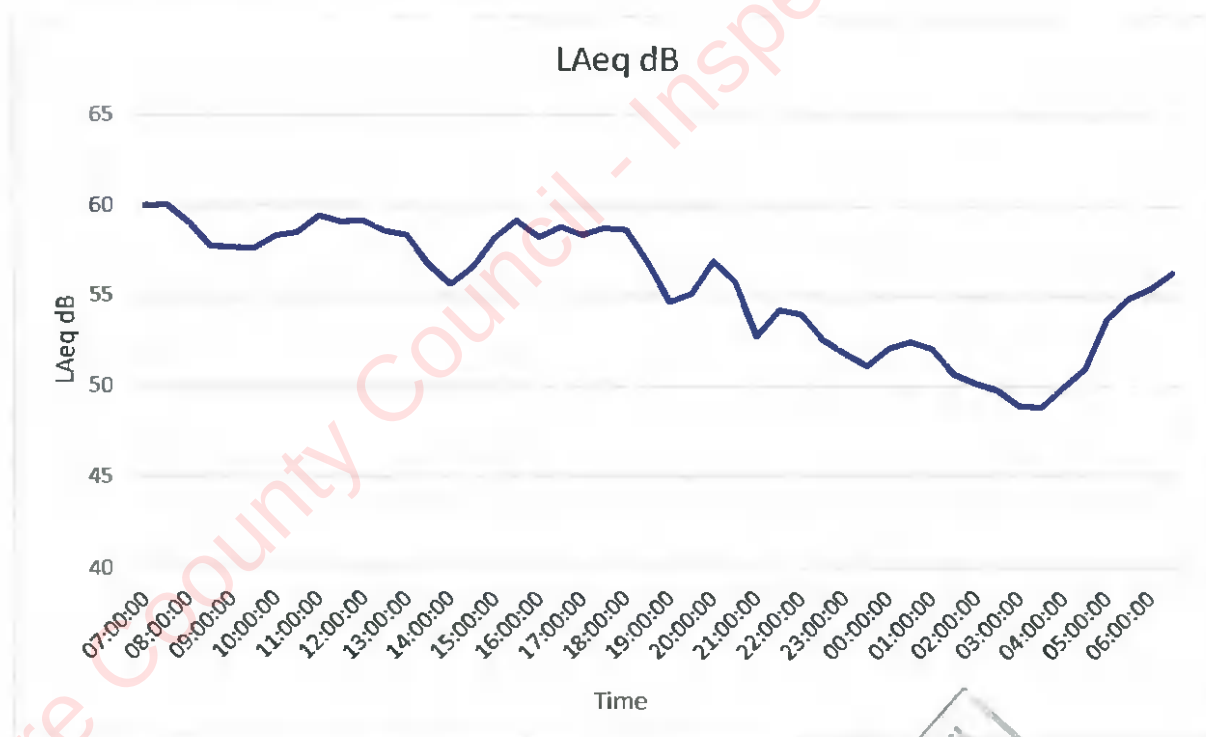


Figure 8.8: LAeq profile at B, beginning 23/01/23





Figure 8.9: LAeq profile at C, beginning 23/01/23

Period	Parameter	A	B	C
23/01/2023 07:00	LAeq 30min	55	60	55
23/01/2023 07:30	LAeq 30min	55	60	55
23/01/2023 08:00	LAeq 30min	57	59	56
23/01/2023 08:30	LAeq 30min	57	58	56
23/01/2023 09:00	LAeq 30min	58	58	56
23/01/2023 09:30	LAeq 30min	58	58	56
23/01/2023 10:00	LAeq 30min	59	58	54
23/01/2023 10:30	LAeq 30min	59	58	54
23/01/2023 11:00	LAeq 30min	59	59	54
23/01/2023 11:30	LAeq 30min	60	59	53
23/01/2023 12:00	LAeq 30min	60	59	53
23/01/2023 12:30	LAeq 30min	60	59	53
23/01/2023 13:00	LAeq 30min	60	58	53
23/01/2023 13:30	LAeq 30min	60	57	54
23/01/2023 14:00	LAeq 30min	60	56	54
23/01/2023 14:30	LAeq 30min	60	57	54
23/01/2023 15:00	LAeq 30min	60	58	53
23/01/2023 15:30	LAeq 30min	60	59	53

23/01/2023 16:00	LAeq 30min	60	58	53
23/01/2023 16:30	LAeq 30min	59	59	54
23/01/2023 17:00	LAeq 30min	59	58	53
23/01/2023 17:30	LAeq 30min	59	59	52
23/01/2023 18:00	LAeq 30min	59	59	51
23/01/2023 18:30	LAeq 30min	58	57	52
07:00 – 19:00	LAeq 30min range	55-60	55-60	51-56
07:00 – 19:00	LAeq 30min average	59	58	54
07:00 – 19:00	LAeq 30min range	52-59	52-58	50-53
07:00 – 19:00	LAeq 30min average	57	56	52
23/01/2023 19:00	LAeq 30min	58	55	52
23/01/2023 19:30	LAeq 30min	57	55	51
23/01/2023 20:00	LAeq 30min	57	57	49
23/01/2023 20:30	LAeq 30min	56	56	49
23/01/2023 21:00	LAeq 30min	55	53	49
23/01/2023 21:30	LAeq 30min	54	54	48
23/01/2023 22:00	LAeq 30min	55	54	47
23/01/2023 22:30	LAeq 30min	55	53	47
19:00 – 23:00	LAeq 30min range	54-58	53-57	47-52
19:00 – 23:00	LAeq 30min average	56	55	49
19:00 – 23:00	LAeq 30min range	51-56	49-54	44-50
19:00 – 23:00	LAeq 30min average	53	51	47
23/01/2023 23:00	LAeq 30min	54	52	45
23/01/2023 23:30	LAeq 30min	53	51	45
24/01/2023 00:00	LAeq 30min	53	52	45
24/01/2023 00:30	LAeq 30min	52	52	44
24/01/2023 01:00	LAeq 30min	52	52	44
24/01/2023 01:30	LAeq 30min	52	51	45
24/01/2023 02:00	LAeq 30min	51	50	44
24/01/2023 02:30	LAeq 30min	52	50	44
24/01/2023 03:00	LAeq 30min	51	49	45
24/01/2023 03:30	LAeq 30min	50	49	44

24/01/2023 04:00	L _{Aeq} 30min	49	50	45
24/01/2023 04:30	L _{Aeq} 30min	49	51	46
24/01/2023 05:00	L _{Aeq} 30min	49	54	47
24/01/2023 05:30	L _{Aeq} 30min	50	55	51
24/01/2023 06:00	L _{Aeq} 30min	50	55	52
24/01/2023 06:30	L _{Aeq} 30min	51	56	53
23:00 – 07:00	L _{Aeq} 30min range	49-54	51-56	44-53
23:00 – 07:00	L _{Aeq} 30min average	51	52	46
23:00 – 07:00	L _{AF90} 30min range	44-51	46-55	40-50
23:00 – 07:00	L _{AF90} 30min average	47	49	43
24 h	L _{den}	60	59	55
07:00 – 23:00 h	L _{Aeq} 16h	58	57	53
23:00 – 07:00 h	L _{night}	51	52	46

Table 8.10: Noise data summary

The main noise source audible at all three stations was distant traffic on the wider road network, which was continuously audible at all times in the background throughout daytime, evening, and night-time periods. Other noise sources of significance were birdsong and Kildare Chilling.

Stations A was the only station located adjacent to a public road (R445 Regional Road) which has not been included in local authority strategic noise mapping. L_{den} levels determined at M7 are consistent with mapped levels shown in Figures 8-3. Measured data are considered more relevant than mapped data as an indicator of baseline noise levels at the dwellings outside of the site.

Measured data suggest that L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the EIAR site, and the number of such movements considerably exceeds 10 movements during night-time hours. As demonstrated through recorded noise levels at stations A, L_{AFmax} levels are likely to approach 80 dB for all onsite areas of the Proposed Development within 10 m of the existing R445 Regional Road.

Noise risk assessment

The ProPG document includes guidance on undertaking a risk assessment with respect to inward noise affecting a proposed development site. The ProPG risk assessment is based on Figure 8-10. Data presented in Table 8-10 suggest that the entire site is 'low risk', increasing to medium risk at location A. i.e., the site is low risk in its entirety, apart from positions immediately adjacent to the R445. In this regard, ProPG states that:

'...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 acoustic design statement which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.'

ProPG notes that the risk category of a particular site will be influenced by the number of L_{AFmax} events which exceed 60 dB externally during night-time hours. Where the number of such events exceeds 10, mitigation may be required even where L_{night} levels are below relevant criteria. Measured data suggest that L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the site, and the number of such movements considerably exceeds 10 during night-time hours. At positions immediately adjacent to roads, L_{AFmax} levels approach 80 dB, within 10 m of the road network.

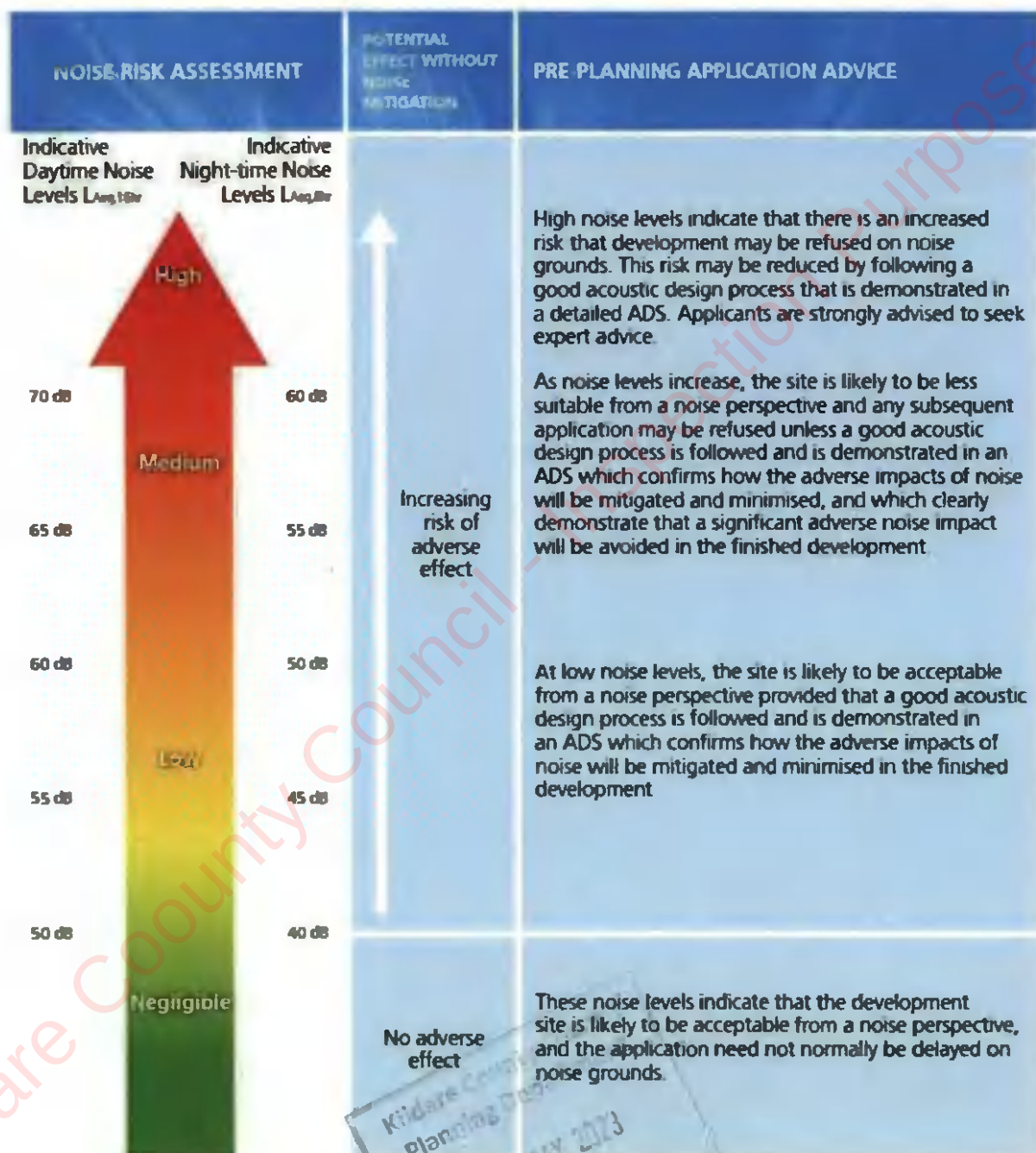


Figure 8.10: ProPG risk assessment

Future trends

EPA EIAR guidance recommends that a noise impact assessment should include a description of the likely evolution of the future receiving acoustic environment in the absence of the Proposed

Development. The local noise environment is semi-urban in character, with the chief background noise sources being industry, local and distant traffic. In the medium term, traffic noise levels are likely to increase across the study area, due to continuing development across Kildare town, and its ongoing expansion. While engine noise emissions will reduce due to increasing take-up of electric vehicles, it is noted that traffic noise above 40-50 km/h arises chiefly from tyre noise, and such tyre noise is unlikely to be less in electric vehicles. The planned development of a relief road around the northeast side of the town is likely to alter the soundscape considerably.

With respect to the development site itself, it is expected that, should the Proposed Development not proceed (the 'do nothing' scenario), no noise emissions are expected to arise other than those from land management practices, depending on how the site is used into the future.

8.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development. A full development description is provided in Chapter 3 of this EIAR.

When considering a development of this nature, the potential noise and vibration impact on the surroundings is considered for each of two distinct stages:

- Construction Phase.
- Operational Phase

The construction phase will involve excavation over the development site, landscaping, construction of internal roads, excavation of foundations, building and transport of materials to site using the local road network.

The primary sources of outward noise in the operational context are deemed to be long term in duration and will comprise traffic movements to site using the existing road network. (These issues are discussed in detail in the following sections).

8.5 Potential Impacts

The potential noise and vibration impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

Construction Phase

Construction will be undertaken on a phased basis and will be managed from a temporary site compound. Construction will be confined to daytime hours Monday-Friday 07:00 to 19.00 and on Saturday 8:00 to 16.00.

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling.
- Installation of temporary site compound.
- Provision of hardcore stone on onsite roadways.
- Excavation of foundations.
- Excavation of ground services trenches.
- Installation of services including sewerage network.
- Steel frame erection.
- Pouring & floating of concrete floor slabs.
- Block work and roof work.
- Building finishing (windows, doors, etc.).
- Internal fit out in buildings.
- Laying of asphalt.
- Site landscaping.



During the construction phase, the chief source of noise emissions will be plant used onsite. Construction plant required onsite at various stages of the project are listed in Table 8-11. The table includes details of typical sound pressure levels, taken from BS 5228-1:2009+A1:2014.

Plant	63 Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Total L _{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Wheeled backhoe loader (9 t)	68	67	63	62	62	61	54	47	67
Consaw	73	67	70	68	73	78	72	77	84
Lifting platform	78	76	62	63	60	59	58	49	67
Mobile generator	78	71	66	62	59	55	56	49	65
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71

Truck (driving)	73	78	78	78	74	73	68	66	80
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Table 8.11: Expected construction plant (dB at 10 m)

Noise emissions arising during the construction phase of the Proposed Development will vary considerably due to several reasons:

- The site is relatively large. Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.
- The large construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.
- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of inactivity. Localised works may require several hours of intense activity.
- During later stages of the construction phase, emissions from some operations will be screened by previously completed buildings.
- As buildings near completion, activity will gradually relocate indoors.
- A number of different construction firms are likely to be contracted, each using different plant.
- With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

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From the foregoing, it is clear that construction phase noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess a worst-case scenario emission. An extreme worst-case scenario consists of construction activity simultaneously occurring at the nearest points to offsite receptors, involving plant with the greatest noise output. In this scenario, operations may occur simultaneously at the north and west boundaries of the proposed site.

For the purposes of modelling, it is assumed that operations in each of the three zones will involve a tracked excavator, discharging mixer truck, consaw, dumper and telescopic handler in simultaneous use, at the nearest point of the works zone. Such a scenario is unlikely to arise but is applied here to represent an extreme worst-case scenario.

Noise emissions from the above were modelled using Sound plan software. Input parameters were as follows:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).



- Hard ground assumed throughout (bare and compacted).
- Existing wall located to the west boundary.
- Hoarding proposed (see section 8.7)
- Plant output data taken from Table 8-11.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper and handler movements continuous

The model output is shown in Figure 8-11. LAeq 1 h levels predicted at the nearest receptors, close to their facades, will be 57-62 dB at the dwellings to the northwest and west. Levels at all other receptors will be lower. Predicted noise levels are lower than construction phase noise limit criteria of 65 dB discussed above with mitigation proposed in section 8.7.

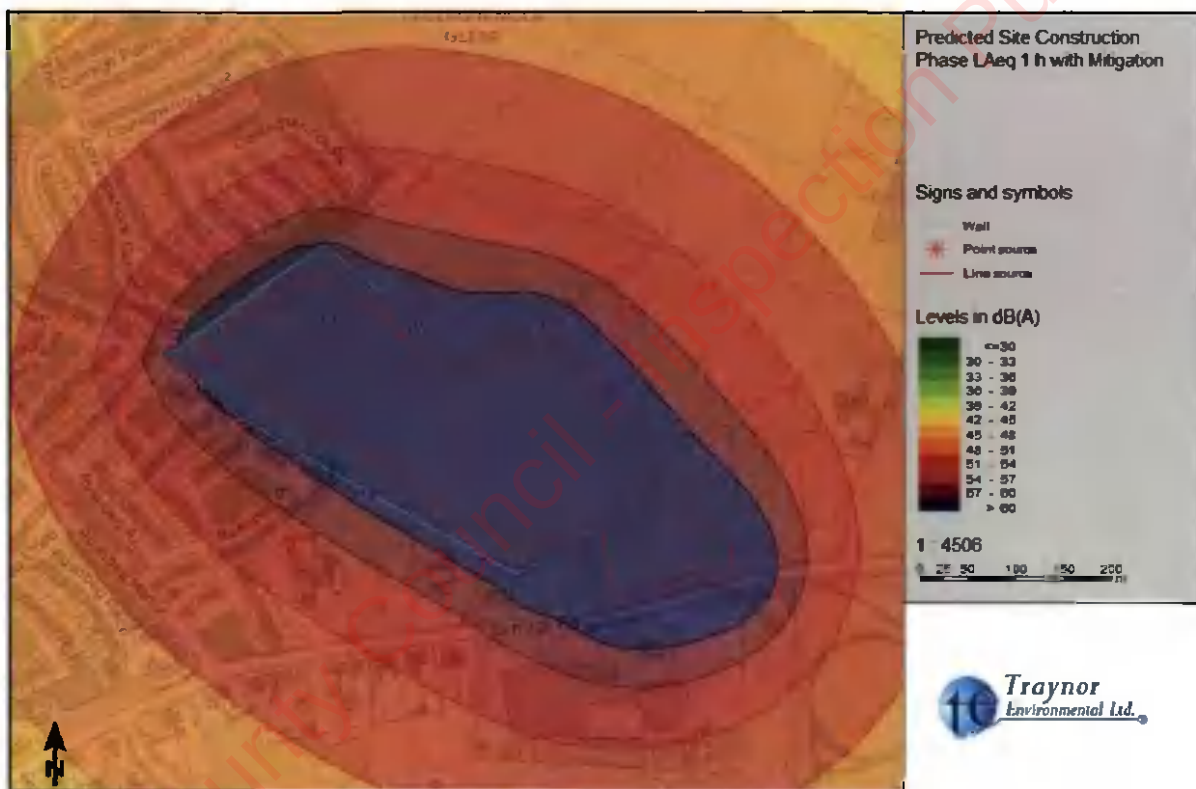


Figure 8.11: Predicted Site construction phase LAeq 1 h

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R445.

Potential sources of ground borne vibration during the construction phase are as follows:

- **Delivery truck movements:** Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- **Plant movements:** The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- **Ground works:** Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

Residual Impact

Noise impacts associated with proposed site will likely to be slight to moderate at nearby receptors. Impacts will be temporary. No vibration impacts are expected.

Operational Phase

Across the proposed site, noise emissions will consist of typical residential estate sources such as playing children, lawnmowers, heat pumps where installed, and car movements. Emissions will also arise from vans associated with deliveries, and waste collection trucks. All such emissions are highly unlikely to be significant onsite or offsite. Onsite traffic speeds will be low, thus minimising tyre noise.

The Creche which is located to the south of the site will serve the residents of the development. The opening hours of the creche is expected to be from 7am – 7pm Monday to Friday. No early morning noise associated with the creche is expected before 7am. The noise of children playing in any environment is regarded as a natural aspect of life in any area of a development.

Considering that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site.

The proposed site layout will incorporate open spaces which will be grassed and planted with trees. It is likely that a maintenance contract will be awarded to one or more local landscaping companies. Maintenance activities undertaken at the proposed site will chiefly include regular mowing of open green areas. While mower emissions are likely to be audible at the nearest receptors, such emissions will blend into the urban soundscape, particularly during the summer when the daytime/evening noise environment in any urban area tends to include at least one mower audible in the distance at any time.

Noise impacts at offsite receptors attributable to car movements on roadways within the completed site are expected to be imperceptible due to a combination of low traffic speeds, relatively low numbers of movements, screening by buildings and separation distance. However, impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity. Dwellings most vulnerable here are located outside the eastern end of the proposed site.

A review of the traffic impact assessment report indicates that the number of daily vehicle movements generated by the fully completed development will have a negligible effect for the residential areas. These will be dispersed across the day and will arrive/depart to/from the site using different roads.

The traffic assessment suggests that the Proposed Development will result in a minor increase in traffic volumes.

Residual Impact

Noise impacts associated with onsite emissions including onsite traffic will be imperceptible at offsite receptors.

8.6 Potential Cumulative Impacts

Construction Phase

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers. In the event that construction activities associated with the majority of developments noted above occur simultaneous to the proposed development, they are at sufficient distances such that the cumulative noise levels will remain dominated by the localised works referred to in section 8.2.

In the event that works on site and works associated with proposed or permitted developments were ongoing simultaneously, there is potential for cumulative noise impacts at all NSLs. Under this scenario, construction activities will be audible at a number of facades of the residential areas due to their location with respect to both areas of works.

The contractor will be required to control noise and vibration impacts associated with this development in line with the guidance levels included in section 8.2 and follow the best practice control measures within BS 8228-2. The impact from any construction works associated with the other developments listed above is considered to be imperceptible as these works are expected to take place at large distances to the most exposed noise sensitive receivers to the proposed development under assessment.

Operational Phase

The operational phase of the development listed above have the potential to generate additional traffic on the roads in the vicinity of the local area. These additional vehicle movements have been considered in the traffic assessment in the operational phase of the potential impact section. The cumulative impact of this source is determined to be imperceptible and long term.

8.7 Mitigation Measures

Construction Phase-Noise

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2*. Whilst construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

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- Selection of quiet plant.
- Noise control at source.
- Screening.
- Liaison with the public
- Monitoring

A detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures, and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

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

Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping, and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators, and pumps, these can be surrounded by acoustic lagging or enclosed with in acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.

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- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed use standard plywood material to provide adequate sound insulation.

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material to reduce noise by 20dB along the west, north boundaries where the existing wall is not located and a percentage of the east boundary. Figure 8-16 shows locations of hoarding required. This will ensure guidance limit for construction noise at nearest noise sensitive location is followed and potential impacts relating to noise nuisance and disturbance and vibration impacts are effectively minimised and controlled.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.



Figure 8.12: shows locations and type of hoarding required

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In

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addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics - Description, measurement, and assessment of environmental noise*.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation or when other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

Construction Phase - Vibration

The vibration from construction activities will be limited to the values set out in section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

Operational Phase

Additional Traffic on Adjacent Roads

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

Mechanical Services Plant

Considering that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward impacts

Inward impacts relate to noise emissions received at a receptor due to emissions emitted by one or more sources. Emerging best practice provides for the design of new developments such that the occupants of residential elements are not subject to high internal noise due to existing (and potential future) external noise sources. Such sources usually consist of transport (road, rail, and aircraft), and industry. Internal and external criteria considered appropriate to new residential developments are identified below. Impacts at the proposed creche are also assessed.

At the Proposed Development site, inward noise will arise from the following sources:

- Onsite vehicle movements associated with residents at onsite and staff and creche. Noise emissions from these will be relatively low at onsite receptors due to low traffic speeds. Inward noise impacts are typically associated with rolling noise at higher speeds, and such emissions are unlikely to arise onsite.

- Noise from delivery vehicles across the site and from waste management vehicles will be similarly low due to low speed.
- The nearest road of significance is the R445 which runs along the southern side of the proposed development site. This road sees traffic throughout the day, evening, and night.
- Inward traffic noise also arises from distant roads, including the M7.
- Inward industrial noise also arises from Kildare Chilling.

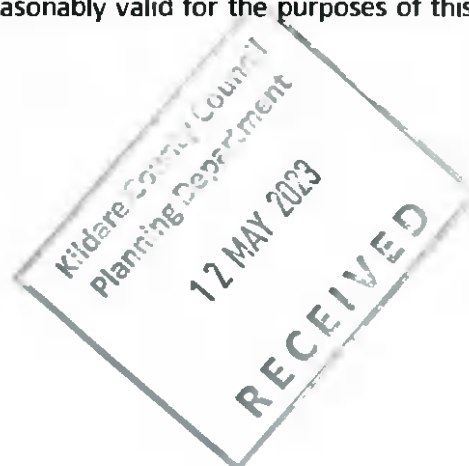
All sources of inward noise are road traffic and industrial. Rail and aircraft noise is not audible at the site.

Noise levels measured at the site indicate that Lden levels close to the R445 rise to 60-61 dB, with Lnight levels reaching 46-47 dB. Levels falls with increasing distance from surrounding roads, with Lden and Lnight levels falling below 55 and 46 dB respectively in parts. Lden and Lnight levels across the site are currently lower than Noise Action Plan thresholds. The ProPG risk assessment concludes that the proposed development site is low risk across almost all areas, increasing to medium risk at positions immediately adjacent to the R445. It is also concluded that night-time L_{AFmax} levels require consideration at positions within approximately 100 m of public roads.

In order to quantify noise levels across the site, predictive modelling was undertaken using Sound plan software. The following input parameters were applied:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).
- Contours taken from mapping.
- Modelled heights: 2 m to allow comparison with measured values.
- Road traffic volumes taken from the traffic count data provided by the design team. The count measured daytime data only (0700-1900 h). Additional evening (1900-2300 h) and night-time (2300-0700 h) flows of 10 % each were assumed.
- Light vehicle and HGV noise emissions taken from CNOSSUS-EU database.
- Traffic speeds 50 km/h,
- Industrial Noise.

The model output is shown in Figures 8-19 and 8-20. Table 8-18 presents a comparison between modelled and measured Lden and Lnight levels. Modelled levels at three measurement positions are within 3 dB of measured levels. The model is considered reasonably valid for the purposes of this assessment.



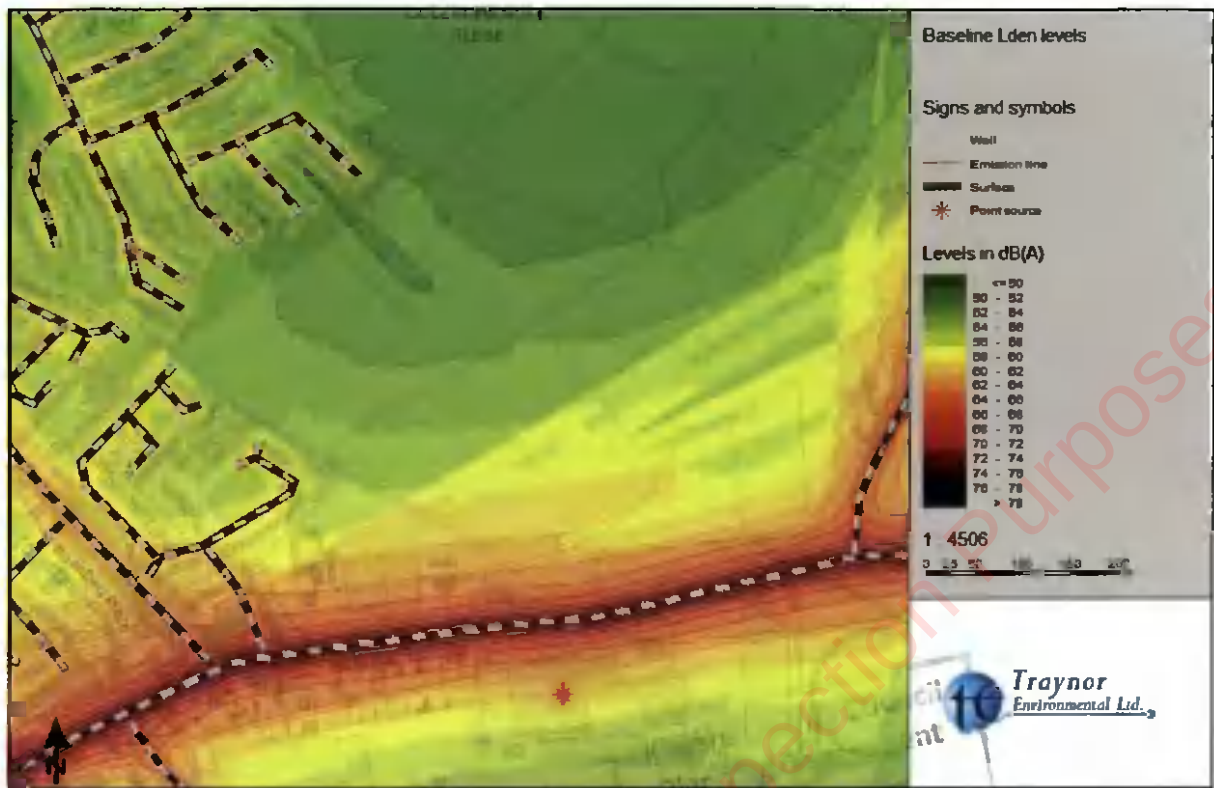


Figure 8.13: Baseline Lden levels



Figure 8.14: Baseline Lnight levels

Parameter		A	B	C
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Lden	Measured	60	59	55
	Modelled	62	59	54
Lnight	Measured	51	52	46
	Modelled	53	50	46

Table 8.12: Modelled and measured baseline Lden and Lnight levels

In order to provide for future increases in noise levels, the model was modified to include future traffic volumes (overall road traffic across the local area) predicted by the project traffic team with respect to the design year 2041. Proposed buildings at the site were added to the model, as well as traffic on the proposed site roads. The model was run at a height of 4 m, to provide an indication of future traffic noise levels at upper floors of the proposed buildings. The model output is shown in Figures 8-15 to 8-18. Parameters modelled are Lnight, Lden, LAeq 16 h and night-time LAeq 1 h, as these relate to identified criteria.

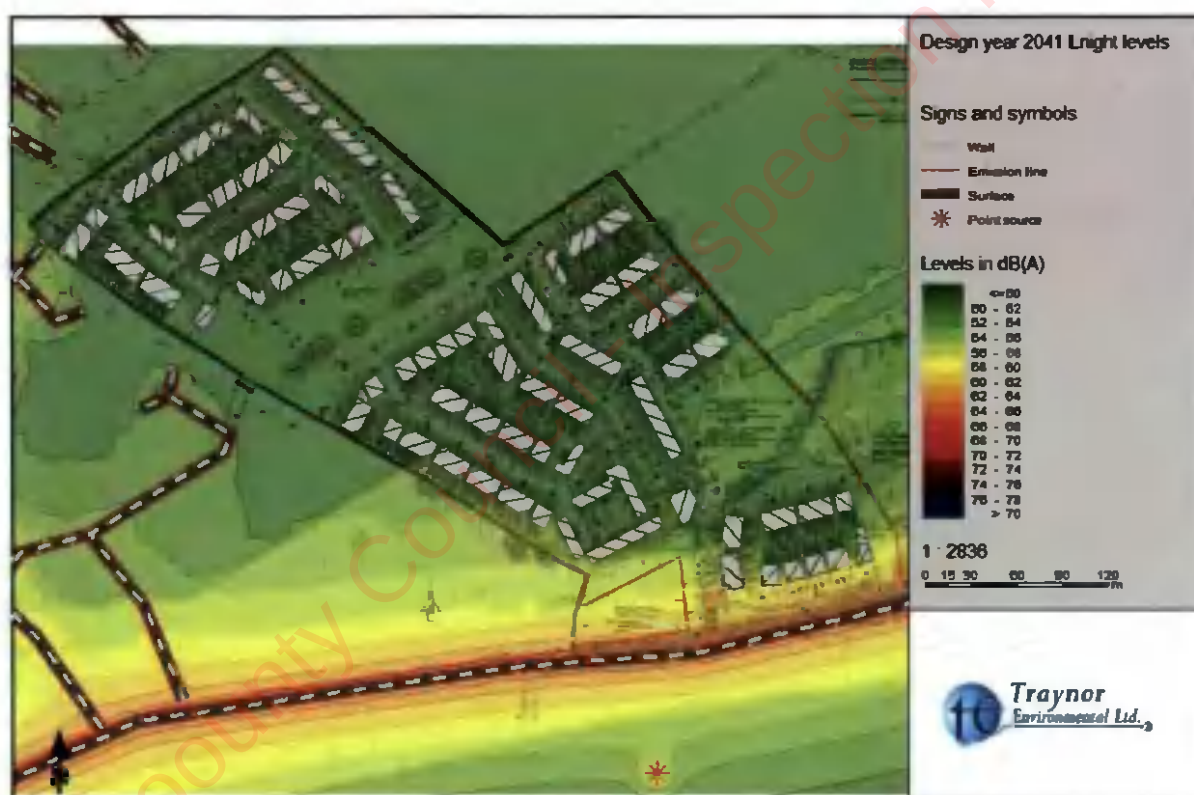


Figure 8.15: Design year 2041 Lnight levels (indicative site boundary)



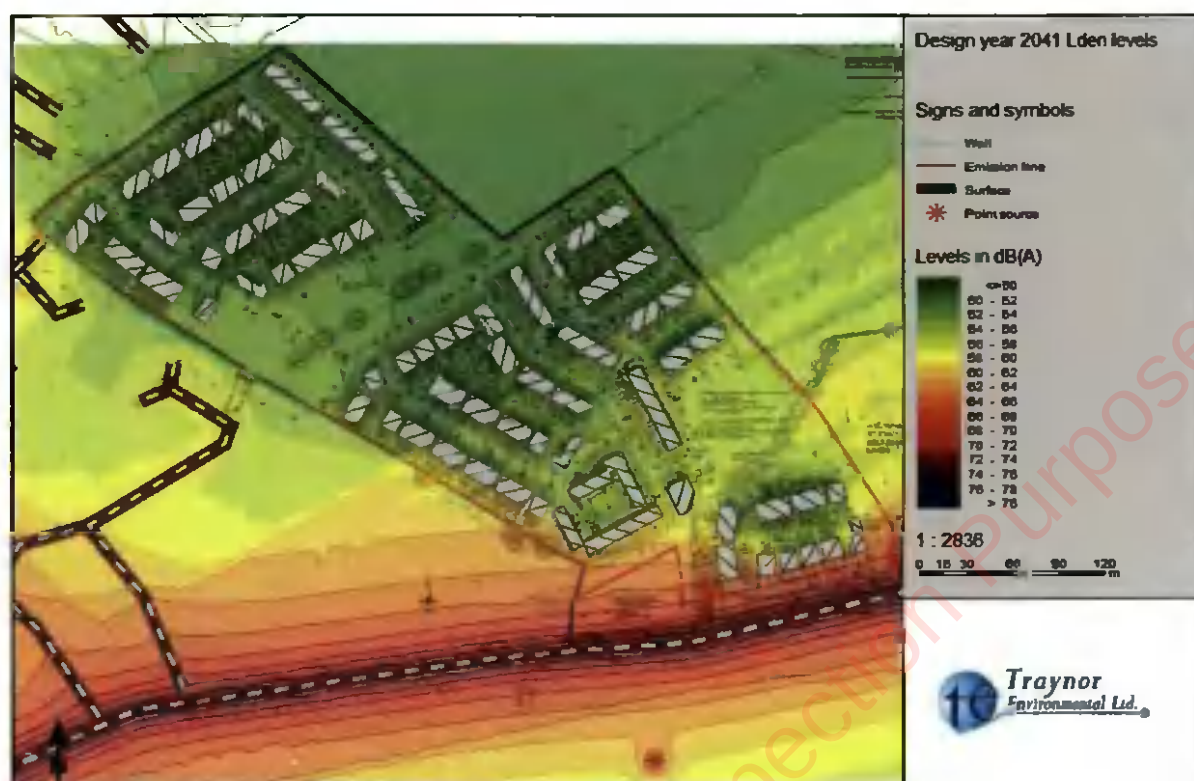


Figure 8.16: Design year 2041 Lden levels (indicative site boundary)

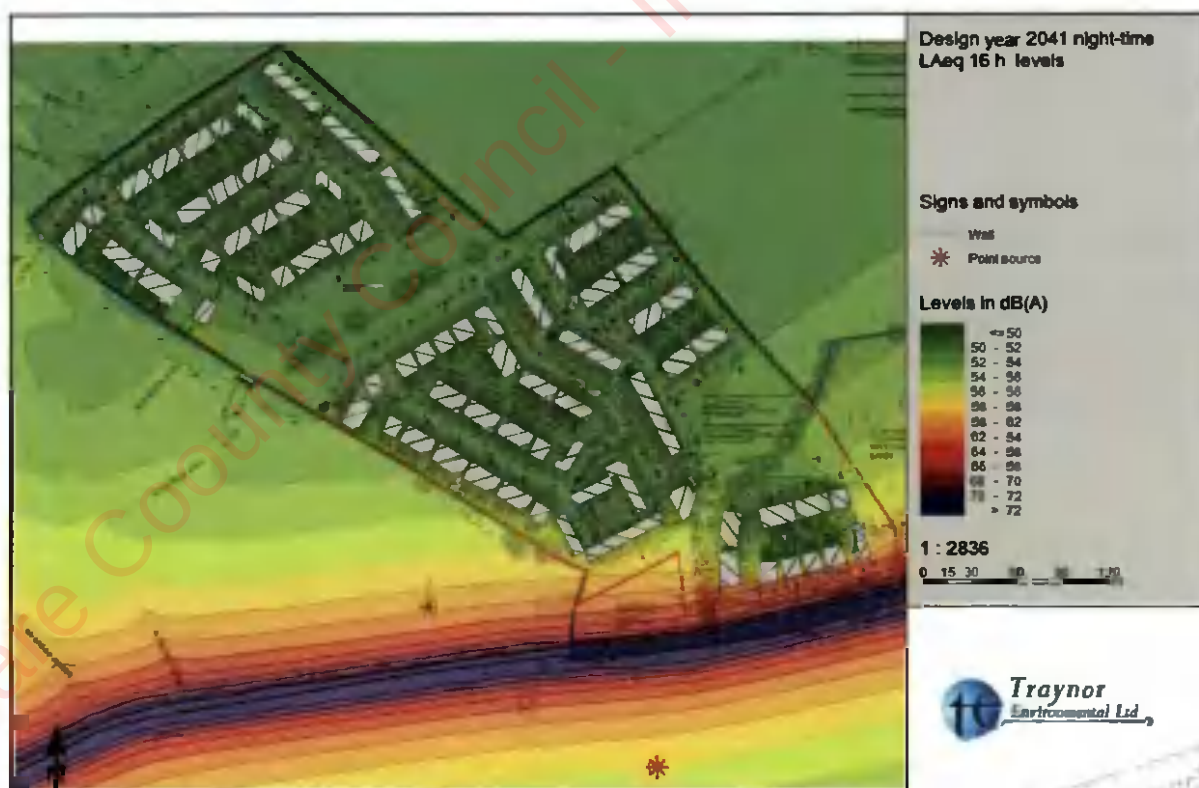


Figure 8.17: Design year 2041 LAeq 16 h levels (indicative site boundary)



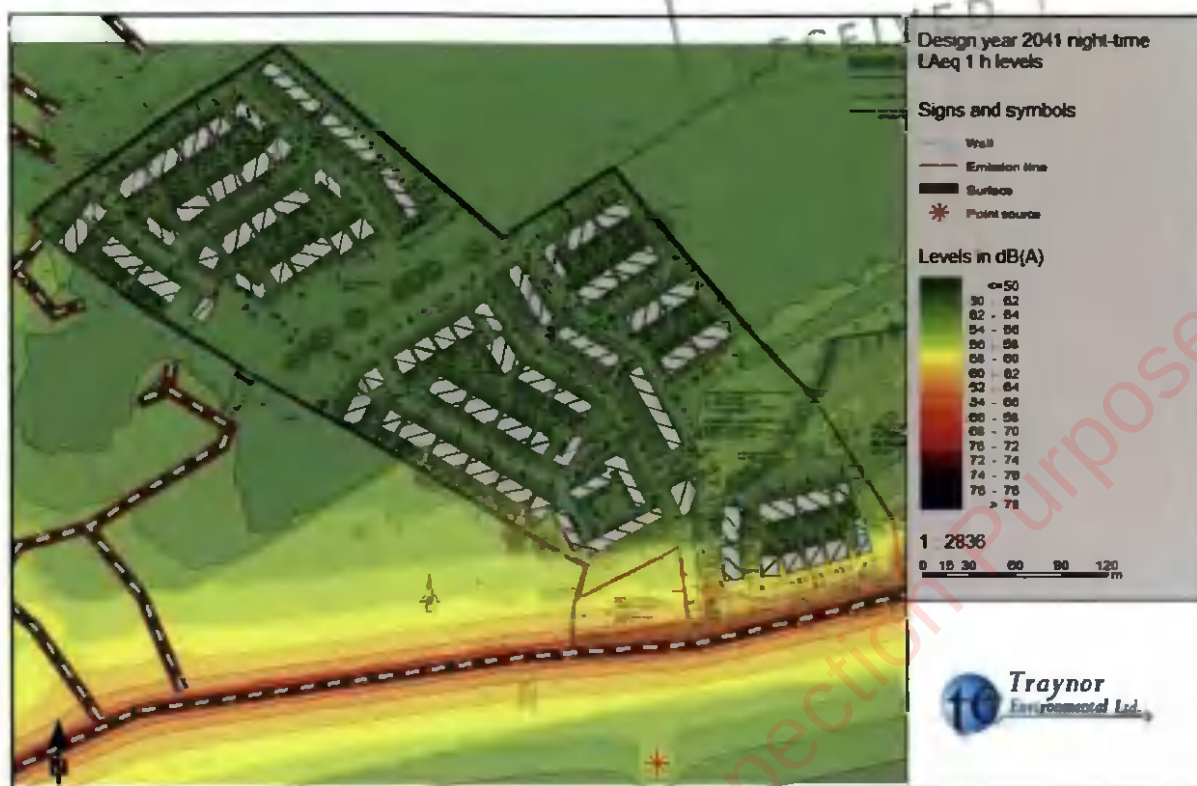


Figure 8.18: Design year 2041 night-time LAeq 1 h levels (indicative site boundary)

Pro-PG Stage 1: Risk assessment

The model indicates that future noise levels, based on increased traffic, will result in incident LAeq 16 h levels which reach 62-64 dB at units facing the R445. Levels across the majority of the residential area will be lower.

Night levels across most of the residential area will be lower than 45 dB. Levels will be higher at facades close to the road network, reaching 58 - 60 dB at units facing the R445. Most of the residential area will continue to be 'low risk' into the future, with risk increasing to 'medium' at units fronting the R445.

ProPG notes that the risk category will be influenced by the number of LAFmax events which exceed 60 dB externally during night-time hours. Measured data suggest that LAFmax levels due to passing traffic exceed 60 dB approximately 100 m into the site, and the number of such movements considerably exceeds 10 during night-time hours. It follows that, bedrooms on façades which face the R445 (South boundary) are likely to receive more than 10 LAFmax events above 60 dB during night-time hours. Bedrooms of facades which are less than 90 degrees to these roads are likely to be similarly exposed. Such LAFmax events require consideration in the design of glazing requirements.

Bedrooms on other facades, and across the wider residential area, are likely to be satisfactory in this context, with any LAFmax events likely to be entirely due to traffic movements within the development site.

Pro-PG Stage 2 element 1: Good acoustic design process

In designing the overall site layout, the following principles of good acoustic design have been applied:

- The majority of the proposed residential units are located deep within the residential area, away from the public road network. A small proportion of facades will face the public road network.
- The proposed residential area incorporates several green spaces, in addition to large open expanses in the wider development.

Pro-PG Stage 2 element 2: Internal noise level guidelines

Internal noise criteria are discussed above. Assuming a 15 dB reduction through an open window (the conventionally accepted value, identified in NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows (prepared by the Napier University Building Performance Centre for DEFRA, 2007)), the following conclusions are drawn:

- Recommended internal daytime LAeq 16 h criteria are 35-40 dB. These criteria will be met with open windows where incident levels do not exceed 50-55 dB. The criteria will be met across most of the residential area with windows open.
- At dwellings fronting the R445, RW value of 33 glazing is likely to allow compliance with criteria with windows closed in living rooms, dining rooms and bedrooms.
- The recommended L_{night} criterion in bedroom is 30 dB. As before, this criterion will be met across most of the residential area with windows open. Installation of RW value of 33 glazing identified in the previous paragraph will allow internal night-time criteria to be achieved at bedrooms facing the R445.
- Facades within 100 m of the R448 will be exposed to more than 10 L_{Afmax} events at night which exceed 60 dB. The World Health Organisation (1999) recommends that L_{Afmax} levels in bedrooms should not exceed 45 dB to prevent sleep disturbance. Where the number of events exceeds 10 per night, the objective is thus to ensure that internal L_{Afmax} levels with windows closed remain below 45 dB. Standard thermal glazing will reduce internal L_{Afmax} levels below 45 dB at almost all bedrooms across the site, including most units within the 100 m corridor along the R445. At units directly fronting the R445, external L_{Afmax} levels may reach 80 dB, and standard thermal glazing will be insufficient. The RW 33 dB recommendation above will also be insufficient, and it will be necessary to further increase RW values here. A conservative RW value of 38 dB is recommended at bedrooms within 20 m of the R445. Standard thermal glazing will be sufficient at other facades.

The operational phase mitigation required onsite relates solely to inward impacts associated with R445 traffic and industrial noise. Internal LAeq T criteria will be met at most residential units using standard thermal glazing. However, certain facades will require enhanced glazing to meet ProPG and BS 8233:2014 criteria. The facades in question are shown in Figure 8-19. At these façades, it is proposed to install glazing with a minimum RW value of 33 dB in living rooms and dining rooms, and 38 dB on bedrooms. Standard glazing will suffice in kitchens, bathrooms, hallways, and stairwells. Table 8-13 shows recommended glazing specifications, along with ventilation requirements.

Table 8-20 specifications are readily achievable, and a number of suppliers offer suitable products. It is necessary that the glazing RW value is guaranteed by the window supplier rather than by the individual glazing and frame manufacturers. Potential suppliers should be advised that levels in each octave band should be achieved as a minimum. Compliance with the overall RW value should only be assessed by reference to the RW+C_{tr} value, typically 4-5 dB higher than the RW value alone.

Band	63 Hz (dB)	125 Hz (dB)	250 Hz (dB)	500 Hz (dB)	1000 Hz (dB)	2000 Hz (dB)	4000 Hz (dB)	8000 Hz (dB)	Total
Dining & living glazing	15	17	21	30	38	36	35	35	33 dB Rw
Dining & living trickle vent	36	36	34	31	34	38	38	38	35 dB Dn,e
Bedroom glazing	25	28	28	34	40	41	43	45	38 dB
Bedroom trickle vent	35	40	38	32	47	53	53	53	38 dB Dn,e

Table 8.13: Site glazing and ventilation requirements at facades shown in Figure 8-26



Figure 8.19: facades requiring enhanced glazing (shown red) (indicative site boundary)

External amenity areas will be satisfactory in the context of WHO and ProPG criteria. At the proposed creche, received LAeq 16 h levels will be satisfactory in the context of Technical Guidance Document TGD-021-5, and specific mitigation measures are not required. Standard thermal glazing is expected to be sufficient to meet an internal ambient LAeq 30 min criterion of 35 dB.

Pro-PG Stage 2 element 3: External amenity area noise assessment

BS 8233:2014 recommends that LAeq 16 h levels should ideally not exceed 50-55 dB in external amenity areas. This criterion will be met in rear gardens of all housing units.

Where LAeq 16 h levels in amenity areas exceed 50-55 dB, BS 8233:2014 states that:

'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.'

In this regard, ProPG adds:

'Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to...a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).'

The residential area will incorporate a number of onsite open green spaces, all within several minutes' walk. Residents of all units will therefore benefit from provision of an extensive open, accessible, and quiet onsite realm. On this basis, noise levels in amenity areas will be satisfactory.

Pro-PG Stage 2 element 4: Assessment of other relevant issues

Other issues assessed, as recommended by ProPG, include the following:

- Compliance with relevant national and local policy: The most relevant policies are those set out in the County Kildare Third Noise Action Plan 2019-2023. The plan proposes that mitigation will be applied where Lden levels exceed 70 dB, and Lnight levels exceed 57 dB. Onsite Lden noise levels do not exceed the 70 dB criteria and are not expected to exceed them in the future.
- Magnitude and extent of compliance with ProPG: LAeq 16 h and Lnight levels in almost all proposed units will meet identified criteria without specific acoustic mitigation measures. Measures required relate solely to units fronting the R448 and are discussed below.
- Likely occupants of the development: The proposed development is expected to be occupied by a typical sample of the population and is unlikely to see a predominance of one particularly sensitive group.
- Acoustic design versus unintended adverse consequences: No adverse consequences have been identified.
- Acoustic design versus wider planning objectives: No issues have been identified.

At the proposed creche, incident LAeq 16 h levels will be considerably lower than the 51-55 dB range suggested by Technical Guidance Document TGD-021-5.



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8.8 Predicted Impacts

Construction Phase

During the construction phase of the project there is the potential for significant and moderate impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact will have a negative, moderate, and short-term impact on the surrounding environment.

Operational Phase

Additional Vehicular Traffic

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible, and long-term impact to nearby residential locations.

Mechanical Plant & Creche

Noise levels associated with operational plant are expected to be well within the adopted day and night-time noise limits at the nearest noise sensitive properties considering the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be of neutral, Imperceptible, long-term impact.

Population & Human Health

The assessment of impacts on human health is typically undertaken by reference to WHO guidance, which has been revised over the last four decades according as noise and health studies have been published. The WHO currently recommends the following:

- In residential settings, a daytime/evening LAeq 16 h level of 50 dB is an indicator of moderate annoyance.
- A night-time LAeq 8 h level of 45 dB is recommended to prevent sleep disturbance.
- With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours.

Impacts assessed above may be reviewed in light of the WHO recommendations, as follows:

- Following completion and occupation of the completed development, daytime, and night-time WHO criteria are not expected to be exceeded at any offsite receptor as a result of onsite emissions.
- Traffic noise arising from public roads in the vicinity will increase slightly as a result of the proposed development. The increase will be slight, and unlikely to be higher than 3 dB at local receptors outside the site boundary.
- With respect to inward impacts, external noise levels will be generally satisfactory in the context of WHO. However, residential units close to the R448 will be exposed to LAeq 16 h and LAeq 8 h levels which exceed WHO criteria. Nonetheless, internal noise levels at these units will be satisfactory, subject to installation of marginally enhanced glazing required to attenuate LAeq 16 h, LAeq 8 h as well as L_AF_{max} events.

On this basis, it is considered that there will be no adverse noise impact on the local population or on human health.

Overall Residual Impacts

Following completion, noise emissions arising within the completed development will be identical in character to emissions arising across the nearby fringes of Kildare. Emissions will be urban residential in character and will not give rise to offsite impacts.

Noise impacts at offsite receptors attributable to vehicle movements on roadways within the completed site will be imperceptible. While increases in traffic on the surrounding road network will arise as a result of the development, much of the increase will be attributable to traffic using the R448 which will benefit the wider town. Increases associated with onsite traffic directly will be less than 2 dB, resulting in noise impacts at nearby receptors which are imperceptible.

At the completed development, inward noise emissions will arise from the surrounding road network. The future noise risk is low across most of the site when assessed using ProPG guidance, increasing to medium at units directly fronting the R448. These properties will benefit from moderately enhanced glazing on units facing these roads.

Noise levels in amenity areas and at the proposed creche will be lower than relevant criteria. Residents will benefit from onsite green spaces.

EPA document Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (2022) sets out a scheme by which environmental noise impacts may be assessed. Operational phase environmental impacts are assessed in this regard in Table 8.21. This assessment scheme is not applicable to inward noise impacts, which are assessed separately through the ProPG procedure set out above.

Criterion	Impact at offsite receptors
Quality of effects	Activities within the development: Neutral effects
	Onsite traffic: Imperceptible effects
Significance of effects	Activities within the development: Imperceptible effects
	Onsite traffic: Imperceptible effects
Extent & context of effects	Activities within the development: Minimal extent, as almost all onsite sources will be inaudible offsite. Effects will conform with baseline environment which is urban-fringe in character.
	Onsite traffic: Extent extends throughout surrounding area. Effects will conform with baseline soundscape which is dominated by road traffic.
Probability of effects	Activities within the development: Effects likely to occur
	Onsite traffic: Effects likely to occur
Duration & frequency of effects	Activities within the development: Permanent, irreversible, daily
	Onsite traffic: Permanent, irreversible, daily

Types of effects	Indirect effects: None identified at offsite receptors
	Cumulative effects: Discussed below
	Do-nothing effects: None identified at offsite receptors
	Worst case effects: None identified at offsite receptors
	Indeterminable effects: None identified at offsite receptors
	Irreversible effects: Effects will be irreversible
	Residual effects: None identified at offsite receptors
	Synergistic effects: None identified at offsite receptors

Table 8.14: Assessment of offsite noise impacts from completed development.

8.9 'Do Nothing' Scenario

Should the proposed development not proceed (the 'do nothing' scenario), no noise emissions are expected from within the site other than those associated with land management practices, depending on how the site is used in the future. If the Proposed Development were not to proceed, the potential for additional investment, employment, and housing in the area in relation to the construction and operation of the Proposed Development would be lost. It is considered that the 'Do-Nothing' impact would be permanent, negative, and slight as the Proposed Development lands are already zoned for residential.

8.10 Worst Case Scenario

The 'worst case' scenario is that the development is not constructed as per the drawings and details provided in the planning application. While one would expect the development is required to be constructed in accordance with the planning documents which includes various mitigation measures outlined above.

The 'worst case' scenario would be that the attributes, mitigation measures were not carried out, the ProPG Internal Noise Levels guidelines, BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings are not met.

8.11 Monitoring & Reinstatement

Construction Phase

It is recommended that monthly noise and vibration monitoring surveys be carried along the boundary of the proposed site in order to monitor the effectiveness of noise and vibration management for the duration of the construction phase. Noise and vibration levels at Residential Sensitive Locations should not exceed the construction phase noise and vibration limit criteria in Section 8.2. Any breaches of these limits will require a review of operations and mitigation measures if the exceedance is due to the construction works on site.

In order to effectively manage noise and vibration at residential dwelling located west of the proposed site, installation of continuous data logging live noise and vibration monitoring system is required. This software will require remote login, data download and text/email alert functionality. It will measure key noise and vibration parameters (e.g., L_{Aeq} , L_{AFMAX} , L_{A90} , L_{A10} , PPV(mm/sec) and Frequencies as Hz.

Operational Phase

When the residential development is operational it will not result in an increase in noise and vibration levels at any of the sensitive locations beyond the site boundary therefore no monitoring is deemed necessary going forward.

8.12 Difficulties in Compiling Information

No difficulties were encountered during the preparation of the EIAR chapter.

8.13 References

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 - Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- BS 6841 (1987): Measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.
- Design Manual for Roads and Bridges, 2011
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003).
- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002).
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017)
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, (May 2022)
- ISO 1996: 2017: Acoustics - Description, measurement, and assessment of environmental noise.
- The Transport Infrastructure Ireland (TII, formerly NRA) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014), the Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII, 2004) was also considered in the preparation of the assessment. This document sets out noise and vibration limits for the construction phase which are generally applied by planning authorities to all construction projects.
- The Professional Guidance on Planning & Noise (ProPG), May 2017

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8.14 Glossary

Ambient: Total noise environment at a location, including all sounds present.

A-weighting: Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as LAeq T, LAF10 T, etc.

Background level: A-weighted sound pressure level of residual noise exceeded 90 % of time interval T. Denoted LAF90 T.

Broadband: Noise which contains roughly equal energy across frequency spectrum. Does not contain tones and is generally less annoying than tonal noise.

Decibel (dB): Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is the smallest change perceptible to the human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 μ Pa.

Dn, e (dB): Insulation value provided by trickle vent.

Effect: Consequence of an impact.

Emissions: Noise originating from source under consideration, spreading spherically, hemispherically, or otherwise into surrounding environment.

Fast response: 0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as LAF10 T, LAF90 T, etc.

Free field: Measurement position removed from acoustically reflective surfaces other than ground. Frequency: Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.

Hertz (Hz): Unit of frequency measurement.

Immissions: Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).

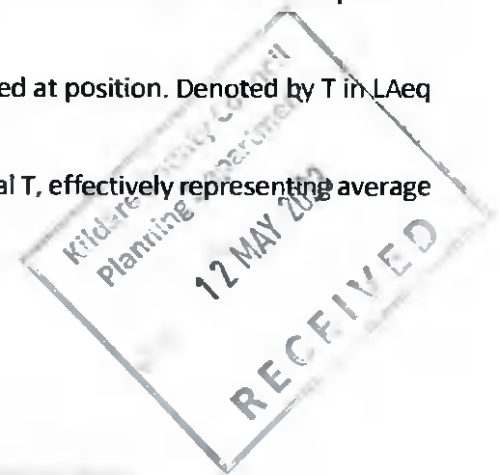
Impact: Change resulting from an action, such as implementation of a project.

Impulse: Noise, which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.

Incident level: Noise level at façade or other structure which would arise if façade was absent. Thus, ignores façade reflections. May be measured directly or calculated from measurements at specified distance from façade.

Interval: Time period T over which noise parameters are measured at position. Denoted by T in LAeq T, LAF90 T, etc.

LAeq T: Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.



LAF90 T: Sound pressure level exceeded 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.

L_{AFmax}: Maximum A-weighted sound pressure level occurring during measurement interval. **L_{day}:** The A-weighted long term average incident sound pressure level determined over all the daytime periods of a year, where the daytime period is typically 0700-1900 h.

L_{den}: Day-evening-night noise level. Calculated from separate **L_{day}**, **L_{evening}** and **L_{night}** levels using formula specified in EU Directive 2002/49/EC.

L_{evening}: The A-weighted long term average incident sound pressure level determined over all the evening periods of a year, where the evening period is typically 1900-2300 h.

L_{night}: The A-weighted long term average incident sound pressure level determined over all the nighttime periods of a year, where the night-time period is typically 2300-0700 h.

Noise sensitive location: Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

Octave band: Frequency spectrum may be divided into octave bands. The upper limit of each octave is twice the lower limit.

Peak particle velocity (PPV): Rate of change of displacement of particles in solid medium due to vibration, measured as mm/s. Usually used to assess vibration in relation to activities such as blasting as correlates well with human perception of vibration and property damage.

Residual level: Noise level remaining when specific source is absent or does not contribute to ambient.

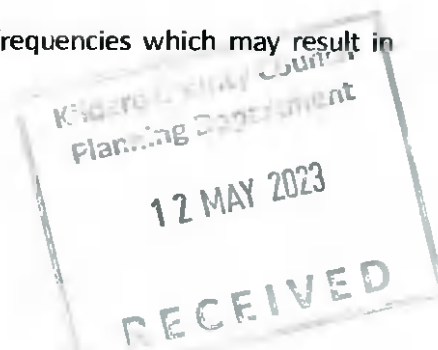
R_w: Overall sound reduction index provided across a range of frequencies, determined from laboratory measured sound insulating properties of material or building element in each frequency band.

Sound pressure: Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.

Soundscape: Acoustic environment as perceived, experienced, or understood by listeners, taking context into account.

Specific level: **L_{Aeq}** T level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.

Tone: Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.





9. CLIMATE & AIR QUALITY

9.1 Introduction

This section identified and assessed the potential air quality and climatic impacts associated with the proposed development both the construction and operational phases of the development.

It includes a comprehensive description of

- the existing air quality and climate at and in the vicinity of the subject site,
- how the construction and operational phases of the development may impact existing air quality and finally,
- the mitigation measures that shall be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local micro climate.

Proposed Development Site Location and Brief Description

This is as described in chapters 1 (introduction) and 3 (Description of Development) of this EIAR and as set out in the statutory notices.

Statement of Competence

In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts". This chapter was prepared by Nevin Traynor BSc. Env. H. Dip I.T. of Traynor Environmental Ltd. Nevin is a Senior Environmental consultant and director of the company established in 2004. Traynor Environmental have 19 years' experience as environmental consultants, offering specialist advice in respect of a wide range of environmental disciplines. The company have been involved in numerous housing projects and EIA preparation since the company was established.

9.2 Methodology

The general assessment methodology of the potential impact of the proposed development on air quality and climate has been devised in accordance with:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022)
- EPA Guidelines on information to be contained in Environmental Impact Assessment Reports 2017
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, August 2018).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Protection Agency, 2015. Revised Guidelines on the Information to be Contained in Environmental Impact Statements.
- Environmental Protection Agency, 2015. Draft Advice Notes for Preparation of Environmental Impact Statements.

- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Development Management Guidelines (DoEHLG, 2007).
- European Union (Planning & Development) (Environmental Impact Assessment Regulations 2018).
- Design Manual for Roads and Bridges (DMRB).

Baseline Environment

The existing ambient air quality in the vicinity of the site has been characterised with information obtained from a number of sources including EPA Annual Air Quality in Ireland Reports and Local air monitoring stations data and EPA Licence compliance documents relating to Kildare Chilling's EPA Licence P0170-02.

The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (dust, vehicle exhaust emissions and boiler emissions) which may be released from the site during the construction and operation phases, and which may exert an influence on local air quality.

Information publicly available on the EPA Website www.epa.ie show that as part of a Licence Review submitted by Kildare Chilling TMS Environment Ltd prepared an air dispersion modelling report to show the impact of emissions from the boilers on the Kildare Chilling site and surrounds using a dispersion modelling approach. The assessment shows compliance with the requirements of the Air Quality Standards for all emissions including the maximum levels that would be permitted under the Medium Combustion Plant Regulations. Kildare Chilling as part of the licence carry out odour surveys of the site operations weekly to ensure no off-site issues.

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Air Quality Standards and other Relevant Guidance

Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from Ireland and the European Union.

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 (Ref Table 9.1).

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 National Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), which implement European Commission Directive 2008/50/EC which has set limit values for the pollutants SO₂, NO₂, PM₁₀, benzene and CO 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). Provisions are also made for the inclusion of new ambient limit values relating to PM_{2.5}. The European 2008/50/EC Clean Air for Europe (CAFE) Directive is the current air quality directive for Europe which supersedes the European Directives 1999/30/EC and 2000/69/EC.

In order to assess a wider range of air pollutants in the development area it is necessary to review current air quality monitoring data from published sources such as the most recent EPA's 2021 Annual report entitled Air Quality in Ireland. This EPA report provides detailed monitoring data collected from a number of monitoring locations throughout Ireland on an annual basis to assess national compliance with National Air Quality Regulations. The location of the site at Ruanbeg, Kildare Town, Co. Kildare is characterised as a Zone D area as defined by the EPA. Available EIAR climate & air quality characters for local sites have been reviewed in preparing this EIAR.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones currently in place in Ireland are as follows:

- Zone A is the Dublin conurbation,
- Zone B is the Cork conurbation
- Zone C comprising 23 large towns in Ireland with a population >15,000.
- Zone D is the remaining area of Ireland.

The zones changed on 1 January 2013 to reflect the results of the 2011 census.

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

Design Manual for Roads and Bridges (DMRB) Guidelines.

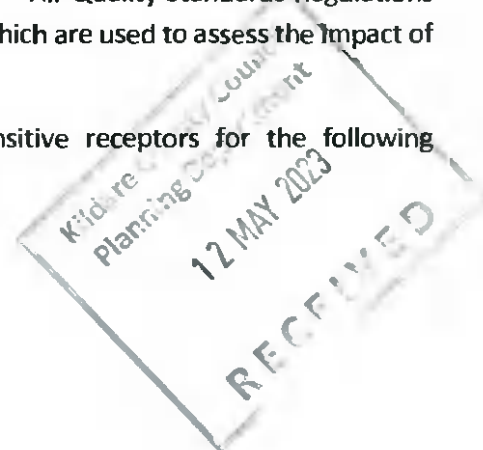
The DMRB Model is based on the UK Highway Agency's DMRB and adapts it for use on national roads in Ireland through a series of implementation documents. Due to the lack of such a model in Ireland the UK DMRB was used to predict vehicle emissions from the new development.

DMRB Volume II, section 3, Part 1 Air Quality provides a screening model which is used to predict vehicle emissions for NO₂, NO_x, PM₁₀, carbon monoxide, benzene and 1,3-butadiene at sensitive receptors which have potential to be affected by the proposed development.

The DMRB model requires a number of inputs such as traffic flow, speed and vehicle mix and annual background pollutant concentrations. Background pollutant concentrations according to air zone were attained by averaging six years of data, from yearly EPA air quality reports for 2016-2021. Predicted concentrations for the construction and operation phases of the project were compared with the Irish ambient air quality standard – S.I. No.180 of 2011 – Air Quality Standards Regulations 2011. These regulations set limit values and averaging periods, which are used to assess the impact of emissions on human health, vegetation, and ecosystem.

Key pollutant concentrations were predicted for nearby sensitive receptors for the following scenarios:

- The baseline scenario (2022), for model verification.



- Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place (2031).
- Year Do-Something scenario (DS), which assumes the proposed development in place (2031).
- Design Year Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place (2041); and
- Design Year Do-Something scenario (DS), which assumes the proposed development in place (2041).

The assessment methodology involved using the DMRB Screening Model (Version 1.03c, July 2007), the NO_x to NO₂ Conversion Spreadsheet (Version 5.1, June 2016), and following guidance issued by the TII, and the EPA. The TII guidance 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 TII guidance, 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:

- Road alignment changes of 5 metres or more.
- Traffic flow changes by 1,000 or more.
- HGV flows change by 200 vehicles per day or more.
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.



Concentrations of key pollutants are calculated at sensitive receptors that have the potential to be affected by the proposed development. For road links which are deemed to be affected by the proposed development and within 200 m of the chosen sensitive receptor's inputs to the air dispersion model consist of: road layouts, receptor locations, traffic movements, percentage heavy goods vehicles, annual average traffic speeds and background concentrations. The DMRB guidance states that road links at a distance of greater than 200 m from a sensitive receptor will not influence pollutant concentrations at the receptor. 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, see Appendix 9.1. The Transport Infrastructure Ireland's Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road

Schemes (Revision 1, 2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any project that causes a change in traffic flows. The degree of impact is determined based on both the absolute and relative impact of the proposed development.

The Transport Infrastructure Ireland's significance criteria have been adopted for the proposed development. The significant criteria are based on PM₁₀ and NO₂ as these pollutants are most likely to exceed the annual mean limit values (40 µg/m³). However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual PM_{2.5} concentrations for the purposes of this assessment.

Transport Infrastructure Ireland (TII) Guidelines

Construction Phase

As stated in the TII Guidance it is "very difficult to accurately dust emissions arising from construction activities". "A semi quantitative approach is recommended to determine the likelihood of a significant impact, which should be combined with an assessment of the proposed mitigation measures".

The semi-quantitative assessment outlined is used to assess the impact of the dust during the construction phase. TII guidance states that dust emissions from construction sites can lead to elevated PM₁₀ concentrations and can cause soiling of properties. The impact of dust emissions during the construction phase is assessed by estimating the area over which there is a risk of significant impacts, in line with the TII guidance. Emissions from construction vehicles are assessed where construction traffic results in a significant (>10%) increase in traffic flows near sensitive receptors in accordance with the TII guidance.

Significance criteria outlined in Tables 9.10 and 9.11 are used to assess the impact of the construction traffic on worst-case sensitive for receptors.

Operational Phase

The TIFs Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes specifies that the changes in pollutant concentrations alongside roads with a significant change in traffic should be assessed. It states that receptors should be considered at all road links where a greater than 5% change in flows or speeds is predicted for the "Do-Something" option.

Significance criteria have been adopted from the TII guidelines and these are presented in Appendix 9.2. The TII guidelines requires the consideration of NO_x and nitrogen deposition impacts at ecological sites that are located within 200m of the proposed development.

POLLUTANT	REGULATION	LIMIT CRITERIA	TOLERANCE	LIMIT VALUE
Nitrogen Dioxide	2008/50/EC	Hourly limit for the protection of human health – not to be exceeded more than 18 times/year	40% until 2003 reducing linearly to 0% by 2010	200 µg/m ³
		Annual limit for the	40% until 2003 reducing	40 µg/m ³

		protection of human health	linearly to 0% by 2010	400 µg/m ³ NO & NO ²
		Annual limit for the protection of vegetation	None	
Lead	2008/50/EC	Annual limit for the protection of human health	100%	0.5 µg/m ³
Sulphur Dioxide	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 24 times/year	150 µg/m ³ NONE	350 µg/m ³ 125 µg/m ³
		Daily limit for protection of human health – not to be exceeded more than 3 times/year	NONE	20 µg/m ³
		Annual and Winter limit for the protection of ecosystems		
Particulate Matter PM ₁₀	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year	50% 20%	50 µg/m ³ 40 µg/m ³
		Annual limit for the protection of human health		
Particulate Matter PM _{2.5} Stage 1	2008/50/EC	Annual limit for the protection of human health	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m ³
Particulate Matter PM _{2.5} Stage 2	2008/50/EC	Annual limit for the protection of human health	NONE	20 µg/m ³
Benzene	2008/50/EC	Annual limit for the protection of human health	20% until 2006. Decreasing linearly	5 µg/m ³

			to 0% by 2010	
Carbon Monoxide	2008/SO/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m ³
Dust Deposition	German TA Luft Air Quality Standard ^{Note 1}	30 Day Average	NONE	350 mg/m ² /day

Table 9.1: Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

¹ The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory.

Note 1: Dust levels in urban atmospheres can be influenced by industrial activities and transport sources. There are currently no national or European Union air quality standards with which these levels of dust deposition can be compared. However, a figure of 350 mg/m²-day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2129) is commonly applied to ensure that no nuisance effects will result from industrial or construction activities.

Construction Impact Assessment Criteria

Transport Infrastructure Ireland's 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (Revision 1, 2011) states that

"it is very difficult to accurately quantify dust emissions arising from construction activities" and that "it is thus not possible to easily predict changes to dust soiling rates or PM₁₀ concentrations."

The guidance advises the use of a semi-quantitative approach to determine the likelihood of a significant impact which should be combined with an assessment of the proposed mitigation measures.

The impact of construction related dust emissions is assessed by estimating the area over which there is a risk of significant impacts as per the NRA guidance. The construction assessment criteria, reproduced from the NRA guidance, are set out in Appendix 9.3 below.

Operational Impact Assessment Criteria

Once operational the proposed development may impact on air quality as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Air quality significance criteria are assessed on the basis of compliance with the national air quality limit values. The Air Quality Standards Regulations 2011 replace the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

Climate Assessment Methodology

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The

macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area. With respect to microclimate, green areas are considered to be sensitive to development. Development of any green area is generally associated with a reduction in the abundance of vegetation including trees and a reduction in the amount of open, undeveloped space. The removal of vegetation or the development of man-made structures in these areas can intensify the temperature gradient.

To assess the impacts of converting vegetative surfaces to hard-standing with residential buildings and its significance, the amount of vegetative surfaces associated with the proposed development that will be converted to residential buildings and hard-standing has been considered.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO₂ emissions that will occur due to the changes in traffic flow that occur in response to the proposed scheme. Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 (FCCC 1997, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM 1998). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties (COP24) to the agreement was convened in Katowice, Poland December 2018. COP24 was viewed as an important step towards the new 2015 agreement on climate change which was signed in Paris in late 2015. Contributions to greenhouse gas 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 on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework" (EU 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "Renewables and Energy Efficiency", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO₂), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOCs) and Ammonia (NH₃). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO₂ (67% below 2001 levels), 65 kt for NO_x (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH₃ (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM_{2.5}. In relation to Ireland, 2020 emission targets are 25 kt for SO₂ (65% below 2005 levels), 65 kt for NO_x (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH₃ (1% reduction) and 10 kt for PM_{2.5} (18% reduction). COM (2013) 917 Final is the "Proposal for a Council Decision for the acceptance of the Amendment to the 1999 Protocol to the

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1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground level Ozone".

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG 2004, 2007). The most recent data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO₂, VOCs and NH₃ but failed to comply with the ceiling for NO_x (EEA 2011). COM (2013) 920 Final is the "Proposal for a Directive on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC". The proposal will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO₂, NO_x, NMVOC, NH₃, PM_{2.5} and CH₄. In relation to Ireland, 2020-29 emission targets are for SO₂ (65% below 2005 levels), for NO_x (49% reduction), for VOCs (25% reduction), for NH₃ (1% reduction) and for PM_{2.5} (18% reduction). In relation to 2030, Ireland's emission targets are for SO₂ (83% below 2005 levels), for NO_x (75% reduction), for VOCs (32% reduction), for NH₃ (7% reduction), for PM_{2.5} (35% reduction) and for CH₄ (7% reduction).

Guidance issued by the European Commission in 2013 entitled Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment has been applied to this assessment in order to determine the potential impacts the proposed developments may have a climate change and biodiversity.

9.3 Receiving Environment

Description of the Baseline Environment/Context

The subject site is located at Ruanbeg, Kildare Town. Co. Kildare north of the R445 and approximately 300m north of the M7 motorway. The site is bounded to the north by Coolaghknock housing estates. To the west by Ruanbeg housing estates and to the east by agricultural fields. The area is characterised largely by residential housing estates and industry.

The site is not located within a Conservation Area or an Architectural Conservation Area. The topography of the site varies, ranging between 92.00m AOD and 98.50m AOD, with a pronounced hillock located south-centre of the site and lower levels within the area adjacent to the Dublin Road. The development area is located within a zone which includes a number of sources of transportation related air emissions principally, Kildare Train Station and TFI Links. The site is 1.2km from the train station.

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). 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 PM₁₀, 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} - PM₁₀) will increase at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

Description of Existing Climate

The nearest representative synoptic meteorological station to the subject site is at Casement which is located approximately 33km southwest of the site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. Recent meteorological data sets for Casement were obtained from Met Éireann for the purposes of this assessment study.

Rainfall

Precipitation data from the Casement meteorological station for the period 2012-2022 indicates a mean annual total of about 782.58 mm. This is within the expected range for most of the eastern half of the Ireland which has between 750mm and 1000 mm of rainfall in the year.

Temperature

The annual mean temperature at Casement (2011-2020) is 9.87°C. Given the relatively proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 9.2 sets out meteorological data for Casement from 2012-2022.

Year	Period	Rainfall (mm)	Mean Temperature (°C)
2012	Annual Mean	688.5	9.4
2013	Annual Mean	925.7	9.6
2014	Annual Mean	946.9	10.1
2015	Annual Mean	836.5	9.4
2016	Annual Mean	731.7	9.7
2017	Annual Mean	703.5	10.0
2018	Annual Mean	657.7	10.0
2019	Annual Mean	865.3	9.8
2020	Annual Mean	787.5	10.1
2021	Annual Mean	696.9	10.0
2022	Annual Mean	768.2	10.5
Mean		782.58	9.87

Table 9.2 - Meteorological Data for Casement 2012-2022

Wind

Wind is of key importance for both the generation and dispersal of air pollutants. Casement met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 9.1). For data collated during five representative years (2017 - 2022), the predominant wind direction is westerly to south-westerly with predominately moderate wind speeds.

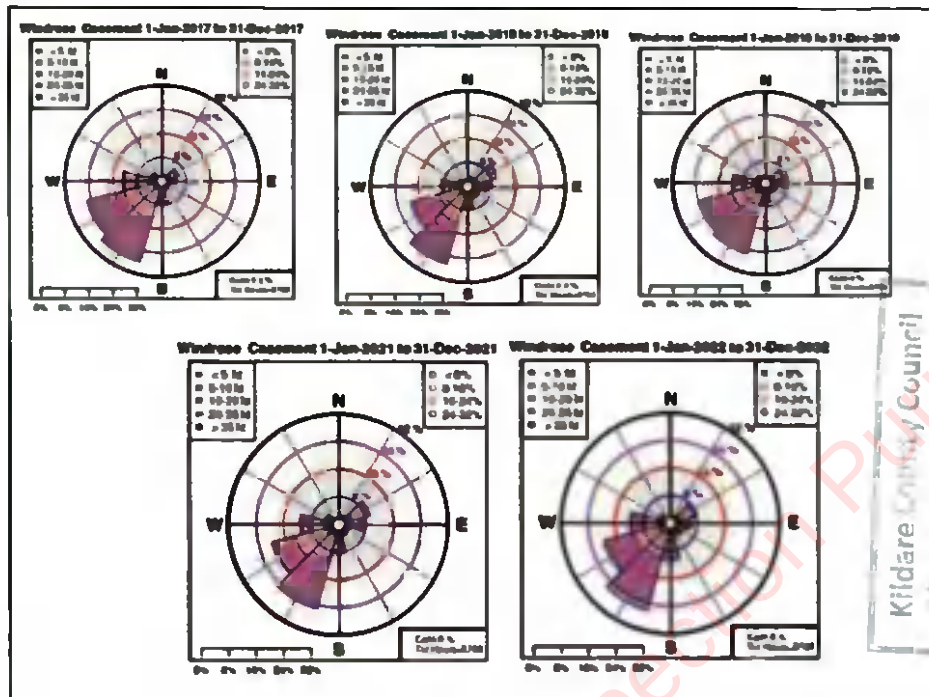


Figure 9.1: Casement Windrose 2017-2022

Description of Existing Air Quality

The existing ambient air quality at and in the vicinity of the site is typical of a suburban location and as such, domestic and commercial heating sources and road traffic are identified as the dominant contributors of hydrocarbon, combustion gases and particulate emissions to ambient air quality. Available climate & air quality characters for local EIAR sites have been reviewed in preparing this EIAR. These characters have shown that the local development have a long-term and imperceptible impact at all of the receptors.

Trends in Air Quality

Trends in Annual air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2021– Key Indicators of Ambient Air Quality" details the range and scope of monitoring undertaken throughout Ireland with Kildare categorised as Zone D.

The most recent 2021 EPA publication includes a number of Zone D monitoring locations which would be broadly comparable to the expected air quality at the subject site. The various Zone D air quality monitoring stations within Ireland provide a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Baseline Air Quality – Review of Available Background Data

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "Air Quality in Ireland 2021 – Indicators of Air Quality" (EPA, 2022). The EPA website details the range and scope of monitoring

undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2021).

In terms of air monitoring and assessment, the proposed development site is within Zone D. The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g., natural sources, industry, home heating etc.) The most recent EPA publication includes a number of monitoring locations which would be broadly comparable to the expected air quality at the subject site. The various air quality monitoring stations within the zone D area provides a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Nitrogen Dioxide (NO₂)

With regard to NO₂, continuous monitoring data from the EPA at the Zone D locations of Emo Court, Birr, Castlebar, Carrick On Shannon, Kilkitt and Edenderry shows that levels of NO₂ are below the annual limit values. The average results at all locations have been used in the DMRB screening model. Long-term data for the period 2017 – 2021 show annual mean concentrations range from 2.0 – 17.0 µg/m³, showing an average over the seven-year period of no more than 6.36µg/m³. Based on these results from 2017 - 2021 a current maximum daily 1-hr mean of 61.88µg/m³ has been used in the DMRB screening model.

Air Quality Zone D		Nitrogen Dioxide (NO ₂)				
Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Emo Court	Annual Mean NO ₂ (µg/m ³)	3.4	3.0	4.0	4.0	3.6
	Max 1-hr NO ₂ (µg/m ³)	33.0	91.0	56.0	38.0	63.8
Birr	Annual Mean NO ₂ (µg/m ³)	-	-	-	9.0	12.8
	Max 1-hr NO ₂ (µg/m ³)	-	-	-	64.0	95.1
Castlebar	Annual Mean NO ₂ (µg/m ³)	7.4	8.0	8.0	6.0	6.3
	Max 1-hr NO ₂ (µg/m ³)	111.5	92.0	86.0	75.6	73.3
Carrick On Shannon	Annual Mean NO ₂ (µg/m ³)	-	-	-	17.0	11.2
	Max 1-hr NO ₂ (µg/m ³)	-	-	-	73.7	82.9
Kilkitt	Annual Mean NO ₂ (µg/m ³)	2.3	3.0	5.0	2.0	2.4
	Max 1-hr NO ₂ (µg/m ³)	25.4	37.0	59.0	18.3	14.7
Edenderry	Annual Mean NO ₂ (µg/m ³)	-	-	-	-	8.8
	Max 1-hr NO ₂ (µg/m ³)	-	-	-	-	47.2

Table 9.3: Trends in Zone D Air Quality - Nitrogen Dioxide (NO₂)

Particulate Matter (PM₁₀)

Results of Continuous PM₁₀ monitoring carried out at the locations of Tipperary Town, Carrick On Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh/Carrignafof, Claremorris, Kilkitt, Cavan Roscommon Town, Edenderry, Mallow, Longford, and Cobh Cork Harbour with five years of annual mean concentrations are shown in Table 9.4. Long-term data for the period 2017 – 2021 show concentrations of the annual mean ranges from 7.0 – 28.0 µg/m³; showing an average concentration over the seven-year period of no more than 12.02µg/m³. The daily limit for the protection of human

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health is no more than 35 days > 50 µg/m³. Based on the EPA data (Table 9.4) a conservative estimate of the current background PM₁₀ concentration in the region of the proposed development is 12.02 µg/m³

Air Quality Zone D		PM ₁₀				
Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Tipperary Town	Annual Mean PM ₁₀ (µg/m ³)	-	-	9.0	12.0	12.7
	Daily Max > 50 µg/m ³	-	-	54.0	71.0	68.6
Carrick On Shannon	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	10.0	9.4
	Daily Max > 50 µg/m ³	-	-	-	18.0	43.6
Enniscorthy	Annual Mean PM ₁₀ (µg/m ³)	-	-	18.0	15.0	13.7
	Daily Max > 50 µg/m ³	-	-	63.0	102.0	59
Birr	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	10.0	12.2
	Daily Max > 50 µg/m ³	-	-	-	28.0	52.4
Askeaton	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	7.0	8.7
	Daily Max > 50 µg/m ³	-	-	-	18.0	38.3
Macroon	Annual Mean PM ₁₀ (µg/m ³)	-	-	28.0	15.0	14.6
	Daily Max > 50 µg/m ³	-	-	69.0	67.0	59.9
Castlebar	Annual Mean PM ₁₀ (µg/m ³)	11.2	11.0	16.0	14.0	9.8
	Daily Max > 50 µg/m ³	97.1	38.0	53.0	70.0	48.4
Cobh/Carrignafof	Annual Mean PM ₁₀ (µg/m ³)	-	15.0	13.0	13.0	12.0
	Daily Max > 50 µg/m ³	-	26.0	47.0	44.0	53.3
Claremorris	Annual Mean PM ₁₀ (µg/m ³)	10.8	12.0	11.0	10.0	9.5
	Daily Max > 50 µg/m ³	51.7	43.0	44.0	30.0	98.2
Kilkitt	Annual Mean PM ₁₀ (µg/m ³)	7.8	9.0	7.0	8.0	7.8
	Daily Max > 50 µg/m ³	41.5	35.0	63.0	34.0	38.6
Cavan	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	9.0	10.6
	Daily Max > 50 µg/m ³	-	-	-	34.0	49.7
Roscommon Town	Annual Mean PM ₁₀ (µg/m ³)	-	12.0	12.0	-	10.3
	Daily Max > 50 µg/m ³	-	34.0	54.0	-	47.2
Edenderry	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	-	17.8
	Daily Max > 50 µg/m ³	-	-	-	-	119.8

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Mallow		Annual Mean PM ₁₀ (µg/m ³)	-	-	-	-	14.7
		Daily Max > 50 µg/m ³	-	-	-	-	59.9
Longford		Annual Mean PM ₁₀ (µg/m ³)	-	-	-	-	13.9
		Daily Max > 50 µg/m ³	-	-	-	-	77.5
Cobh Harbour	Cork	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	-	13.4
		Daily Max > 50 µg/m ³	-	-	-	-	54.7

Table 9.4: Trends in Zone D Air Quality - PM₁₀

Nitrogen Oxide (NO_x)

With regard to NO_x, continuous monitoring data from the EPA at the Zone D locations of Emo Court, Birr, Castlebar, Carrick on Shannon, Kilkitt and Edenderry. The average long-term concentrations range from 2.6 – 40.1 µg/m³ for the period 2017 – 2021. Based on these results a conservative estimate of the current background NO_x concentration in the region of the proposed development is 9.08 µg/m³.

Air Quality Zone D				Nitrogen oxide (NO _x)				
Station	Averaging Period			Year (NO _x)				
				2017	2018	2019	2020	2021
Emo Court	Annual	Mean	NO _x	4.0	5.0	4.8	4.7	5.2
	(µg/m ³)							
	Hourly Max ¹			67.4	248.00	164.8	445.0	268.9
Birr	Annual	Mean	NO _x	-	-	-	23.2	31.5
	(µg/m ³)							
	Hourly Max ¹			-	-	-	272.7	1152.9
Castlebar	Annual	Mean	NO _x	10.5	11.0	11.1	8.9	10.9
	(µg/m ³)							
	Hourly Max ¹			418.9	613.0	307.1	653.6	250.4
Carrick On Shannon	Annual	Mean	NO _x	-	-	11.1	40.1	21.9
	(µg/m ³)							
	Hourly Max ¹			-	-	307.1	460.3	408.2
Kilkitt	Annual	Mean	NO _x	2.6	4.0	7.6	2.5	3.1
	(µg/m ³)							
	Hourly Max ¹			110.2	51.0	258.4	22.2	34.6
Edenderry	Annual	Mean	NO _x	-	-	-	-	12.3
	(µg/m ³)							
	Hourly Max ¹			-	-	-	-	343.4

Note 1 NO_x is expressed as µg/m³.

Note 2 NO_x annual mean limit value for the protection of Vegetation: 30 µg/m³ (Limit only applies to rural stations in Zone D)

Table 9.5: Trends in Zone D Air Quality - Nitrogen oxide (NO_x)

Particulate Matter (PM_{2.5})

Continuous PM_{2.5} monitoring was carried out by the EPA at the Zone D locations of Tipperary Town, Carrick On Shannon, Mallow, Enniscorthy, Birr, Askeaton, Macroom, Longford, Cobh/Carrignafof, Claremorris, , Cavan, Roscommon Town, Edenderry, Castlebar, and Kilkitt showed annual mean levels of 4.0–28.0 µg/m³ over the period 2017 - 2021. Based on this EPA data shown in table 9.6, an average background PM_{2.5} concentration in the region of the proposed development is 9.79 µg/m³.

Air Quality Zone A		PM _{2.5}				
Station	Averaging Period	Year (PM _{2.5})				
		2017	2018	2019	2020	2021
Tipperary Town	Annual Mean PM ₁₀ (µg/m ³)	-	-	9.0	8.0	8.6
	Daily Max	-	-	54.0	65.0	65.3
Carrick On Shannon	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	7.0	5.9
	Daily Max	-	-	-	17.0	33.2
Mallow	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	10.0	7.9
	Daily Max	-	-	-	16.0	39
Enniscorthy	Annual Mean PM ₁₀ (µg/m ³)	-	-	18.0	12.0	9.8
	Daily Max	-	-	63.0	98.0	54.6
Birr	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	6.0	7.9
	Daily Max	-	-	-	22.0	45.5
Askeaton	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	4.0	5.7
	Daily Max	-	-	-	16.0	34.0
Macroom	Annual Mean PM ₁₀ (µg/m ³)	-	-	28.0	11.0	10.1
	Daily Max	-	-	69.0	63.0	50.9
Longford	Annual Mean PM ₁₀ (µg/m ³)	-	9.0	-	9.0	9.4
	Daily Max	-	54.0	-	74.0	72.8
Cobh/Carrignafof	Annual Mean PM ₁₀ (µg/m ³)	9.2	10.0	13.0	8.0	7.4
	Daily Max	82.0	18.0	47.0	39.0	49.9
Claremorris	Annual Mean PM ₁₀ (µg/m ³)	5.6	6.0	11.0	5.0	8.2
	Daily Max	45.7	36.0	44.0	25.0	18.8
Cavan	Annual Mean PM ₁₀ (µg/m ³)	-	-	-	6.0	7.4

	Daily Max	-	-	-	30.0	41.4
Roscommon Town	Annual Mean PM ₁₀ (µg/m ³)	-	9.0	12	7.0	7.1
	Daily Max	-	30.0	54.0	37.0	39.3
Edenderry	Annual Mean PM ₁₀ (µg/m ³)	-	13.0	-	-	17.8
	Daily Max	-	36.0	-	-	119.8
Castlebar	Annual Mean PM ₁₀ (µg/m ³)	-	-	16.0	-	-
	Daily Max	-	-	53.0	-	-
Kilkitt	Annual Mean PM ₁₀ (µg/m ³)	-	-	7.0	-	-
	Daily Max	-	-	63.0	-	-

Note 1 PM_{2.5} annual mean limit value for the protection of human health: 25 µg/m³

Table 9.6: Trends in Zone D Air Quality - (PM_{2.5})

Benzene

In terms of benzene, the annual mean concentration in the Zone D monitoring location of Kilkenny in 2021 was 0.18 µg/m³. This is well below the limit value of 5 µg/m³. Based on this EPA data a conservative estimate of the current background benzene concentration in the region of the proposed development is 0.18 µg/m³

Air Quality Zone D		Benzene				
Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Kilkenny	Annual Mean Benzene(µg/m ³)	-	-	-	-	0.18
	Daily Max	-	-	-	-	0.55

Table 9.7: Trends in Zone D Air Quality - Benzene 2017 - 2021

Carbon Monoxide (CO)

With regard to CO, annual averages at the Zone D locations of Birr over the 2020 – 2021 period are low, ranging from 0.3 to 0.4 µg/m³ based on this EPA data, a conservative estimate of the current background CO concentration in the region of the proposed development is 0.35 mg/m³. The maximum daily 8-hr mean of 1.20mg/m³ has been used in the DMRB screening model.

Air Quality Zone D		Carbon Monoxide(CO)				
Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Birr	Annual Mean PM ₁₀ (mg/m ³)	-	-	-	0.4	0.3
	Max ¹	-	-	-	1.2	1.2

Note 1 maximum daily 8-hr mean limit value for protection of human health of 10 mg/m³

Table 9.8: Trends in Zone D Air Quality - Carbon Monoxide (CO)

Background concentrations for 2031 and 2041 have been calculated. These have used the predicted current background concentrations and the year-on-year reduction factors provided by Transport Infrastructure Ireland in the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes and the UK Department for Environment, Food and Rural Affairs LAQM.TG.

9.4 Characteristics of The Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages:

A. - Construction phase.

B. - Operational phase.

During the construction stage the main source of 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 describes the primary sources of potential air quality and climate impacts which have been assessed as part of this EIAR.

Do-Nothing Scenario

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

9.5 Potential Impacts

Construction Impacts

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 and PM₁₀/PM_{2.5} emissions. The proposed development can be considered moderate in scale and therefore there is the potential for significant dust soiling 50m from the source (Table 9.9). While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m.

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Potential impacted in the absence of mitigation could cause:

- Potential for loss of life or injury to employees, Contractors, visitors, and local residents
- Potential for damage to the environment
- Potential for damage to the facilities, plant, and equipment
- Mobilised suspended sediment and cement release through construction activities are the principal potential sources of water quality impact during the construction phase of the works.

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 roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

Table 9.9: Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place

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 CO₂ and NO₂ emissions. However, due to the short-term and temporary nature of these works, the impact causes noticeable changes in the character of the environment but without significant consequences.

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.

Operational Phase

Local Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, traffic-related air emissions may generate quantities of air pollutants such as NO₂, CO, benzene and PM₁₀.

Traffic flow information was obtained from Punch Consulting Engineers on this project and has been used to model pollutant levels under various traffic scenarios and under sufficient spatial resolution to assess whether any significant air quality impact on sensitive receptors may occur. Cumulative effects have been assessed, as required by the EU Directive on EIA (Council Directive 2014/52/EU).

There are several proposed or permitted developments in the wider area surrounding the proposed development under assessment. These are as follow:

Previous Planning Permissions Granted on site.

- 07/2326 – Loughdillan Developments Ltd

Planning Permissions Granted off site.

- RACE, Dublin Road, Kildare, Co Kildare (Planning Ref. 221538).
- 1 Coolaghknock Avenue, Melitta Road, Kildare Town, Co. Kildare (Planning Ref. 221069).
- 455 Curraghfarm, Dublin Road, Kildare Town, R51 W504 (Planning Ref. 22244).
- Curragh Farm, Dublin Road, Kildare Town, Co. Kildare. R51 W504 (Planning Ref. 22243).

The operational phase of the developments listed above has the potential to generate cumulative impacts on the climate & air quality in the local area. These developments have been taken into account in the DMRB assessment. The cumulative impact of the proposed development in combination with the surrounding developments has been determined to be imperceptible and long-term following the DMRB assessment.

Background concentrations have been included in the modelling study. These background concentrations are year-specific and account for non-localised sources of pollutants of concern. Appropriate background levels were selected based on the available monitoring data provided by the EPA.

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of CO, benzene, NO₂, NO_x and PM₁₀ for the years 2031 and 2041 was predicted at the nearby sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impact, to be determined.

The receptors modelled represent the worst-case locations close to the proposed development and were chosen due to their close proximity (within 200 m) to the road links impacted by proposed development. The worst-case per hour traffic data which satisfied the assessment criteria detailed in Section 9.2 is shown in Table 9.10 which has a 20% HGV flow. 6 receptors have been identified in the vicinity of the proposed development. Sensitive receptors have been chosen as they have the potential to be adversely impacted by the development, these receptors are shown in Table 9.10, 9.11 and Figure 9.2.

Link Number	Road Name	Speed (kph)	Base Year	Do-Nothing		Do-Something	
			2022	2031	2041	2031	2041
1	R445 - Curragh Road (West)	50	319	482	506	565	588
2	R445 - Curragh Road (East)	50	362	531	558	619	645

Table 9.10: ADDT - Traffic Data used in Air Modelling Assessment

Name	Receptor Type	Coordinates	
		Eastings	Northings
R1	Residential Housing	274808	212408
R2	Commercial Housing	274491	212156
R3	Commercial Housing	274414	212229
R4	Residential Housing	274353	212254
R5	Residential Housing	274187	212172
R6	Residential Housing	274112	212120

Table 9.11: Description of Sensitive Receptors



Figure 9.2: Approximate Sensitive Receptor Locations used in Modelling Assessment

Modelling Assessment

Transport Infrastructure Ireland Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment, as is best practice. 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.

NO₂

The results of the DMRB modelled impact of the proposed development for NO₂ in 2031 and 2041 are shown in Table 9.12 – 9.13. The annual average concentration is within the limit value for all worst-case receptors. Levels of NO₂ range between 15.925% - 16.550% in 2031 and 15.925% - 16.575% in 2041 of the annual limit value using the annual mean concentrations for the EPA. The hourly limit value for NO₂ is 200 µg/m³ and is expressed as a 99.8th percentile (i.e., it must not be exceeded more than 18 times per year). The daily maximum 1-hour NO₂ concentration is not predicted to be exceeded in 2031 or 2041. There are some increases in traffic flows between 2031 and 2041, therefore any reduction in concentrations is due to reduced background concentrations and greater efficiencies predicted in engines.

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The impact of the proposed development on annual mean NO_2 levels can be assessed relative to "Do Nothing (DN)" levels in 2031 and 2041. Relative to baseline levels, some imperceptible increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on NO_2 concentrations will be an increase of 0.10% of the annual limit value at Receptor 6. Thus, using the assessment criteria outlined in Appendix 9.2 Tables A1 – A2, the impact of the proposed development in terms of NO_2 is negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term and imperceptible to all of the receptors assessed.

PM₁₀

The results of the modelled impact of the proposed development for PM_{10} in 2031 and 2041 are shown in Table 9.14. Predicted annual average concentrations at all receptors in the region of the development range between 30.05% - 30.18% in 2031 of the limit value. Future trends with the proposed development in place indicate similarly low levels of PM_{10} . PM_{10} concentrations in 2041 range between 30.05% - 30.18% of the limit value.

The impact of the proposed development can be assessed relative to "Do Nothing" levels in 2031 and 2041. Relative to baseline levels, some imperceptible increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on PM_{10} concentrations will be an increase of 0.025% of the annual limit value at Receptors 2,3,5 & 6. Thus, the magnitude of the changes in air quality are negligible at all receptors based on the criteria outlined in Appendix 9.2, Tables A1 – A3. Therefore, the overall impact of PM_{10} concentrations as a result of the proposed development is long-term and imperceptible.

NO_x

The results of the modelled impact of the proposed development for NO_x in 2031 and 2041 are shown in Table 9.16. The limit value assigned to Zone D is $30 \mu\text{g}/\text{m}^3$.

The impact of the proposed development on annual mean NO_x levels can be assessed relative to "Do Nothing (DN)" levels in 2031 and 2041. Relative to baseline levels, some imperceptible increases in pollutant levels are predicted as a result of the proposed development. Thus, using the assessment criteria for NO_2 and PM_{10} outlined in Appendix 9.2 and applying these criteria to NO_x , the impact of the proposed development in terms of NO_x is negligible, long-term, and imperceptible.

PM_{2.5}

The Air Quality Standards Regulations 2011 specify a $\text{PM}_{2.5}$ target value of $25 \mu\text{g}/\text{m}^3$ over a calendar year to be met by 1 January 2015. Long term $\text{PM}_{2.5}$ monitoring was carried out in four Zone A locations. Based on this EPA data shown in table 9.6, an average background $\text{PM}_{2.5}$ concentration in the region of the proposed development is $9.79 \mu\text{g}/\text{m}^3$. Therefore, long term averages were below the target value $25 \mu\text{g}/\text{m}^3$.

The impact of the proposed development can be assessed relative to the $\text{PM}_{2.5}$ trends in the Zone D area. Thus, the impact of the proposed development in terms of $\text{PM}_{2.5}$ is negligible, long-term, and imperceptible.

CO and Benzene

The results of the modelled impact of CO and benzene in the development for 2031 and 2041 are shown in Table 9.17 and Table 9.18, respectively. Predicted pollutant concentrations with the proposed development in place are below the ambient standards at all locations. Levels of CO was

12.00% in 2031 and 2041 of the limit value. Levels of benzene was 3.60% in 2031 and 2041 of the total limit value. Future trends indicate similarly low levels of CO and benzene. Levels of both pollutants are below their respective limit values, with CO reaching 12.00% of the limit and benzene reaching 3.60% in 2041.

The impact of the proposed development can be assessed relative to "Do Nothing" levels in 2031 and 2041. CO and benzene concentration from the DMRB Model in both 2031 and 2041 are predicted to increase marginally. Thus, using the assessment criteria for NO₂ and PM₁₀ outlined in Appendix 9.2 and applying these criteria to CO and benzene, the impact of the proposed development in terms of CO and benzene is negligible, long-term, and imperceptible.

Receptor	Impact Opening Year (2031)					Impact Design Year (2041)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	6.37	6.37	0.00	Imperceptible	Negligible Increase	6.37	6.37	0.00	Imperceptible	Negligible Increase
2	6.49	6.51	0.02	Imperceptible	Negligible Increase	6.52	6.54	0.02	Imperceptible	Negligible Increase
3	6.48	6.50	0.02	Imperceptible	Negligible Increase	6.51	6.51	0.00	Imperceptible	Negligible Increase
4	6.46	6.48	0.02	Imperceptible	Negligible Increase	6.47	6.49	0.02	Imperceptible	Negligible Increase
5	6.53	6.56	0.03	Imperceptible	Negligible Increase	6.54	6.57	0.03	Imperceptible	Negligible Increase
6	6.58	6.62	0.04	Imperceptible	Negligible Increase	6.59	6.63	0.04	Imperceptible	Negligible Increase

Table 9.12: Annual Mean NO₂ Concentrations (µg/m³)

Receptor	Daily Maximum 1-hour for NO ₂ concentrations (µg/m ³)					
	Impact Opening Year (2031)			Impact Design Year (2041)		
	DN	DS	DS-DN	DN	DS	DS-DN
1	61.89	61.90	0.02	61.90	61.90	0.00
2	62.09	62.12	0.03	62.10	62.13	0.03
3	62.08	62.10	0.02	62.08	62.11	0.03
4	62.05	62.08	0.03	62.06	62.08	0.02
5	62.15	62.19	0.04	62.16	62.20	0.04
6	62.22	62.27	0.05	62.23	62.28	0.05

Table 9.13 Daily maximum 1-hour for NO₂ concentrations (µg/m³)

Receptor	Impact Opening Year (2031)					Impact Design Year (2041)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	12.02	12.02	0.00	Imperceptible	Negligible	12.02	12.02	0.00	Imperceptible	Negligible Increase
2	12.04	12.05	0.01	Imperceptible	Negligible Increase	12.04	12.05	0.01	Imperceptible	Negligible Increase
3	12.04	12.05	0.01	Imperceptible	Negligible Increase	12.04	12.05	0.01	Imperceptible	Negligible Increase
4	12.04	12.04	0.00	Imperceptible	Negligible	12.04	12.04	0.00	Imperceptible	Negligible Increase
5	12.05	12.06	0.01	Imperceptible	Negligible	12.05	12.06	0.01	Imperceptible	Negligible Increase
6	12.06	12.07	0.01	Imperceptible	Negligible	12.06	12.07	0.01	Imperceptible	Negligible Increase

Table 9.14: Annual Mean PM₁₀ Concentrations (µg/m³)

Receptor	Impact Opening Year (2031)		Impact Design Year (2041)	
	DN	DS	DN	DS
1	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00

Table 9.15: Number of days with PM₁₀ concentration > 50 µg/m³



Receptor	Impact Opening Year (2031)					Impact Design Year (2041)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	9.10	9.10	0.00	Imperceptible	Negligible Increase	9.10	9.10	0.00	Imperceptible	Negligible Increase
2	9.43	9.49	0.06	Imperceptible	Negligible Increase	9.44	9.50	0.06	Imperceptible	Negligible Increase
3	9.40	9.46	0.06	Imperceptible	Negligible Increase	9.50	9.55	0.06	Imperceptible	Negligible Increase
4	9.36	9.40	0.04	Imperceptible	Negligible Increase	9.37	9.42	0.04	Imperceptible	Negligible Increase
5	9.54	9.62	0.08	Imperceptible	Negligible Increase	9.57	9.64	0.08	Imperceptible	Negligible Increase
6	9.68	9.78	0.10	Imperceptible	Negligible Increase	9.71	9.81	0.10	Imperceptible	Negligible Increase

Table 9.16: Annual Mean NO_x Concentrations (µg/m³)

Receptor	Impact Opening Year (2031)					Impact Design Year (2041)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible
2	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible
3	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible
4	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible
5	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible
6	0.18	0.18	0.00	Imperceptible	Negligible	0.18	0.18	0.00	Imperceptible	Negligible

Table 9.17: Annual Mean Benzene Concentrations (µg/m³)



Receptor	Impact Opening Year (2025)					Impact Design Year (2040)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible
2	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible
3	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible
4	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible
5	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible
6	1.2	1.2	0.0	Imperceptible	Negligible	1.2	1.2	0.00	Imperceptible	Negligible

Table 9.18: Maximum 8-hour CO Concentrations (mg/m³)

Summary of Modelling Assessment

Levels of traffic-derived air pollutants for the development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Appendix 9.2, Table A1 – A3, the impact of the development in terms of PM₁₀, CO, NO₂, NO_x and benzene is negligible, long-term, and imperceptible.

Human Health

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. In terms of the operational stage air quality impacts will predominantly occur as a result of the change in traffic flows in the local areas associated with the proposed development. As demonstrated by the modelling results (Table 9.12 – 9.19), emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

9.6 Potential Cumulative Impacts

In accordance with The Planning and Development Regulations 2001 as amended, this section has considered the cumulative impact of the proposed development in conjunction with future and current development in the vicinity of the subject site. This section relates to the cumulative impact on the subject site itself and on surrounding sites.

The European Commission's report of May 1999 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' defines cumulative impact as follows:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project".

The cumulative air quality impact of the developments in the site area which include existing residential developments, under construction developments and existing local transport infrastructure together with the proposed development is assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development will have on the baseline air quality. Together the combined impact can be assessed to determine if there is sufficient "atmospheric capacity" to facilitate the proposed development.

It is predicted from the modelling results (Table 9.12 – 9.19) that the cumulative impact of the construction and operational phases of the proposed development and proposed or permitted neighbouring developments will not have an adverse long-term impact on the receiving environment.

It is considered that in the absence of mitigation there is the potential for a short term slight negative cumulative impact associated with the construction phase of the subject development on ambient air quality and climate primarily as a result of the use of diesel to fuel construction plant and equipment. The proposed development will have a cumulative impact with the developments listed in section 9.5 above.

9.7 Mitigation Measures

Construction phase

Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation, and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 9.3.

- The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues.
- The development of a documented system for managing site practices with regard to dust control
- The development of a means by which the performance of the dust management plan can be monitored and assessed.
- The specification of effective measures to deal with any complaints received.

At all times, the procedures within the plan 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. The procedures to rectify the problems are set out in appendix 9.3 (Dust Management Plan).

Dust nuisance is defined when air quality standards relating to dust deposition and PM₁₀ are exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a Dust Management Plan (see appendix 9.3). Provided the dust management measures outlined in the plan (see Appendix 9.3) are adhered to, the air quality impacts during the construction phase will not be significant. Regard has also been taken for the import of infill materials from off-site locations and potential dust impacts as a result of this will also be mitigated.

Climate

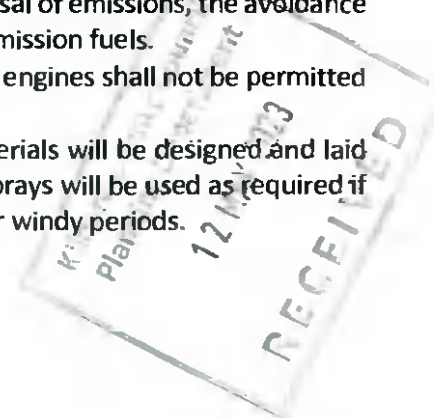
Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development. Construction vehicles, generators etc., may give rise to some CO₂ and N₂O emissions. However, due to short-term and temporary nature of these works, the impact on climate will not be significant.

However, due to the short-term and temporary nature of these works, the impact causes noticeable changes in the character of the environment but without significant consequences.

Nevertheless, some site-specific mitigation measures will be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising delivery vehicles due to poor timing or ordering on site will aid to minimise the embodied carbon footprint of the site.

Mitigation Measures (Construction)

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- A 3m high solid wooden hoarding with a 3m high dust net shall be erected around the entire construction site perimeter giving a total dust barrier height of 6m.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- A road sweeper vehicle shall be on-site at all times to clean soiled public roads in the vicinity of the site.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- An independent environmental consultant shall be appointed by the contractor to prepare a dust control and monitoring method statement prior to the commencement of site activities.
- A weekly inspection of each dust gauge will ensure that the site manager identifies at the earliest instance if dust suppression techniques shall be implemented at the project site areas.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- 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.



- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM₁₀ are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Table 9.19 presents a summary of dust control techniques which will be implemented at the site during activities.

SUMMARY OF DUST CONTROL TECHNIQUES	
Sources of Particular Matter	Control Technique
Loading and unloading processes	Containment / Suppression
	Reducing drop heights
	Use of variable height conveyors
	Use of chutes
Double handling transfer points	Site and process design
	Reduction of vehicle movements
Aggregate stockpiles	Appropriate siting
	Away from closest receptors/site boundaries
	Use of enclosures and bunding
	Reduced drop heights
	Water suppression
	Sprays
	Bowsers
	Covering
	Covered stock bins
	Dust covers
Mobile Crushing of site generated C&D Waste (if applicable)	Appropriate siting
	Away from closest receptors/site boundaries
	Use of enclosures and bunding

	Reduced drop heights
	Water suppression
	Sprays
	Bowlers
Conveyors / transfer points	Containment
	Wind boards
	Housings
	Suppression
	Water sprays
	Housekeeping
	Clean up of spilled materials
	Appropriate siting
	Away from closest receptors/site boundaries
Concrete Cutting Plant	Suppression
	Water sprays fitted to equipment/plant
Roadways including site yard area.	Suppression
	Water sprays and bowlers
	Wheel wash at site compounds
Vehicles	Washing / Covering
	Wheel wash to be installed at site exit
	Vehicles exiting the site with C&D loads shall be covered with tarpaulin

Table: 9.19: summary of dust control techniques

Operational Phase

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.

The operational phase mitigation by design measures to minimise the impact of the development on air quality and climate are as follows:

Mitigation Measures (Operational)

- Thermally efficient glazing systems on all units
- Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in all apartments
- Thermal insulation of walls and roof voids of all units
- Natural Gas heating in all units
- Inclusion of electric car charging points to encourage electric vehicle ownership

9.8 Residual impacts

Construction Phase

Air Quality

When the dust management measures detailed in the mitigation section of this Chapter (Section 9.7) are implemented, fugitive emissions of dust from the site will be neutral effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

Climate

Impacts to climate during the construction phase are considered imperceptible and therefore residual impacts are not predicted. However, due to short-term and temporary nature of these works, the impact causes noticeable changes in the character of the environment but without significant consequences.

Operational Phase

Various elements associated with the construction phase of the proposed development have the potential to impact local ambient air quality, however the potential construction phase impacts shall be mitigated as detailed in Section 9.7 above to ensure there is a minimal impact on ambient air quality for the duration of all construction phase works. It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health. Air emissions can be further reduced by using operational mitigation measures and detailed in Section 9.7.

The results of the air dispersion modelling study indicate that the impacts of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase for the long and short term.

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9.9 'Do Nothing' Scenario

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

9.10 Worst Case Scenario

The main potential for adverse impact on local air quality will occur during the construction phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should dust mitigation measures not be implemented during the construction phase, significant dust nuisance is likely in areas close to the construction site. Given the distance to sensitive receptors dust nuisance is not considered to be a significant issue providing mitigation measures are carried out.

9.11 Monitoring & Reinstatement

Monitoring

Monitoring of construction dust deposition at nearby sensitive receptors (residential dwellings) during the construction phase of the proposed development will be carried out to ensure mitigation measures are working satisfactorily. This will 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/(m²*day) during the monitoring period between 28 – 32 days.

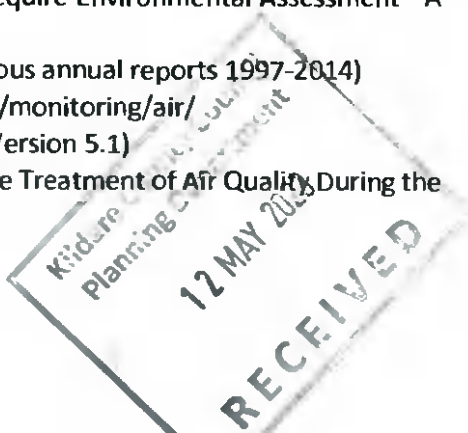
There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

9.12 Difficulties in Compiling Information

There were no difficulties encountered in compiling this section of the EIAR.

9.13 References

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10. Landscape and Visual

10.1 Introduction

This chapter considers the potential effects on the landscape and visual resource in the area arising from the Proposed Development. A full description of the Proposed Development, development lands and all associated project elements is provided in Chapter 3 of this EIAR. The nature and probability of effects on the landscape and visual resource in the area arising from the overall project has been assessed. The assessment comprises:

- A review of the existing receiving environment.
- Prediction and characterisation of likely impacts;
- Evaluation of effects significance; and
- Consideration of mitigation measures, where appropriate.

The Proposed Development will consist of the construction of a strategic housing development of 295 no. units, a creche, various public and communal open spaces. The proposed development also provides for: hard and soft landscaping; boundary treatments; public realm works; SUDs scheme, car parking; bicycle stores and shelters; bin stores; lighting; plant rooms; and all ancillary site development works above and below ground.

Key issues in relation to landscape and visual impact include:

- The change from semi-rural agricultural fields to extensive urban village on the eastern edge of Kildare town. From a green backdrop to a built form.
- The height/prominence/visibility of some blocks, and their impact locally as well as on wider sensitive visual receptors / LCA.

This Landscape and Visual Impact Assessment was carried out by chartered landscape architect Ronan Finnegan, BSc, PG Dip, CMLI of Cunnane Stratton Reynolds. He has over thirteen years' experience as a landscape architect which has involved undertaking Landscape and Visual Impact Assessments (LVIA) for a broad range of development types including large residential, infrastructure and renewable energy projects located across Ireland and the UK. Oversight of the LVIA chapter was provided by Declan O'Leary, B.Agr.Sc. (Land Hort) UCD 1986; Post Grad Dip in Landscape Architecture (University of Central England 1993); MLI; Director of Cunnane Stratton Reynolds.

Please note red line boundaries shown in this chapter are for indicative purposes. Please refer to Chapter 3 of this EIAR for accurate red line site boundary outlined by MCROM architects.

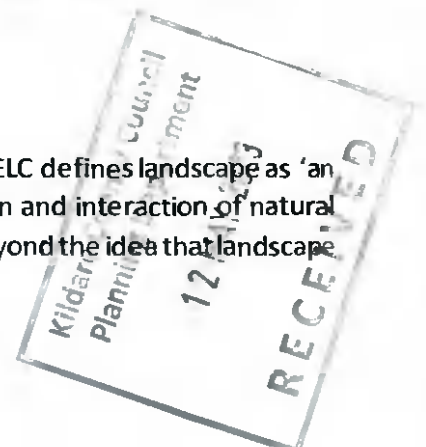
LRD Opinion Response

Kildare County Council requested that both winter and summer photomontage views of the proposed development from the agreed 12 viewpoints to be provided, so to show both the worst case and best case scenarios. The visual figures are presented in **Appendix 10.1** and considered in detail within the predicted visual impacts section of this report.

10.2 Methodology

Definition of Landscape

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This definition is important in that it expands beyond the idea that landscape



is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right - a shared resource providing a complex range of cultural, environmental and economic benefits to individuals and society.

As a cultural resource, the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreation and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions.

As an environmental resource, the landscape provides habitat for fauna and flora. It receives, stores, conveys and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource, the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

Forces of Landscape Change

Landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the environs of the proposed development have altered over the last thousand years, from wilderness to agriculture and settlement or townscape.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs.

Climate change is one of the major factors likely to bring about future change in the landscape, and it is accepted to be the most serious long-term threat to the natural environment, as well as economic activity (particularly primary production) and society. The need for climate change mitigation and adaptation, which includes the management of water and more extreme weather and rainfall patterns, is part of this.

Guidance

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.

The methodology for assessment of the landscape and visual effects is informed by the following key guidance documents, namely:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition 2013, published by the UK Landscape Institute and the Institute of Environmental Management and Assessment (hereafter referred to as the GLVIA).



- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2022, published by the Environmental Protection Agency (EPA) (hereafter referred to as the 'EPA guidelines');
- Kildare County Development Plan 2023-2029.
- Kildare Town Local Area Plan 2012-2018
- Draft Kildare Town Local Area Plan 2023-2029.



Key Principles of the GLVIA

Use of the Term 'Effect' vs 'Impact'

The GLVIA advises that the terms 'impact' and 'effect' should be clearly distinguished and consistently used in the preparation of an LVIA.

'Impact' is defined as the action being taken. In the case of the proposed development, the impact would include the construction of the buildings and associated boundaries and external areas.

'Effect' is defined as the change or changes resulting from those actions, e.g. a change in landscape character, or changes to the composition, character and quality of views in the receiving environment. This report focusses on these effects.

Assessment of Both 'Landscape' and 'Visual' Effects

Another key distinction to make in a LVIA is that between landscape effects and the visual effects of development.

'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. 'Landscape character assessment' is the method used in LVIA to describe landscape, and by which to understand the potential effects of a development on the landscape as 'a resource'. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and 'visual amenity' refer to the interrelationship between people and the landscape. The GLVIA prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

Methodology for Landscape Assessment

The landscape effects of the development are assessed within the Predicted Impacts section of this report. The nature and scale of changes to the landscape elements and characteristics are identified, and the consequential effect on landscape character and value are discussed. Trends of change in the landscape are taken into account. The assessment of significance of the effects takes account of the sensitivity of the landscape resource and the magnitude of change to the landscape which resulted from the development.

Sensitivity of the Landscape Resource

Landscape sensitivity is a function of its land use, landscape patterns and scale, visual enclosure and distribution of visual receptors, scope for mitigation, and the value placed on the landscape. It also

relates to the nature and scale of development proposed. It includes consideration of landscape values as well as the susceptibility of the landscape to change.

Landscape values can be identified by the presence of landscape designations or policies which indicate particular values, either on a national or local level. In addition, a number of criteria are used to assess the value of a landscape.

Landscape susceptibility is defined in the GLVIA as the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline scenario and/or the achievement of landscape planning policies and strategies. Susceptibility also relates to the type of development – a landscape may be highly susceptible to certain types of development but have a low susceptibility to other types of development.

For the purpose of assessment, three categories are used to classify the landscape sensitivity of the receiving environment.

Sensitivity is therefore a combination of Landscape value and Susceptibility.

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change.
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principle management objective for the area is conservation of the existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong or has evidence of alteration to / degradation / erosion of elements and characteristics. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principle management objective is to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Table 10.1: Categories of Landscape Sensitivity

Magnitude of Landscape Change



The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Four categories are used to classify magnitude of landscape change.

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements features or characteristics of the landscape and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the landscape key elements features or characteristics of the landscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

Table 10.2: Categories of Landscape Change

Significance of Effects

In order to classify the significance of effects (both landscape and visual), the predicted magnitude of change is measured against the sensitivity of the landscape/viewpoint, using the following guide. There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound.

Sensitivity of the Landscape Resource

	Very High	High	Medium	Low	Negligible
Very High	Profound	Profound-Very Significant	Very Significant-Significant	Moderate	Slight
High	Profound-Very Significant	Very Significant	Significant	Moderate-Slight	Slight-Not Significant
Medium	Very Significant-Significant	Significant	Moderate	Slight	Not Significant
Low	Moderate	Moderate-Slight	Slight	Not significant	Imperceptible

Negligible	Slight	Slight-Not Significant	Not significant	Imperceptible	Imperceptible
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Table 10.3: Guide to Classification of Significance of Landscape Effects

The matrix above is used as a guide only. The assessor also uses professional judgement informed by their expertise, experience and common sense, to arrive at a classification of significance that is reasonable and justifiable.

Landscape effects are also classified as positive, neutral or negative/adverse (See definitions in Quality and Timescale section at the end of the methodology). Development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and if a development achieves the objective of the policy the resulting effect might be positive, even if the landscape character is profoundly changed.

Methodology for Visual Assessment

The report assesses the visual effects of the development. Visual assessment considers the changes to the composition of views, the character of the views, and the visual amenity experienced by visual receptors. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The significance of the visual effects experienced at these locations is assessed by measuring the viewpoint sensitivity against the magnitude of change to the view resulting from the development.

Sensitivity	Description
Very High	Viewers at iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise designated as being of high value or national value. This may also include residential viewers who are focussed to a large extent on the view.
High	Viewers at viewpoints that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features) and views which are highly valued by the local community. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.
Medium	Viewers considered of medium susceptibility, such as locations where viewers are travelling at slow or moderate speeds through or past the affected landscape in cars or on public transport, where they are partly but not entirely focused on the landscape, or where the landscape has some valued views. The views are generally not designated, but which include panoramic views or views judged to be of some scenic quality, which demonstrate some sense of naturalness, tranquillity or some rare element in the view.
Low	Viewers at viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, etc. The view may present an attractive backdrop to these activities but there is no evidence that the view is valued, and not regarded as an important element of these activities. Viewers travelling at high speeds (e.g. motorways) may also be generally considered of low susceptibility.

Negligible	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping where the view has no relevance or is of poor quality and not valued.
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Table 10.4: Categories of Viewpoint Sensitivity

Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view:

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes the dominant the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

Table 10.5: Categories of Visual Change

Significance of Visual Effects

As for landscape effects, in order to classify the significance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint, using the guide in Table 3 above.

Quality and Timescale

Qualitative Impacts

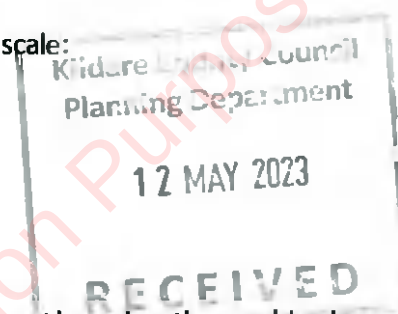
The predicted impacts are also classified as beneficial, neutral or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn. These qualitative impacts/effects are defined as:

- **Adverse** – Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished;
- **Neutral** - Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;
- **Beneficial** – improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Timescale of the Impacts

Impacts/effects are also categorised according to their longevity or timescale:

- **Temporary** – Lasting for one year or less;
- **Short Term** – Lasting one to seven years;
- **Medium Term** – Lasting seven to fifteen years;
- **Long Term** – Lasting fifteen years to sixty years;
- **Permanent** – Lasting over sixty years.



A statement is made as to the appropriateness of the proposed development based on the combined assessment of the predicted landscape and visual effects. This methodology, in accordance with the various guidelines for LVIA, results in a conclusion as to the appropriateness of the proposed development based on objective assessment of its likely landscape and visual impacts.

10.3 Receiving Environment

This section sets out a review of landscape related Planning Policy as set out in the Kildare County Development Plan and associated documents, and a description of the study area informed by desktop assessment.

The receiving environment is described in terms of its character, physical characteristics and the various elements that make up the landscape, including cultural, recreational, residential and other amenity values.

Relevant Planning Policy

Kildare County Development Plan 2023-2029

The Kildare County Development Plan 2023-2029 (hereafter referred to as Development Plan / Plan) is the current adopted plan. The Development Plan contains a range of policies relevant to establishing the landscape and visual values and sensitivities for the site and site environs. These are set out below.

Chapter 2 Core Strategy

Kildare is designated as a 'Self-sustaining Growth Town' as identified on the Core Strategy Map: *Self-Sustaining Growth Towns are towns with a moderate level of jobs and services – includes sub-county market towns and commuter towns with good transport links and capacity for continued commensurate growth to become more self-sustaining.*

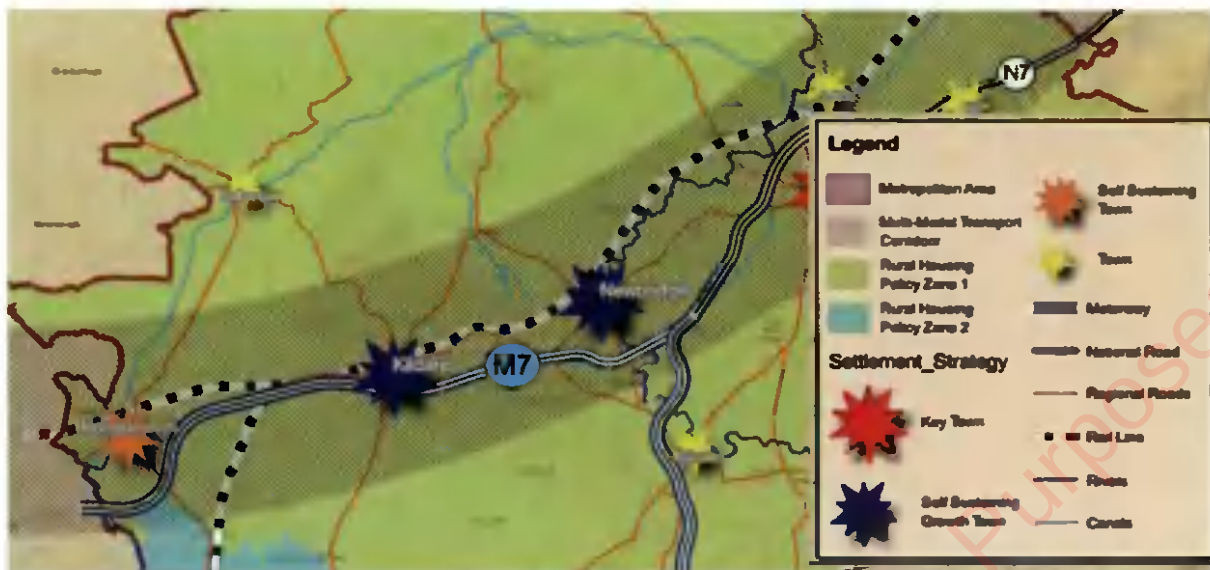


Figure 10.1: Kildare County core strategy map 2023-2029 (Source: Kildare County Council)

Chapter 3 Housing

This chapter references the Urban Development and Building Height Guidelines for Planning Authorities published in December 2018 and specifically SPPA which supports diversity in typology, height and form of residential development. It states:

It is a specific planning policy requirement that in planning the future development of greenfield or edge of city/town locations for housing purposes, planning authorities must secure:

1. *the minimum densities for such locations set out in the Guidelines issued by the Minister under Section 28 of the Planning and Development Act 2000 (as amended), titled "Sustainable Residential Development in Urban Areas (2007)" or any amending or replacement Guidelines;*
2. *a greater mix of building heights and typologies in planning for the future development of suburban locations; and*
3. *avoid mono-type building typologies (e.g. two storey or own-door houses only), particularly, but not exclusively so in any one development of 100 units or more.*

Chapter 11 Built and Cultural Heritage

There are no protected structures on site or any other listed structures or features within the site. The site also does not lie within any Architectural Conservation Areas (ACA).

Biodiversity and Green Infrastructure

Chapter 12 of the Plan covers Biodiversity and Green Infrastructure, with the aim being, "To protect, manage and enhance the County's biodiversity for future generations, including sites designated at national and EU level, protected species and habitats outside of designated sites and to promote the development of an integrated Green Infrastructure network in order to improve our resilience to climate change and to enable the role of Green Infrastructure in delivering sustainable communities."

Protected Sites

The Pollardstown Fen (Ref. 000396), which is a designated Special Areas of Conservation (SAC), proposed Natural Heritage Area (pNHA) and, Nature Reserve and Ramsar Site. The Pollardstown Fen SAC & pNHA is located 4km north-east of the site.

The Curragh (Ref. 000392) is a proposed Natural Heritage Areas. The subject sits in close proximity to the pNHA.

Policies of the Council on Natural Heritage and Protection include;

BI P1 *Integrate in the development management process the protection and enhancement of biodiversity and landscape features by applying the mitigation hierarchy to potential adverse impacts on important ecological features (whether designated or not), i.e. avoiding impacts where possible, minimising adverse impacts, and if significant effects are unavoidable by including mitigation and/or compensation measures, as appropriate. Opportunities for biodiversity net gain are encouraged.*

BI P3 *Ensure that any proposal for development within or adjacent to a Natural Heritage Area (NHA), Ramsar Sites and Nature Reserves is designed and sited to minimise its impact on the biodiversity, ecological, geological and landscape value of the site, particularly plant and animal species listed under the Wildlife Acts and the Habitats and Birds Directive including their habitats*

BI P4 *Ensure that any new development proposal does not have a significant adverse impact, incapable of satisfactory mitigation on plant, animal or bird species which are protected by law.*

BI P4 *Ensure that any new development proposal does not have a significant adverse impact, incapable of satisfactory mitigation on plant, animal or bird species which are protected by law*

BI P6 *Recognise the important contribution trees and hedgerows make to the county biodiversity resource climate mitigation, resilience and adaptation*





Figure 10.2: Protected Sites KCDP 2023-2029 (Source: Kildare County Council)

Green Infrastructure

Policies of the Council's Green Infrastructure (in relation to Landscape Recreation and Amenity) include:

BI P12 *Recognise the importance of Green Infrastructure in Kildare and protect this valued biological resource, the ecosystem services it provides and the contribution to climate resilience*

BI P13 *Recognise the importance of Urban Green Infrastructure in addressing a broad range of urban challenges, such as connecting people with nature, adapting to climate change, supporting the green economy and improving social cohesion and to seek to protect and enhance this resource, particularly existing semi-natural areas, or habitats (such as hedgerows, canals, rivers, ponds)*

BI P14 *Protect and enhance the Green Infrastructure network throughout the county*

BI P15 *Promote and support the development of Sustainable Urban Drainage Systems (SuDS) to ensure surface water is drained in an environmentally friendly way by replicating natural systems*

Objectives of the Council's General Green Infrastructure (in relation to Natural Heritage and Green infrastructure) include:

BI O66 *Develop a strategy, to identify a series of greenbelt/green spaces (in addition to those identified in this CDP) to retain and protect between the growing settlements within Kildare during the lifetime of the Plan with particular attention to the undeveloped areas between Celbridge, Leixlip and Maynooth and to collaborate with South Dublin County Council, where appropriate*

BI 069 Promote a network of paths and cycle tracks to enhance accessibility to the Green Infrastructure network across the County, while ensuring that the design and operation of the routes respect, and where possible, enhance the ecological potential of each site.

BI 070 Ensure that the Green Infrastructure Strategy and Network identified in this County Development Plan and Local Area Plans is used to inform the development management process to ensure that new residential areas, business/ industrial development tourism and other relevant projects contribute towards the conservation and protection of Kildare's habitats and species, and the protection, management and enhancement of the existing Green Infrastructure in terms of design, layout and landscaping.

BI 071 Identify existing Green Infrastructure at the initial stages of the planning process and to use this information to guide the overall design of an appropriate site layout which is reflected in the developments landscaping plan. The landscaping plan submitted with an application should clearly illustrate how existing Green Infrastructure, and opportunities to create more linkages, have informed and been incorporated into the development, layout and, if appropriate, management proposals

BI 072 Ensure that the design of new development does not cause fragmentation of the Green Infrastructure network.

BI 073 Encourage the use and incorporation of Biophilic design into all new development schemes, increasing proximity of and/or views to nature, landscape and landscape features, in the interests of public health.

BI 072 Ensure that the design of new development does not cause fragmentation of the Green Infrastructure network

BI 074 Strengthen ecological networks between urban areas to create greater linkages to Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network

BI 075 Require multifunctional open space provision within all new developments; this includes provision for ecology and sustainable water management.

BI 077 Integrate nature-based solutions and climate change considerations into the design, planning, and implementation of infrastructure provision/works and development proposals at the earliest possible stage of the design process.

Map VI 12-3 sets out a Green Infrastructure Concept Map for the County. The Curragh Plains forms a key element of the site environs.



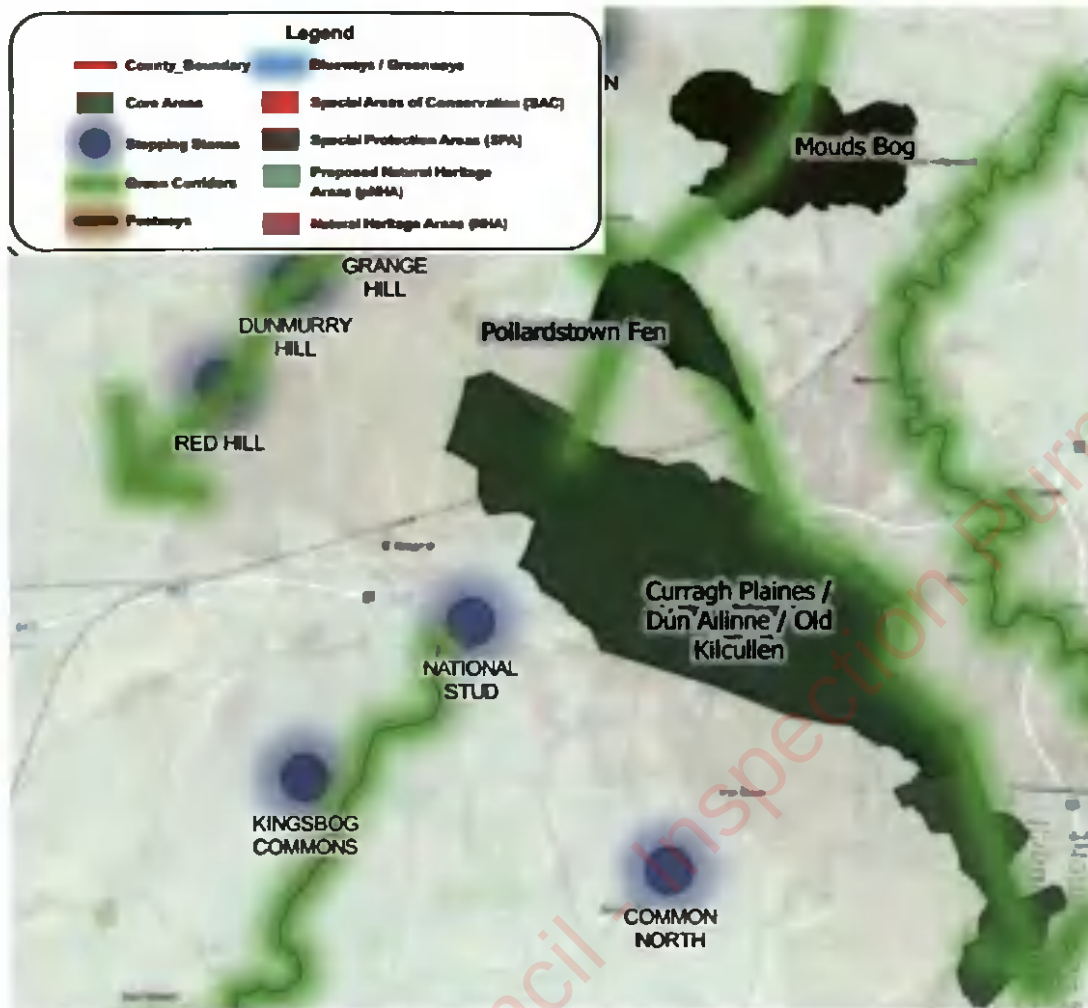


Figure 10.3: Green Infrastructure Concept Map VI 12-3 KCDP 2023-2029 (Source: Kildare County Council)

Chapter 13 Landscape Recreation and Amenities

This chapter sets out the following Aim:

To provide for the protection, management, and enhancement of the landscape of Kildare to ensure that development does not disproportionately impact on the unique landscape character areas, scenic routes or protected views; and to support the provision of high quality and accessible recreational facilities, amenities and open spaces for residents and visitors to the County, in recognition of the contribution of all forms of recreation to quality of life, personal health and wellbeing.

This aim is supported by a Landscape Character Assessment of the County and a range of protected Scenic Routes and Views.

Landscape Character

A Landscape Character Assessment of County Kildare was carried out in 2004 and sets out Landscape Character Areas and their sensitivities for the county.

The site location is located within "Central Undulating Lands" of the county. According to the Council's Landscape Character Area study, such lowlands are deemed "Class 1 Low Sensitivity," which is

described as being, "Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area." (Ref Table 13.2 of the Plan)

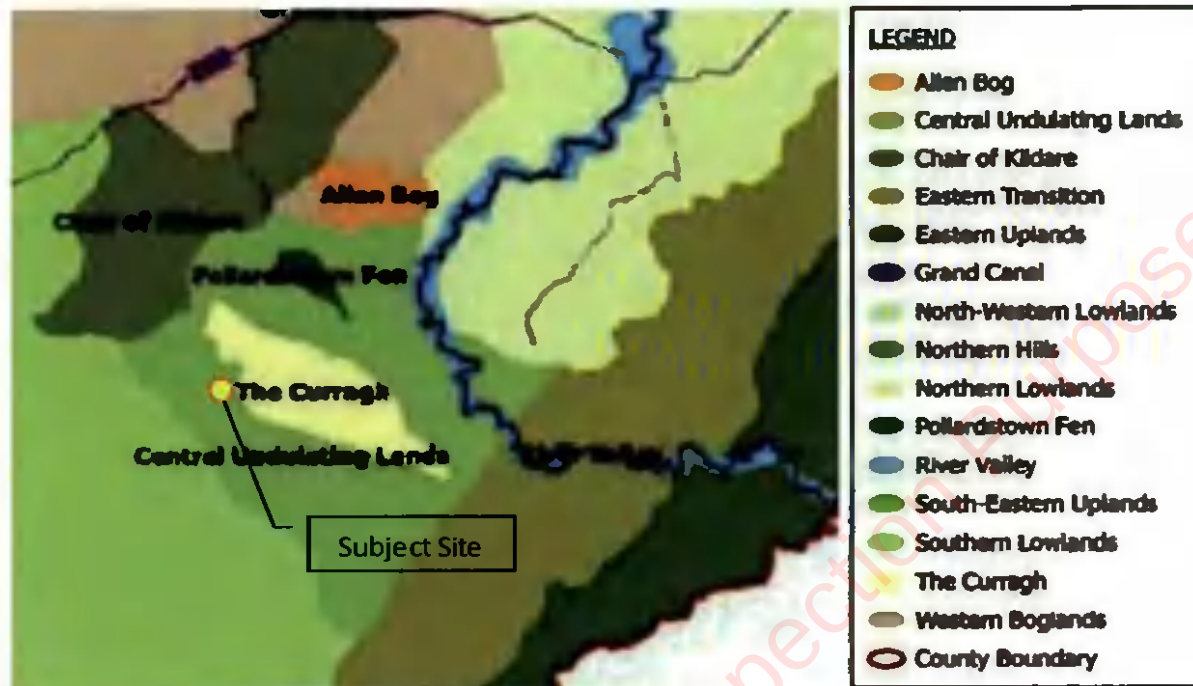


Figure 10.4: Landscape Character Areas KCDP 2023-2029 (Source: Kildare County Council)

In terms of impact of development on landscape, both "housing" and "urbanisation" are compatible in 'low sensitivity' areas.

The site lies in close proximity to the 'The Curragh', which is of "Class 5 Unique Sensitivity", which is described as being, "Areas with little or no capacity to accommodate uses without significant adverse effects on the appearance or character of the landscape having regard to unique and special sensitivity factors." Any development on the subject site shall have regard to this 'unique' sensitivity landscape character area.

Table 13.4 of the Plan sets out a matrix of Likely compatibility between a range of land-uses and proximity to Principal Landscape Sensitivity Factors. Potential relevant sensitivity factors with regard to urban expansion are highlighted in Figure 4 below. Proximity to the 'Class 5 Unique Sensitivity' areas like Curragh, 'Areas of High Amenity' such as Curragh and Environs, and Scenic Views and Routes would be the main sensitivities relevant to the proposed development.



5 - Likely to be very compatible in most circumstances.	Agriculture and Forestry	Housing	Urbanisation	Infrastructure	Extraction	Energy					
4 - Likely to be compatible with reasonable care.											
3 - Likely to be compatible with great care.											
2 - Compatible only in certain circumstances.											
1 - Compatible only in exceptional circumstances.											
0 - Very unlikely to be compatible.											
Proximity within 300m of Principal Landscape Sensitivity Factors.	Agriculture	Forestry	Rural Housing	Urban Expansion	Industrial Projects	Tourism Projects	Major Powerlines	Sand and Gravel	Rock	Windfarm	Solar
Major Rivers and Water bodies	5	5	2	2	2	3	2	1	0	1	0
Canals	5	5	2	2	2	3	2	1	0	1	1
Ridgelines	5	5	1	1	1	1	1	0	0	2	0
Green Urban Areas	4	5	2	0	0	4	3	3	3	2	2
Broad-Leaved Forestry	3	5	2	2	2	4	3	2	3	1	2
Mixed Forestry	3	5	2	2	2	4	3	2	3	1	2
Natural Grasslands	5	2	2	1	1	4	2	1	1	2	2
Moors and Heathlands	2	2	1	0	0	1	2	1	0	2	1
Agricultural Land with Natural Vegetation	5	5	2	2	2	3	3	3	3	4	2
Peat Bogs	0	0	0	0	0	3	2	0	0	2	1
Scenic View	5	5	2	1	1	5	1	3	0	0	2
Scenic Route	5	5	2	1	1	5	1	3	0	0	2

Figure 10.5: Table 13.4 of the Plan - Likely compatibility between a range of land-uses and proximity to Principal Landscape Sensitivity Factors.

Section 14.8.1, General Landscape Policies and Objectives

LR P1 Protect and enhance the county's landscape, by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the existing local landscape.

LR O1 Ensure that consideration of landscape sensitivity is an important factor in determining development uses. In areas of high landscape sensitivity, the design, type and the choice of location of proposed development in the landscape will also be critical considerations.

LR O3 Require a Landscape/Visual Impact Assessment to accompany significant proposals that are likely to significantly affect: – Landscape Sensitivity Factors; – A Class 4 or 5 Sensitivity Landscape (i.e.

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within 500m of the boundary); – A route or view identified in Map V1-3.3 (i.e. within 500m of the boundary).

LR 04 Ensure that local landscape features, including historic features and buildings, hedgerows, shelter belts and stone walls, are retained, protected and enhanced where appropriate, so as to preserve the local landscape and character of an area

LR 05 Preserve, where permissible, the open character of commonage.

LR 09 Continue to support development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of local absorption opportunities provided by the landscape, landform and prevailing vegetation

The Curragh and Environs (Areas of High Amenity)

The Curragh is located between Newbridge and Kildare. It is one of the largest area of unenclosed natural grassland in the country. It is also one of the valuable amenity areas for Kildare, Newbridge and Kilcullen, and also the subject site. The subject site lies at the edge of Kildare town or urban area and closely lying to the Curragh and Environs.

KCCDP Section 13.4 The Curragh and Environs (Areas of High Amenity), relevant policy and objectives;

LR P2 Protect High Amenity areas from inappropriate development and reinforce their character, distinctiveness and sense of place.

LR O17 Control development that will adversely affect the visual integrity of Areas of High Amenity by restricting the development of incongruous structures that are out of scale with the landscape within the Areas of High Amenity including advertising signs, hoardings, fencing etc. which create visual clutter and disrupt the open nature of these areas.

LR O18 Facilitate appropriate development in areas of high amenity that can utilise existing structures, settlement areas and infrastructure, taking account of the visual absorption opportunities provided by existing topography and vegetation

LR O19 Restrict the overdevelopment of the edge of the Curragh Plains and development that obtrudes on the skyline as viewed from the Plains.

LR O20 Co-operate with all relevant stakeholders including the Department of Defence, the Department of Housing, Local Government and Heritage, the racehorse industry, those with sheep grazing rights and the various interests currently with rights to the Curragh in the implementation of the Curragh Conservation, Management and Interpretation Plan, designated as a SNHA3

Scenic Routes and Protected Views

Figure 10.5 highlights the Principal Landscape Sensitivity Factors of relevance to the proposed development. These include proximity to Scenic Routes and Protected Views, which are views which consist of important and valued views and prospects within the county. The council recognises that some development may be necessary in certain circumstances, with consideration of:

"appropriate location, siting and design criteria should strictly apply. All proposals will be assessed taking into account the overall character of the scenic route and the character of the landscapes through which the route passes, in accordance with the criteria outlined in section 13.3.2."



There are two scenic views in close proximity to the site, these are;

Scenic Route 3 Views of Curragh Plains, from the M7 Interchange to St. Ledger's Bottoms.

"Extensive and open views are available from the former N7 national road (now the R445) that runs through the Curragh racecourse, east of Kildare town. The generally smooth terrain and the lack of hedgerows allow for long-distance vistas, the extent of which however, is restricted by the softly undulating topography. Existing conifer tree plantations add complexity to the otherwise smooth terrain and plain vistas".

Scenic Route 4 Views of Curragh Plains including Little Curragh; County Road from Kildare Town Boundary to Military Ranges, R413 from Kildare Town Boundary to Motorway Interchange.

"Local roads south of the Curragh allow vistas onto the racecourse lands as well as the military camp and rones. The land softly undulates throughout and gently rises on the eastern section of the road, limiting the extent of the views. Scrub vegetation (i.e. gorse) and conifer forests add complexity to the otherwise smooth terrain."

Relevant Policies and Objectives;

LR P3 *Continue to support development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of local absorption opportunities provided by the landscape, landform and prevailing vegetation*

LR O32 *Avoid any development that could disrupt the vistas or have a disproportionate impact on the landscape character of the area, particularly upland views, river views, canal views, views across the Curragh, views of historical or cultural significance (including buildings and townscapes), views of natural beauty and specifically those views listed in Tables 13.5–13.7 of this plan.*

Kildare Town Local Area Plan 2012-2018

Aim of the LAP

To build on Kildare town's strengths and to provide a focused approach to planning for future growth in a coherent sustainable, spatial fashion. The Plan aims to achieve a more consolidated urban form that facilitates a sustainable economic base and creates sustainable and integrated communities while balancing future development with the conservation and enhancement of the town's natural and built environment.

Zoning

The site falls under land use zoning - 'C - New Residential' with the description "To provide and improve new residential areas and for associated local shopping and other services incidental to new residential development."

The site has a local phasing objective "Phase C1" with the description "This zoning provides for low density residential development at a maximum of 4 units per acre (10 units per hectare). Serviced residential sites should be provided to people wishing to build a house to their own design and layout. Full planning permission shall be sought by the developer/landowner for the site layout and development works and outline permission for the individual houses. A design brief shall also be submitted outlining principle design features for the overall scheme. Each individual applicant shall then submit their own design and apply for full permission/approval on a serviced site."

The phasing and development of these lands are also identified in the Long term Development Strategy Map of Kildare Town.

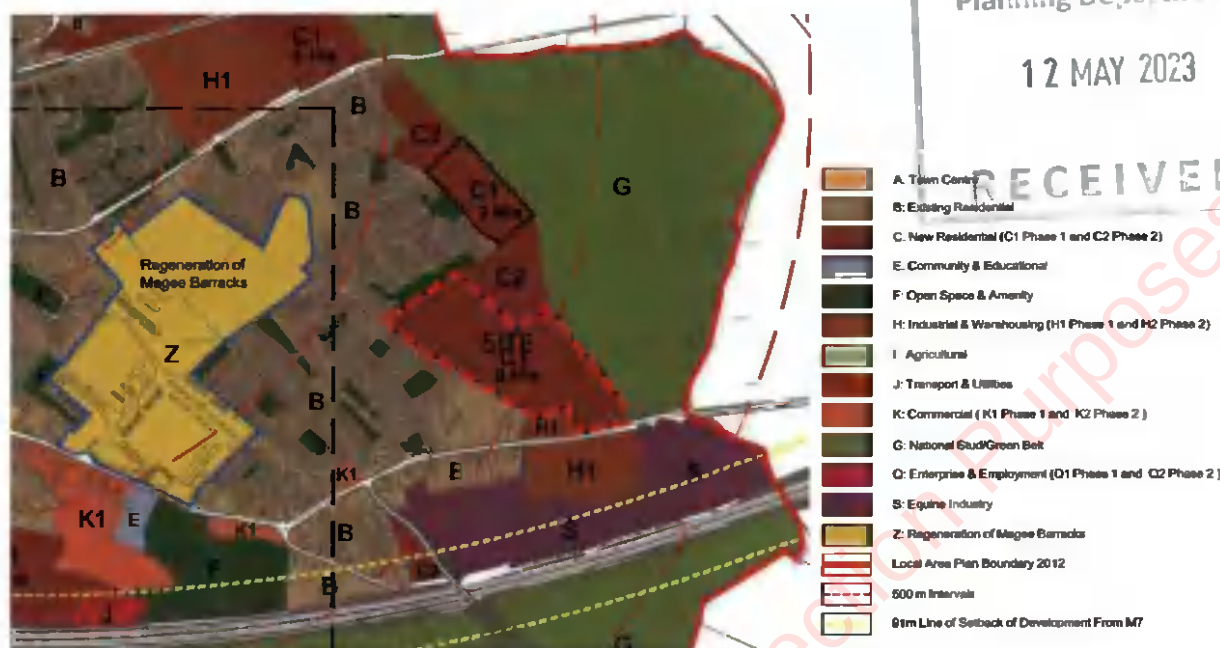


Figure 10.6: Land Use Zoning Kildare LAP 2012-2018

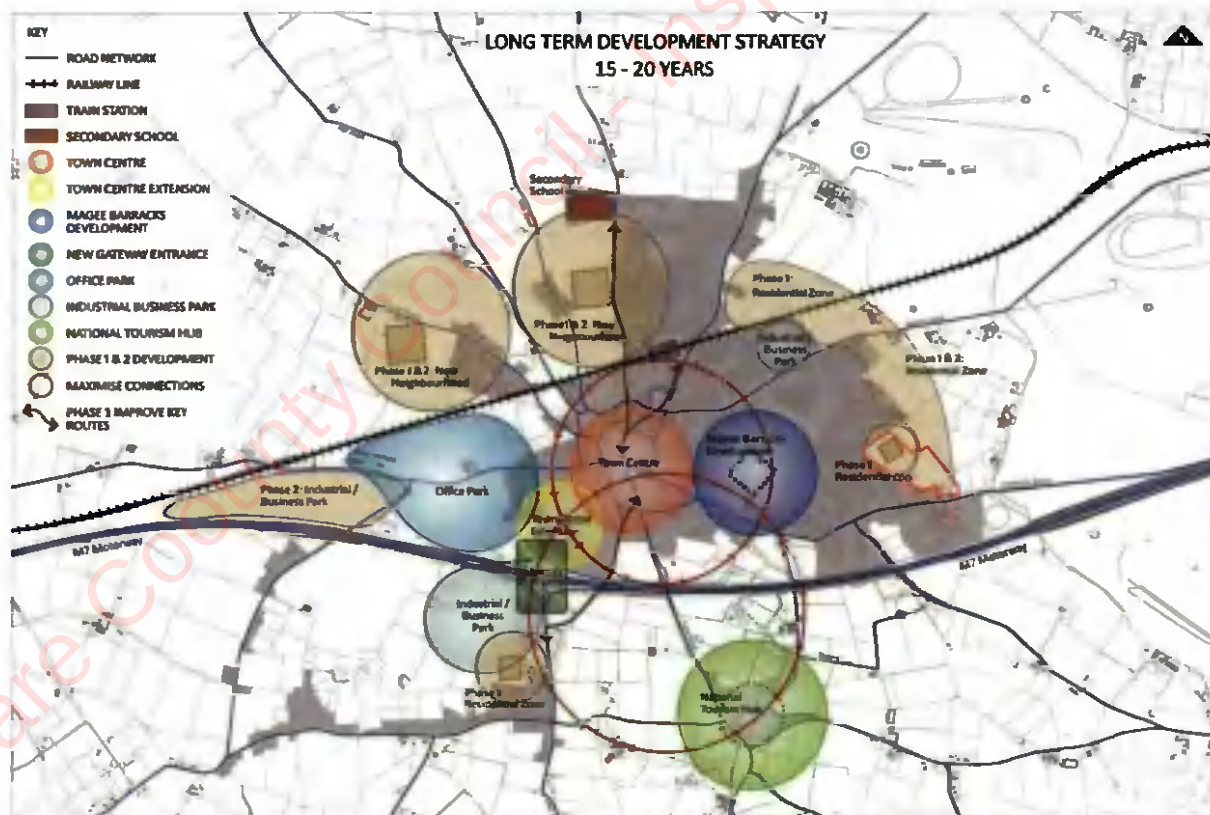


Figure 10.7: Long Term Development Strategy for Kildare Town Kildare LAP 2012-2018

Views and Prospects

The LAP identifies a number of views to be protected and prospects to be maintained towards the town's landmarks.

None of these are close to the site or within the site and are not oriented towards the site.

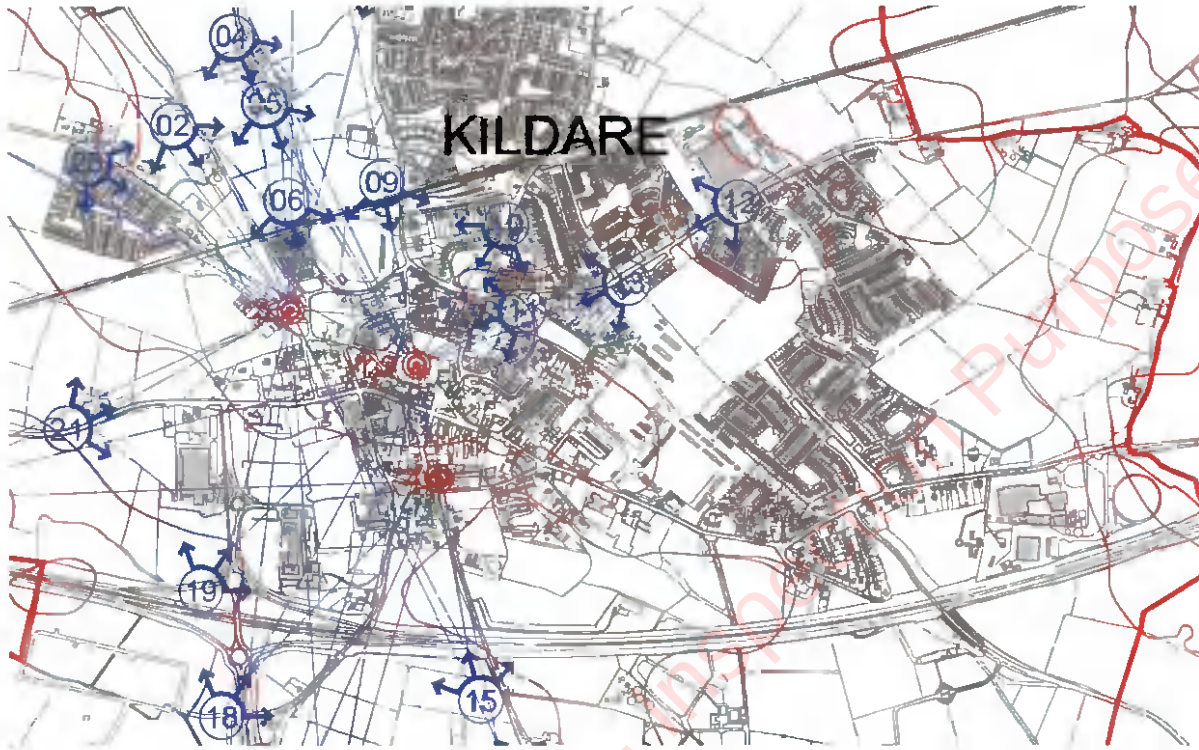


Figure 10.8: Views, Prospects & Townscape Objectives Kildare LAP 2012-2018

Draft Kildare Town Local Area Plan 2023-2029

The draft Kildare Town LAP is currently out for public consultation. The planning aims of the LAP are much the same in relation to the Proposed Development, where it's lands are still zoned for residential use and protected views are still all orientated facing away from the Site.

There are some local level details which affect the Proposed Development lands. This includes a small area of land on the western end which is zoned as F: Open Space and Amenity within Map 6.1 and 11.1. The area also serves as a nature based water management as indicated in Map 10.1. New access proposals include a new pedestrian/cycle route runs between the existing residential lands to the north and west of the Site and cuts through the top end of the Site and improvements to cycling along the R445 road as indicated on Map 7.1 of the plan. The hedge along the Site's eastern boundary is designated as part of the Curragh Buffer Zone in Map 9.1.



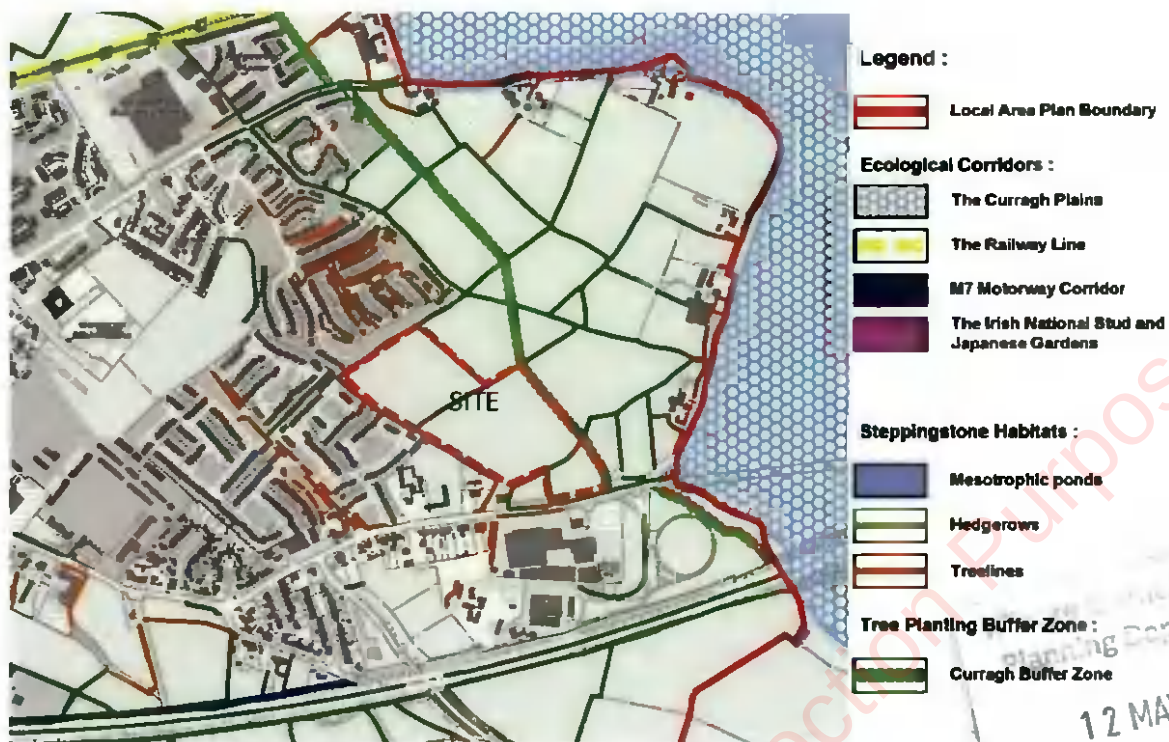


Figure 10.9: Natural Heritage and Green Infrastructure Map 9.1 of the Draft Kildare LAP 2023-2029



Figure 10.10: Zoning Map 11.1 of the Draft Kildare LAP 2023-2029

Summary of Planning Context;

The subject site;

- is zoned for residential development and is within the Kildare Town Development Boundary.

- Draft Kildare LAP zones part of the western area of the site for open space and amenity
- sits in close proximity to the Curragh pNHA.
- is located within "Central Undulating Lands" Landscape Character Area which is of "Class 1 Low Sensitivity."
- is within close proximity to the 'The Curragh' Landscape Character Area which is of "Class 5 Unique Sensitivity", to the east of the site
- abuts and partly visible from Scenic Route 3 - Views of Curragh Plains, from the M7 Interchange to St. Ledgers Bottoms.
- lies at a distance to Scenic Route 4 - Views of Curragh Plains including Little Curragh; County Road from Kildare Town Boundary to Military Ranges, R413 from Kildare Town Boundary to Motorway Interchange

Description of Receiving Environment

The subject site is described below in terms of:

- Location and overview;
- Site boundaries;
- Topography and drainage;
- Access;
- Vegetation and natural heritage;
- Landscape Character.

Location and Overview

The subject site is located at the eastern edge of Kildare Town. The site is bounded by agricultural fields to the east, Dublin Road R445 to the south, and residential areas to the west and north.



Figure 10.11: Land use along eastern edge of Kildare Town

Site Boundaries

The site consist of three agricultural fields and most of the site boundaries are defined by these field boundaries. The site is defined by agricultural field boundaries to the north, east and south. The site boundary to the west is mostly defined by the residential properties.

Topography and Drainage

The topography of the surrounds is slightly undulating. The highest point of the site is situated in the central field at 98m OD. The north-western corner is at 97m OD and the lowest is 92m OD situated at the south-eastern corner. The site is undulating with a small crescent in the central field but mostly slopes smoothly down from north-west to south-west.

There are no streams or rivers on the site; the natural drainage pattern has been disturbed by the improvement of the lands for agriculture. Drainage ditches along the edges of most of the fields capture the site's surface water and channel it off site to the south.

Access

The site can be accessed from Dublin Road R445 from the south. The adjacent residential are as currently don't provide access to the site.

Vegetation and natural heritage

The historical townland boundary of Kildare and Collaghknock Glebe partly runs along the western (north-western corner) site boundary and transverses the site east-west. Most of the field boundaries have remained historically as seen in historical maps.





Figure 10.12: Historical Tawnland Boundaries

Most of the field / site boundaries are defined by hedgerows and tree lines, except for the western edge to residential estate.

The quality of the hedgerows is variable. Some are more mature and these provide significant habitat features and a high degree of visual enclosure in the landscape. Others are less mature or have suffered from poor maintenance, and have less value as habitat and landscape features.

Most of the existing vegetation are healthy, functioning and worthy of retention. The vegetation along field boundaries have a drainage and ecology function facilitating ecology connectivity.

Visibility

The site extents are mostly screened by existing developments to the north and west, existing vegetation; field boundaries, and undulating topography. The most visible areas of the site are;

- Western and north western edge from residential estate
- Northern boundary from residential estate
- Southern boundary from Dublin Road.

The estates to north and west are internally orientated, presenting the front facades (and living room windows) of the houses to the estate streets and open spaces. The rear boundaries of the properties that border on the site are generally defined by high walls (>1.8m). These screen the site in views from the ground floor rear windows (kitchens) and the back gardens. A few number of houses are directly oriented towards the site.

The landscape around the site is slightly undulating but mostly flat with mature trees and hedgerows defining the field boundaries. The effect of this is that views are generally foreshortened and limited from the site or towards the site.

Landscape Character

The landscape character of the subject lands is of fields in pasture on the edge of town with strong urban influences – particularly to the west. It is defined by its;

- Landform which slopes gently across the plateau of the site towards the south.
- Existing agricultural use of the fields.
- Existing healthy hedgerow connectivity across the site including an historic townland boundary.
- Shared boundaries with residential and sub-urban estates.
- Proximity to Kildare town, major transport corridor the M7 and Kildare Railway Line.
- Limited access to the site due to the private ownership.
- Limited views from across the majority of the site area.



Views of the Site and surroundings



Figure 10.13: View from the northernmost field looking westwards to northwards across onto the adjoining existing house estates



Figure 10.14: View from the Site's middle field looking northwards in the direction of the Curragh but blocked by the intervening vegetation. Some portion of housing visible on the end of Coolaghknock Park.



Figure 10.15: View from the Site's southernmost field looking northeast to east towards the eastern part of the Site and part of the KCC National Stud/Greenbelt zoned lands falling within the wider landholdings and adjoining undulating agricultural lands with mature trees defining the field boundaries.



Figure 10.16: View along the R445 road looking westwards towards the mature roadside boundary hedgerows of the Site and adjoining lands.



Figure 10.17: View from the R445 road looking west across the Curragh Plains back towards the town of Kildare with views of the Site obscured by the surrounding mature trees and hedgerows vegetation cover.



Figure 10.18: View of the Curragh plains from local road off the R443 road looking south.

Summary of Landscape Characteristics and Values

The conservation and enhancement values of the Receiving Environment are set out in this section. The conservation values indicate those aspects of the receiving environment which are sensitive and could be negatively impacted on by the proposed development. These values form the potential landscape and visual constraints to the proposed development.

The enhancement values reflect change that is occurring in the landscape and its inherent robustness.

Conservation Values

These include:

- Trees/treelines and mature hedgerows across the field boundaries including a townland boundary;
- Visual amenity and residential amenity of the neighbouring areas;
- The integrity of the unique Curragh Plains landscape character, further east of the site.
- The network of ditches and their role as wildlife and hydrological networks.
- The relationship between existing communities and the site in terms of views, boundary treatments and character.

Enhancement Values

These include:

- Objectives for Kildare as a self-sustaining growth town.
- Zoning of lands for residential development.
- Consolidation of urban areas and transition to rural landscape.

10.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey sheltered housing block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

Full development description is outlined in Chapter 3 of this EIAR and in the statutory notices.



Figure 10.19: Proposed Development

Key elements of the development relevant to its landscape and visual impacts include:

- The change from agricultural fields to developed lands;
- Impact on landscape resource; existing hedgerows, townland boundaries and trees;

- Place-making in accordance with local policy and good practice;
- Interfaces with existing established residential areas;
- Views from residential areas;
- New landscape structure, features and amenities / habitats including tree cover; and
- Integrity of the Curragh Plains – a unique landscape character area in the county.

10.5 Potential Impacts

Construction Phase

The construction phase is expected to be phased over a number of years, due to the disruptive nature of development effects will generally be adverse where experienced but temporary.

The potential construction impacts from the ongoing infrastructure, building and related works will include:

- Potential changes to the character of the site and wider Very High Value of the Curragh Plains Landscape, resulting from the permanent loss of agricultural and introduction of temporary construction activity across the site.
- Changes as a result of the site clearance, including some loss of trees and hedgerows to accommodate the works, temporary storage of earth, demolition waste and materials and removal offsite of the waste for disposal or recycling, as well as protection / retention of identified boundary trees and sections of hedgerow.
- All engineering, building and landscape works required with associated site infrastructure, fencing and plant.
- The temporary movement of machinery, materials and personnel in and out of the site.
- Changes to views from surrounding area including the adjoining housing estates bounding the site, where some potential views of the site activity are likely to be constrained to upper-level views as a result of existing boundary walls and seasonality vegetation cover of the boundary hedgerows.

Operational Phase

The potential operational impacts include the:

- Potential changes to the Very High Value of the Curragh Plains Landscape
- Potential impacts on scenic routes
- Complete transformation from agricultural lands suburban landscape on the eastern edge of Kildare town
- Loss of hedgerows / trees
- Introduction of a range of residential buildings into the landscape / view
- Introduction of new infrastructure – roads, cycle paths and pedestrian paths into the view
- Potential change in the skyline
- Introduction of a more designed or urban landscape/townscape
- Establishment of new elevations and/or vegetation and planting in the streets, open spaces, gardens and along sections of the site boundary.

10.6 Potential Cumulative Impacts

A review of Kildare County Council's online planning search facility was undertaken, to determine any other applications of note with the potential for cumulative landscape or visual effects.

There is one large scale Strategic Housing Development (SHD) located within the limits of the former Magee barracks, currently under construction. It is located within the centre of Kildare Town and its nearest boundary edges are approximately 400m southwest of the proposed Ruanbeg development

This development (Phase 1) includes a mixed residential scheme of 375 no. residential units (185 no. houses and 190 no. apartments) and other uses and open spaces (planning ref: ABP-305007-19). The overall height of this built development includes apartment blocks up to 5 storeys in height, 3 storey duplexes and 2 storey houses. It falls over an area of 11.35ha which is approx. 1.75ha more than the proposed Ruanbeg development and contains an additional 80 units.

10.7 Mitigation Measures

Mitigation by design and avoidance was carried out with the preparation of a Landscape Masterplan for the Proposed Development site. The landscape masterplan has influenced the overall site layout through the proposed development design evolution, see **Appendix 5.7** for further information on the proposals.

Construction Phase

The landscape proposals for the Proposed Development site include retaining existing landscape features wherever possible including lengths of mature hedgerows and trees.

The works around the existing vegetation to be cleared and retained will be supervised by the clerk of works ecologist and project arborist. Protection measures will be outlined in the Construction Environmental Management Plan (CEMP) (Appendix 5.4) which will help protect these features. Retained trees and hedgerows will be protected throughout the construction phase by the installation of secure fencing in accordance with B55837:2012: Trees in Relation to Construction around the root protection areas (RPAs) as per the arborists Arboricultural Impact Assessment (AIA) report (Appendix 5.5). Areas of soil outside the main site works will be fenced off to prevent compaction. Where the soil will be disturbed by the site works it will be removed and stored elsewhere on site in accordance with best practice so that it can be reused where possible across the Proposed Development for landscaping including use as a seedbank for wildflowers in order to minimise the need for its removal offsite or importing any additional topsoil.

Visual impacts will be mitigated through the appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish. Any temporary lighting will be directed onto the area of site works so to prevent unnecessary light spillage onto the surroundings. Works will be carried at agreed hours with the council.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. Similarly, other structures including the site compound and scaffolding will be temporary in nature and contained within the works area.

Operational Phase

The retained landscape features will be incorporated into the overall landscape proposals which will bolster the existing green infrastructure of the existing Proposed Development site and immediate surroundings.

Existing lines of mature trees within the Proposed Development site will be incorporated as a key feature within the areas of public open spaces. These spaces will also include valuable functioning SUDS features including a bioretention pond on the western boundary.

Planting across the Proposed Development will include trees, hedges, shrubs, perennials, wildflower meadow, wetland planting, amenity/private grassland. The planting will consist of a range of suitable native and non-native non-invasive species which across the various open spaces and gardens will help to soften the appearance of the buildings and act as a visual barrier to reduce potential visual impacts.

The existing retained hedgerows and trees along the perimeter of the proposed site and internally act an importance physical and visual barriers to the surrounding areas of housing and farmland. Tree lines are proposed across the Proposed Development to add structure and act as vertical screens.

Habitat housing will include the placement of log piles (created from felled trees within the Proposed Development site), bird and bat boxes at locations through the Proposed Development as determined by the ecologist clerk of works.

Pathways are designed to allow good legibility for all abilities users across the Proposed Development and to directly connect onto the R445 Road providing access into Kildare town and towards the Curragh Plains. Further pedestrian and vehicle access is provided onto the existing residential area to the west and pedestrian access only to the north. Access points have been designed to allow for future potential connections into the adjoining zoned development lands directly to the north of the Site.

The lighting across the Proposed Development will be designed to prevent light spillage pollution into the surrounding residential areas and rural areas.

10.8 Predicted Impacts

Predicted Landscape Impacts

The receiving environment consists of;

- The existing site and immediate surroundings (sub-urban / edge of town character), and
- The Curragh Plains.

A review of the extent to which the development will affect the views experienced from adjacent landscapes are examined in this chapter's visual assessment section.

Landscape Sensitivity Assessments

Landscape Sensitivity: The Site, Immediate setting / Curragh Plains

The landscape character is mixed in nature. The site is situated at the edge of the town and adjacent to sub-urban housing or built-up areas to the south, west and north, and to the west by rural or countryside landscape. The site sits in between major transport corridors – M7 and Kildare Railway Line, although further away from site are important features.

The site sits about 250m-300m west of the Curragh Plains. The Curragh Plains is one of the scenic and unique landscape in the county and has high regard to the landscape and visual amenity. The Curragh Plains is also a pNHA. The landscape is undulating and long-distance views are limited.

The immediate environs is mixed in nature and offers opportunity to consolidate the landscape and improve through development. The immediate surroundings can be recognised as being in a state of change / transition with policy in place to guide their transformation to new residential neighbourhoods.

The character of the landscape is such that there is some capacity for accommodating change; where development would make no significant change or would make a positive change. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration as stated in local policy.

The landscape sensitivity is regarded as **Medium** - Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change.

Predicted Landscape Impacts and Effects

Construction Phase

The construction phase will result in ongoing infrastructure, building and related works for approximately 12-18 months.

The construction stage will result in ongoing infrastructure, building and related works. This will entail:

- Site clearance which will involve removal of the roadside hedgerow to allow access and removal of 29 trees along with short sections of hedgerow to facility the proposed works.
- Protective fencing added around the remaining retained trees for the duration of the site works.
- Clearing of the grassland vegetation cover and temporary storage of soil through the site for reuse as part of the landscaping.
- The temporary storage and movement of materials and waste within the site.
- The temporary movement of construction machinery and personnel in and out of the site.
- All engineering, building and landscape works required with associated site infrastructure, fencing and plant.

The effects during construction would relate to a small geographical area.

The landscape sensitivity of the receiving environment is **Medium**

The magnitude of change would be **High** - introduction of large elements considered uncharacteristic in the context.

The Significance of this effect would be **Medium and Adverse** - Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished;

Overall, the impacts described are generally temporary and visually adverse in nature, during the construction phase.

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Operational Phase

The site's Enhancement Values reflect policy that is supportive of landscape change at this location. The landscape analysis indicates a context where the area is at the edge of built-up areas and the landscape character is mixed and not strong.

The site's Conservation Values relate to the proximity to the Curragh Plains. Impacts here would be primarily visual and relatively distant. These effects are discussed in the visual assessment below.

The 'impact' of the development is the change of the site from farmland to a new residential area of scale on the southeastern end of Kildare town. Whilst some trees and hedgerows will be affected, the new development has been laid out to incorporate the existing mature trees and hedgerows wherever feasible. The proposed development has been prepared in accordance with best practice urban design guidelines.

The 'Effects' of this in terms of alteration of the landscape character are assessed below.

The landscape sensitivity of the receiving environment is **Medium** - Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong or has evidence of alteration to / degradation / erosion of elements and characteristics. The character of the landscape is such that there is some capacity for change in the form of development.

The magnitude of change would be **Medium** - ... Change that is moderate in extent, resulting in partial loss or alteration to key elements features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.

The Significance of this effect would be **Moderate and Neutral** - Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality.

The effects on completion would be **Permanent** and relate to a small geographical area. The change in keeping with local policy for change.

Cumulative

The cumulative impacts of the proposed Ruanbeg development and the Former Magee Barracks Site during the construction phase would include increase construction activity occurring across the local landscape, buffered by the Ruanbeg Manor housing estate. There will be a slight increase loss of existing tree/hedgerow removal which will be compensated by the proposed landscaping.

Once operational, the proposed Ruanbeg development will together with the under construction Former Magee Barracks Site will further add to the expansion of housing (670 units between the two sites) on two parcels of lands off the R445 road and on either side of the existing Ruanbeg Manor estate. This will change the character of both lands from agricultural lands and a derelict barracks to one of continuous expanse of housing lands on the eastern end of Kildare Town bounding the R445 road. Such a change to the character of this landscape has already been recognised in local planning policy through the zoning of the proposed development lands for residential use.

The character of the proposed Ruanbeg development has been designed to reflect its location on the urban-rural fringes of the town and next to other established residential developments. While the character of the Former Magee Barracks Site is designed to be more reflective of its closer proximity to the town centre, with taller buildings and potential retail uses proposed.

Overall, the significance of the cumulative landscape impact would be Moderate and Neutral

Predicted Visual Impact

Zone of Visual Influence and Potential Visual Receptors

Based on the assessment of the landscape characteristics, values and sensitivities, 12 representative viewpoints were selected to assess visual impacts and effects.

The assessed viewpoints are shown on Figure 10.20 and 10.21 overleaf and are listed in Table 10.6 below. A sensitivity rating has been ascribed to each visual receptor based on the definitions provided in Table 10.4. A rationale for the sensitivity rating is provided under the description of each existing view below.



Figure 10.20: Viewpoint Locations Map – short and medium distance (Indicative red line boundary, refer to Ch.3 for accurate site boundary)





Figure 10.21: Viewpoint Locations Map - Long-distance views (Indicative red line boundary, refer to Ch.3 for accurate site boundary)

VP	Location / Description	Rationale for Selection	Expected Visibility	Sensitivity Rating
01	Coolaghknock Close	Representing residential receptors and road users	Visible	High
02	Coolaghknock Gardens	Representing residential receptors and road users	Partially	High
03	Ruanbeg Crescent	Representing residential receptors and road users	Partially	Medium
04	Ruanbeg Avenue	- Representing residential receptors and road users - Open space users	Partially	High
05	Ruanbeg Park	- Representing residential receptors and road users - Open space users	Partially	High
06	Dublin Road (R445)	- Representing road users - Representative of views from Scenic Route 3	Partially	High
07	Dublin Road (R445)	- Representing road users - Representative of views from Scenic Route 3	Partially	High

08	Curragh View / Curragh Plains	- Representing views from Curragh View and local road users - Representative of Curragh Plain Unique Landscape	Limited / No visibility	High
09	Melitta Road (R413)	- Representing road users - Representative of views from Scenic Route 4	Limited / No visibility	High
10	Melitta Road (R413)	- Representing road users - Representative of views from Scenic Route 4	No visibility	High
11	Dublin Road (R445)	- Representing road users - Representative of views from Scenic Route 3	No visibility	High
12	Dublin Road (R445)	- Representing road users - Representative of views from Scenic Route 3	No visibility	High

Table 10.6: Viewpoint Locations

Photography and presentation of viewpoints

Each Viewpoint is illustrated by a photograph showing the existing view and the photomontage showing the proposed development.

Photomontages have been produced by Urban 3D and are presented in **Appendix 10.1** with a map of their locations. Verified photographs and photomontages have been taken with a fixed prime lens of 50mm FL view, which is broadly equivalent to the c.40-degree Horizontal Field of View (HfoV) and is representative of what the human eye perceives and reflects the requirements of the Landscape Institute Technical Guidance Note on Visual Representation 2019.

To correctly view the photomontage at the correct scale the extents of the 50mm lens or 40-degree angle of view should be extended to A3 in size and viewed at arm's length. This can be done by printing a hard copy or, more easily, digitally on screen.

Viewpoint Descriptions

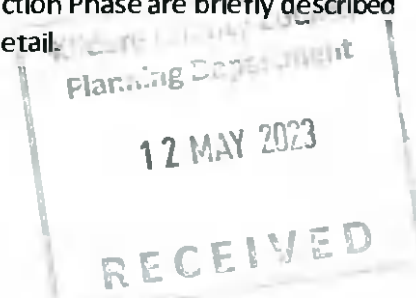
Each viewpoint is described below in its existing condition and the effects of the proposed development. The descriptions, including of the change / effects, focus primarily on the extent of the 50mm image, and the winter (worst case scenario) view, but refer to the context, as appropriate, to inform analysis. The potential temporary effects during the Construction Phase are briefly described while effects during the Operational Phase are described in more detail.

Viewpoints Assessment

Viewpoint 1 - Coolaghknock Close

Existing View

The view is looking south from Coolaghknock Close. This is a close distance view of the site from a local road in a residential neighbourhood by the edge of open space. The views would be representative of views enjoyed by residential receptors, road users and pedestrians. The subject site is visible from this location, through gaps in the hedgerow which runs along the edge of the open space and site's northern boundary. During winter months there are partial views of the Kildare



Chilling Company factory buildings and some houses in the existing Ruanbeg estate to the west of the Site.

The viewpoint sensitivity is High - *viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features)*

Visual Impacts and Effects

Construction Phase

Views of the construction phase will be greatest along the Site's northernmost field. The presence of the hedgerows, trees and site hoarding help to partially restrict views of the ground level activity while upper-level activity will be visible. These views will be slightly increased in winter when the hedgerow and trees are lacking vegetation coverage.

The magnitude of change would be Low, the significance of effect would be Moderate-Slight Adverse Temporary.

Operational Phase

The proposed development is partially screened by the existing hedgerow and the full extent of the development is hidden from this location. The view will contain the set of duplexes along the site's eastern edge and some roofs of the nearest houses, with views greatest in the winter months.

Views will be greatest around the open spaces, while views from most residences are facing out onto Coolaghknock Close away from the proposed development some may experience partial views from windows located in upper storeys and frontages of residential dwellings located at higher elevations. It is expected that the proposed development would be a minor intrusion and would not be uncharacteristic in the context.

The Magnitude of change would be Low - *Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity*

The significance of effect would be Moderate-Slight the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. *Scheme complements the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality;*

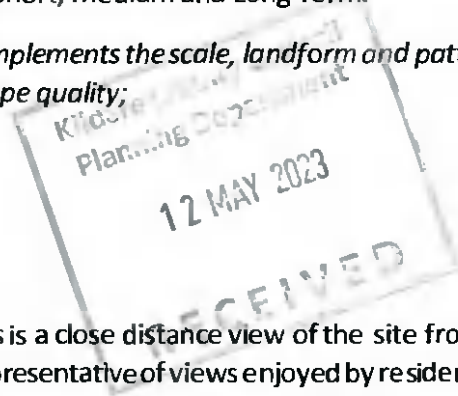
Viewpoint 2 - Coolaghknock Gardens

Existing View

The view is looking south from Coolaghknock Gardens. This is a close distance view of the site from a local road in a residential neighbourhood. The views are representative of views enjoyed by residential receptors, road users and pedestrians. Most of the site is hidden or screened from this location of the viewpoint by the hedgerow which adjoins the Site's northern boundary.

The viewpoint sensitivity is High - *viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features)*

Visual Impacts and Effects



Construction Phase

The existing hedgerow will help restrict views of the site works, although there maybe partial views above the hedgerow and hoarding from windows located in upper storeys and residential dwellings located at higher elevations, particularly during the winter months when the hedgerow are lacking vegetation coverage.

The magnitude of change would be Low, the significance of effect would be Moderate-Slight Adverse Temporary.

Operational Phase

There will be partial views of the proposed development's housing along its' northern end above and through gaps in the existing boundary hedgerow, with the full extent of the proposed development hidden from this location. Views from most residences are facing out onto the street away from the proposed development, however some may experience partial views from windows located in upper storeys and frontages of residential dwellings when facing south-easterly, being greatest during the winter months. It is expected that the proposed development would be a minor intrusion and would not be uncharacteristic in the context.

In addition, a future potential pedestrian connectivity linkage with Coolaghknock would slightly alternate this view with a new footpath, break in hedgerow and passing of people to/from both estates. The narrow break in hedgerow would provide some additional partial views of the frontage of the nearest new housing.

The Magnitude of change would be Negligible to Low- Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity

The significance of effect would be Slight the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;

Viewpoint 3 - Ruanbeg Crescent

Existing View

The view is looking south-east from Ruanbeg Crescent. This is a close distance view of the site from a local road in a residential neighbourhood. The views are representative of views enjoyed by residential receptors, road users and pedestrians. There are no views of the site available from this location due to existing developments, boundary walls and hedgerows in the view.

The outlook of the view is poor i.e., looking at existing developments or backs of existing houses. Lack of long-distance views or valued features.

The viewpoint sensitivity is Medium - Although a residential setting would suggest high susceptibility, the value of the view or outlook is low, leading to a Medium Sensitivity.

Visual Impacts and Effects

Construction Phase

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The various walls, buildings and dense hedgerow trees screen out views of the site works.

The magnitude of change would be None, the significance of effect would be None.

Operational Phase

The proposed development is not visible from this location.

The magnitude of change would be None, the significance of effect would be None.

Viewpoint 4 - Ruanbeg Avenue

Existing View

The view is looking east from Ruanbeg Avenue. This should be a close distance view of the site from a local road in a residential neighbourhood. The views would be representative of views enjoyed by residential receptors, road users and pedestrians, and also the open space users.

Visibility of the site from this point is mostly screened by the high boundary walls and residential properties, with only a section of the site's northern hedgerow visible above the estate's wall. Some of the residential properties in the neighbourhood backs on to the proposed site, there may be views from private spaces from windows located at upper storeys.

The viewpoint sensitivity is High -viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features)

Visual Impacts and Effects

Construction Phase

Views of the site works at ground level from this point are contained by the boundary wall, with views being limited to upper levels of the works to the nearest new houses and upper portions of machinery. Some residential backing onto the site will have extended elevated views of the siteworks from their upper floors. Such views would be increased with the removal of the boundary wall for the new access road.

The magnitude of change would be Low, the significance of effect would be Moderate-Slight Adverse Temporary.

Operational Phase

The removal of the existing boundary wall will open views into the northern edge of the proposed development. Here, views will be of additional housing which isn't uncharacteristic of the surroundings. The openness means there is little change between summer and winter months view. Some of residence backing onto the site will have views of the nearest new housing from their upper floors. There will also be views of the movement of vehicles and pedestrians/cyclist passing this point as they come/go from the new estate through the new access point.

The Magnitude of change would be Low-Medium Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.. andintroduction of

elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity

The significance of effect would be **Moderate** the Short, Medium and Long Term.

Qualitatively the impact would be **Neutral** i.e. Scheme complements the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality;

Viewpoint 5 - Ruanbeg Park

Existing View

The view would be looking east from Ruanbeg Park. This would be a close distance view of the site from a local road in a residential neighbourhood. The views would be representative of views enjoyed by residential receptors, road users and pedestrians, and also open space users.

Views of the site from this point is limited to the uppertips of some hedgerows and trees along short sections of the site's northern and eastern boundaries, as it is otherwise screened by walls and houses. Some of the residential properties in the neighbourhood back onto the proposed site and have elevated views into the site from windows located at first floor level. The upper floors of a few houses within the Coolaghknock estate are visible further to the north against the background.

The viewpoint sensitivity is **High** -viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features)

Visual Impacts and Effects

Construction Phase

As with the previous view, inward views of the siteworks are hindered by the high wall and adjoining housing, with some partial views of the upper levels of works and jibs of machinery. Some residential backing onto the site will have extended elevated views of the siteworks from their upper 1st floor. Any potential inwards views as a result of the removal of a section of the boundary are likely to be curtailed by site's boundary hoarding.

The magnitude of change would be **Low**, the significance of effect would be **Moderate-Slight Adverse** Temporary.

Operational Phase

The site layout means that this group of existing residents on the southeastern corner of Ruanbeg Park are looking out onto the Proposed Development's open space including around the pump house and pond, with the new housing set further back within the site. Helping to reduce the potential prominence of the new housing, which are not uncharacteristic of their surroundings. Such views will be greatest from elevated first floors with some views of the new housing upper floor and rooflines possible from the rear grounds of the existing residences. Some views will be reduced and softened over time as the new boundary hedgerow increases in height and with the growth of the proposed trees. There will be little change being the winter and summer views until the proposed vegetation has matured.

The view will be further altered by the removal of the existing boundary wall at the end of the road junction and its replacement with new hedgerow planting and a footpath. This would provide greater visual connectivity between the existing and proposed housing estates, when viewed from this point and from some of the frontages of houses and eastern end of the public open space within Ruabeg Park. The new path would allow for pedestrians/cyclists to pass through both housing estate, creating greater interaction between the two developments.

The Magnitude of change would be Low-Medium Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity..introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity

The significance of effect would be Moderate the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality.

Viewpoint 6 - Dublin Road (R445) / Scenic Route 3

Existing View

The view is looking north-east from Dublin Road (R445), also designated Scenic Route 3 in the development plan. The view is representative of viewers travelling along the R445 and the scenic route. The existing hedgerow and vegetation along the northern section of the R445 fully screens the views enjoyed from the route. The proposed site is partially visible from gaps in the vegetation.

The viewpoint sensitivity is High - Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.

Visual Impacts and Effects

Construction Phase

There will be a notable change to this view with the result of the hedgerow and tree removal along the site's roadside southern boundary edge to accommodate the works. Hoarding will run the length of this boundary which will help contain most views of the site's ground level activity while views of the upper level activity above the hoarding will be possible. There will also be views of construction site traffic coming onto/off the main road from the new site entrance.

The magnitude of change would be Medium, the significance of effect would be Significant Adverse Temporary.

Operational Phase

The proposed development includes removal of the existing site boundary hedgerow and 8 no. trees along the northern section of the road. These elements will be replaced by the new landscaping along the boundary edges of the proposed development. The proposed development would introduce new housing and activity around the new entrance and a shared public footpath/cycle path (on both side of the road). These alternations would initially represent change to the view and character of the

existing road. Over time as the proposed landscaping and new boundary treatment establish this change would reduce.

The magnitude of change would be **Medium** – introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity

The significance of the effect is **Significant** and would remain so in the Short Term.

Qualitatively the impact would initially be to **Adverse in the short term**:- Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished.

Before reducing to **Neutral in the Medium and Long Term**.

Viewpoint 7 - Dublin Road (R445) / Scenic Route 3

Existing View

The view is looking north-west from Dublin Road (R445), also designated Scenic Route 3 in the development plan. The view is representative of viewers travelling along the R445 and the scenic route. The existing hedgerow and vegetation along the northern section of the R445 fully screens the views enjoyed from the route. The proposed site is partially visible from gaps in the vegetation.

The viewpoint sensitivity is **High** - Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.

Visual Impacts and Effects

Construction Phase

The changes to this view are very similar to viewpoint above, as a result of the removal of the site's roadside boundary trees and hedgerows.

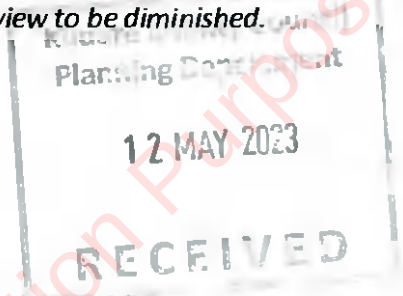
The magnitude of change would be **Medium**, the significance of effect would be **Significant Adverse Temporary**.

Operational Phase

The proposed development includes removal of the existing site boundary hedgerow and 8 no. trees along the northern section of the road. The proposed changes to the existing views will be similar to viewpoint 6, but viewed in the opposite direction of travel. Here the boundary vegetation is replaced by the new landscaping, new footpaths/cycleways and new housing located along the southernmost end of the proposed development. The street trees helping to break up the form of the new housing.

These alternations would initially represent change to the view and character of the road. Over time as the proposed landscaping and new boundary treatment establish this change would reduce.

The magnitude of change would be **Medium** – introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity



The significance of the effect is Significant and would remain so in the Short, Medium and Long Term.

Qualitatively the impact would initially be to Adverse in the short term:- *Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape(townscape)/view to be diminished.*

Before reducing to Neutral in the Medium and Long Term.

Viewpoint 8 – Local Road L7022 / Curragh View / Curragh Plains

Existing View

The view is looking west from a local road connecting R445 and R413. The viewpoint is located about 400m east from the site boundary. The viewpoint is representative of views experienced by the residents of Curragh View, local road users and from the Curragh Plains.

Although this route is not classified as a 'scenic route', one can enjoy the unique Curragh Plains landscape from this location. The Curragh Plains is exactly opposite to the proposed view, that is looking east from the viewpoint and not west towards the site. The site is partially visible or is not visible from this location due to existing vegetation and undulating topography. Where there are gaps in the vegetation along the local road, the site is partially visible.

The viewpoint sensitivity is High - *Viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features) and views which are highly valued by the local community.*

Visual Impacts and Effects

Construction Phase

Views of the site works will be barely visible through minor gaps in the intervening hedges and trees. There will be some minor views of upper level activity along the site's southeastern corner between a clear gap in the vegetation.

The magnitude of change would be Negligible, the significance of effect would be Not Significant Neutral Temporary.

Operational Phase

The proposed development's visibility from this point is largely screened out by the intervening vegetation. A small portion of the end buildings on the site's southeastern end may be visible but heavily filtered through minor gaps in the intervening vegetation during the winter months, occurring as only a minor intrusion and not necessarily uncharacteristic in the view.

The magnitude of change would be Negligible – *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The significance of effect would be Slight-Not Significant in the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. *Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;*

Viewpoint 9 - Melitta Road (R413)

Existing View

The view is looking south-west from Melitta Road (R413), also designated Scenic Route 4 in the development plan. The viewpoint is located about 750m north from the site boundary. The view is representative of viewers travelling along the R413 and the scenic route.

The Scenic Route offers splendid views of the Curragh Plains. There is thick woodland running parallel along the south of the scenic route stretching from local road L7022 towards the edge of the town. The woodland area effectively screens any long distance views oriented towards south and south-west, that is towards Kildare Town and the site respectively, from the scenic route. The site is not visible from this viewpoint.

The viewpoint sensitivity is High - Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.

Visual Impacts and Effects

Construction Phase

The site works will be barely visible through minor gaps in the intervening hedgerows, trees and fenceline during winter months.

The magnitude of change would be **Negligible**, the significance of effect would be **Not Significant** Neutral Temporary.

Operational Phase

The proposed development is not clearly visible from this location due to being heavily screened by the intervening trees and hedgerows. Any limited views of the proposed development will be of its uppermost portions of the eastern end buildings and only appearing as a very minor intrusion in the winter months and not necessarily uncharacteristic in the view.

The magnitude of change would be **Negligible** - Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

The significance of effect would be **Slight-Not Significant** in the Short, Medium and Long Term.

Qualitatively the impact would be **Neutral** i.e. Scheme complements the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality;

Viewpoint 10 - Melitta Road (R413)

Existing View

The view is looking south-west from Melitta Road (R413), also designated Scenic Route 4 in the development plan. The viewpoint is located about 1.2km north from the site boundary. The view is representative of viewers travelling along the R413 and the scenic route.

The Scenic Route offers splendid views of the Curragh Plains. There is thick woodland vegetation running parallel along the south of the scenic route stretching from local road L7022 towards the edge of the town. The woodland area effectively screens any long distance views oriented towards south and south-west, that is towards Kildare Town and the site respectively, from the scenic route. The site is not visible from this viewpoint.

The viewpoint sensitivity is High - *Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.*

Visual Impacts and Effects

Construction Phase

Views toward the proposed development will be restricted by the intervening field boundary hedgerow vegetation.

The magnitude of change would be None, the significance of effect would be None.

Operational Phase

There will be no impacts or effects on this view as the proposed development will be screened by the intervening field boundary vegetation in the summer months. Some very minor views of the uppermost portions of housing nearest the site entrance maybe visible above the intervening and backdropped by the factory buildings.

The magnitude of change would be **None to Negligible** – *Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.*

The significance of effect would be Slight-Not Significant in the Short, Medium and Long Term.

Qualitatively the impact would be **Neutral** i.e. *Scheme complements the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality;*

Viewpoint 11 - Dublin Road (R445) / Scenic Route 3

Existing View

The view is looking west from Dublin Road (R445), also designated Scenic Route 3 in the development plan. The viewpoint is located 300m east from site boundary. The view is representative of viewers travelling along the R445 and the scenic route.

The Scenic Route offers splendid views of the Curragh Plains, viewing north from the route. The topography of the landscape is slightly undulating at this location. The existing hedgerows and trees in between the site and the viewpoint effectively screens views towards the town and the site from this location. Where there are gaps in the vegetation the ridges of the residences in the Coolaghknock neighbourhood (north of the site) is clearly visible.

The viewpoint sensitivity is High - Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.

Visual Impacts and Effects

Construction Phase

Views toward the proposed development will be restricted by the intervening field boundary hedgerow vegetation, with some potential limited views during the winter months but being barely perceptible.

The magnitude of change would be None to Negligible, the significance of effect would be None to Slight-Not Significant.

Operational Phase

Any potential views are limited to the winter months, as views are heavily screened by the intervening mature field boundary hedgerows and trees.

During the winter months there will be some limited heavily filtered views of the buildings on the eastern end of the proposed development through minor gaps in the intervening mature field boundaries. Some views will be further reduced as the proposed boundary treatment matures overtime. The buildings are set lower down and do not affect views of the Kildare skyline from this point. Where visible, it is expected that the proposed development would be a minor intrusion and would not be uncharacteristic in the context. The existing more elevated residential development of Coolaghknock remaining more prominent within this view.

The magnitude of change would be None to Negligible – Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

The significance of effect would be Slight-Not Significant in the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;

The magnitude of change would be None, the significance of effect would be None.

Viewpoint 12 - Dublin Road (R445) / Scenic Route 3

Existing View

The view is looking west from Dublin Road (R445), also designated Scenic Route 3 in the development plan. The viewpoint is located 800m east from site boundary. The view is representative of viewers travelling along the R445 and the scenic route.

The Scenic Route offers splendid views of the Curragh Plains, viewing north from the route. The topography of the landscape is mostly flat at this location.

The existing hedgerows and trees in between the site and the viewpoint effectively screens views towards the site and the town.

In the middle of the background, the town's 'Landmarks'; Round Tower, spire of St. Brigid's Cathedral, spire of White Abbey Church and spire of St. Brigid's RC Church are visible towering over the landscape. Where there are gaps in the vegetation the ridges of the residences in the Coolaghknock neighbourhood (north of the site), Curragh Plains neighbourhood and other residential areas of the town are partially visible.

The viewpoint sensitivity is High - Viewers at viewpoints that are recognised in policy or otherwise designated as being of value. This may also include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.

Visual Impacts and Effects

Construction Phase

Views toward the proposed development will be restricted by the intervening field boundary hedgerow vegetation.

The magnitude of change would be None, the significance of effect would be None.

Operational Phase

As with previous viewpoint no. 11 the proposed development will be fully screened by the intervening field boundary vegetation during the summer months. Similarly, potential views of the proposed development will be very limited during the winter months, with some very minor views of buildings along the eastern end of the proposed development possible but heavily filtered through the various intervening mature field boundaries hedgerows and trees. Where visible, it is expected that the proposed development would be only a minor intrusion and would not be uncharacteristic in the context. The lower setting ensures any limited views do not affect the views from this point towards the historic buildings set against the town's skyline.

The magnitude of change would be None to Negligible - Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

The significance of effect would be Slight-Not Significant in the Short, Medium and Long Term.

Qualitatively the impact would be Neutral i.e. Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;

Viewpoint Assessment Summary

The following table summarises the results of the assessment of the effects of the Proposed Development on the visual resource in the construction and operational phase.

VP No.	Location	Sensitivity	Degree of Change	Significance and Quality
				Short
VP01	Coolaghknock Close	High	Low	Moderate-Slight Adverse

VP02	Coolaghknock Gardens	High	Low	Moderate-Slight Adverse
VP03	Ruanbeg Crescent	Medium	None	None
VP04	Ruanbeg Avenue	High	Low	Moderate-Slight Adverse
VP05	Ruanbeg Park	High	Low	Moderate-Slight Adverse
VP06	Dublin Road (R445)	High	Medium	Significant Adverse
VP07	Dublin Road (R445)	High	Medium	Significant Adverse
VP08	Curragh View / Curragh Plains	High	Negligible	Not Significant Adverse
VP09	Melitta Road (R413)	High	Negligible	Not Significant Adverse
VP10	Melitta Road (R413)	High	None	None
VP11	Dublin Road (R445)	High	None to Negligible	None to Not Significant Adverse
VP12	Dublin Road (R445)	High	None	None

Table 10.7: Summary of Visual Effects - Construction Phase

12 MAY 2023

VP No.	Location	Sensitivity	Degree of Change	Significance and Quality		
				Short	Medium	Long
VP01	Coolaghknock Close	High	Low	Moderate-Slight and Neutral		
VP02	Coolaghknock Gardens	High	Negligible to Low	Slight and Neutral		
VP03	Ruanbeg Crescent	Medium	None	None		
VP04	Ruanbeg Avenue	High	Low-Medium	Moderate and Neutral		
VP05	Ruanbeg Park	High	Low-Medium	Moderate and Neutral		
VP06	Dublin Road (R445)	High	Medium	Significant and Adverse	Moderate and Neutral	
VP07	Dublin Road (R445)	High	Medium	Significant and Adverse	Moderate and Neutral	
VP08	Curragh View / Curragh Plains	High	Negligible	Slight-Not Significant and Neutral		

VP09	Melitta Road (R413)	High	None to Negligible	Slight-Not Significant and Neutral
VP10	Melitta Road (R413)	High	None to Negligible	Slight-Not Significant and Neutral
VP11	Dublin Road (R445)	High	None to Negligible	Slight-Not Significant and Neutral
VP12	Dublin Road (R445)	High	None to Negligible	Slight-Not Significant and Neutral

Table 10.8: Summary of Visual Effects - Operation Phase

The proposed development is expected to have a temporary adverse effect on the visual resource during construction. Upon operation and into the future, the development is expected to have a neutral long term / permanent effect on the visual resource.

Cumulative

The potential for cumulative views of the proposed Ruanbeg development with that of the Former Magee Barracks Site are heavily limited due to the intervening built-up area of Ruanbeg Manor, slight variations in the underlying topography between the two developments, and proposed heights of the Ruanbeg development.

There will be some limited sequential cumulative partial views of both the construction and operation phases of the two developments, as experienced by pedestrians, cyclists and vehicle users, when travelling along the R445 road. Views being most prevalent as one directly passes by the road entrances to either development, where one experiences an increase of the built environment within the immediate area. Some distant views like viewpoint no. 12 will allow some limited combined winter views of both developments, although both being heavily filtered by the intervening vegetation with the taller buildings of the Former Barracks Site development more prevalent.

Overall, the significance of the cumulative impact would be Slight to Not Significant and Neutral

10.9 'Do Nothing' Scenario

If the Proposed Development did not proceed the existing agricultural lands are likely to be continued to be used for grazing in keeping with their current land management regime.

However, as the lands are already zoned for residential development in the KCDP it is envisaged that the current agricultural land use would be subject to change to housing in the near future due to the anticipated expansion of Kildare town. Such a change in land use would result in a similar change to landscape character and visual amenity as that predicted for this application.

10.10 Worst Case Scenario

This would occur were the Proposed Development to be implemented through a poor design layout that would maximise the availability of the space within the Site for buildings and had no consideration

of how the proposal would interact with the site and that of the surrounding receptors such as the neighbouring residential areas and/or the green belt and Curragh Plains landscape.

10.11 Monitoring & Reinstatement

The landscape mitigation and enhancement measures are incorporated into the Proposed Development's landscape masterplan, see **Appendix 5.7**. The masterplan proposals include a range of hard and soft landscaping. The soft landscape measures include the retainment of existing hedgerows and trees along with new SUDs drainage and planting of trees, hedges, grasses, wildflowers, shrubs, bulbs and perennials. The successful establishment of the planting will be key to helping to fully integrate the Proposed Development's built structure into the surrounding landscape and provide a visual buffering of the Proposed Development's built elements from surrounding visual receptors. The mitigating effects of which have been considered when determining the predicted landscape and visual effects in the assessment above.

In order to ensure the success of the proposed landscape planting and retained vegetation, implemented during the construction phase, the appointed landscape contractor will be required to undertake and maintain the planting in accordance with the proposed landscape maintenance and management plans. There will be a minimum 18 months defects period on all soft landscape works implemented. Thereafter the landscaping will be maintained in perpetuity consecutive 12 months periods. This regular maintenance/inspection of the planting across the Proposed Development helps to ensure the planting becomes established over the initial years and that any failed planting is duly replaced.

10.12 Difficulties in Compiling Information

The site assessment has carried out from within the Proposed Development site and surrounding publicly accessible lands and routes only. As such it does not involve assessing directly from private lands e.g., a resident's garden or internal outward views from their house. Instead, professional judgement and experience has been used when considering the potential visual impacts on these affected receptors where no direct access is possible.

10.13 Conclusion

This report has assessed the landscape and visual effects of the proposed residential development at the Ruanbeg Kildare. The subject lands are zoned for New Residential use and the proposed application meets that need. The proposed design reflects a considered form and materiality of development that is sensitive to its context and although some existing rural landscape features are lost, an appropriate new urban character is created that contributes positively to local place-making.

Landscape Effects

The Landscape 'Sensitivity' is assessed as **Medium**.

The 'Magnitude of Change' is **Medium**

The Significance of the effect is **Moderate**

Qualitatively the landscape effect is **Neutral** and **Permanent**

This recognises that, whilst the change in character from agricultural lands to urban is important, it reflects land use policy for the site and has been applied to the site as per the best practice in terms of urban design, open space development and Green Infrastructure policy i.e. the change is from agricultural lands on the urban fringe to a quality urban townscape as part of the urban expansion of the eastern end of Kildare town.

Visual Effects

The predicted visual effects of the proposed development will range between **No effect to Significant** significance and **adverse or neutral** in quality depending on the proposed development's degree of visibility and changes to the existing views experienced by the affected receptors.

The proposed development is not uncharacterised in the context and is expected to be of '**Slight to Moderate**' Significance from adjacent residential areas (Viewpoints 1 to 5).

The views from Scenic Route 3 / Dublin Road (viewpoints 6 & 7) are expected to experience a change of **Significant and Adverse** significance in the short-term. As the proposed landscaping and boundary treatment matures the significance would reduce to '**Moderate**' and '**neutral**' in quality.

The expected visibility from long-distance viewpoints; VP 8-12 (Scenic Route 3, 4 and the Curragh Plains) is negligible to no visibility. The proposed development is expected to have '**Slight – Not Significant**' significance or no change effects. Therefore, the quality of views towards the town (landmark buildings), the quality of views enjoyed in scenic routes towards the Curragh Plains will not change and are not impacted.

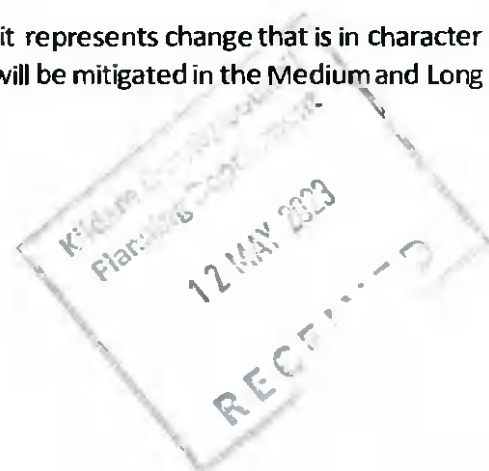
Cumulative Effects

A review of potential cumulative landscape and visual effects with other developments in the area, determined that there will be limited cumulative effects with the approved under construction residential development of the Former Magee Barracks Site. Where there would be an increase of residential areas within the eastern side of Kildare town, with the two developments buffered by the existing Ruanbeg Manor estate. This would have a **Moderate** landscape cumulative effects and **Slight-Not Significant** visual cumulative effect and both of **neutral** quality.

Summary

The development is regarded as a complementary and neutral change to the landscape amenity of the area and in keeping with change proposed in local policy.

Visually, the change is regarded as qualitatively '**neutral**' as it represents change that is in character with other elements in the landscape or, if initially adverse, will be mitigated in the Medium and Long Term by planting and screening.



10.14 References

Kildare County Council (2023) Kildare County Development Plan 2023-2029 Kildare: Kildare County Council.

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Landscape Institute (2019) Visualisation of development, London: Landscape Institute. <https://www.landscapeinstitute.org/visualisation/>



11. Traffic and Transportation

11.1 Introduction

This section of the report assesses the likely impact of the proposed development on the existing transportation system in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any identified impacts arising from the proposed LRD residential development at Ruanbeg.

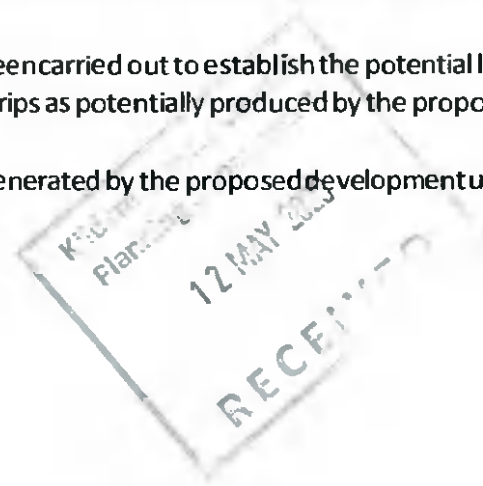
This chapter specifically considers the pedestrian, bicycle, public transport (bus and rail) infrastructure, potential impacts of the construction works, the remedial & mitigation measures being provided in addition to the local road network and associated junction impacts. Prepared by PUNCH Consulting Engineers, an overall commentary on the predicted changes in traffic, public transport, pedestrian and cyclist environmental conditions are all discussed in this chapter and provide a setting for all the other assessments undertaken in this EIAR.

This chapter was prepared by John Paul Murray MEng(Hons) BSc MIEI and Julie Tiernan BE(Civil) (Hons) MSc CEng MIEI of PUNCH Consulting Engineers. John Paul Murray is a Design Engineer with PUNCH Consulting Engineers with 3 years' experience in traffic and drainage engineering, and is a member of Engineers Ireland. Julie Tiernan is a Technical Director with PUNCH Consulting Engineers with over 15 years' experience in Traffic and Transportation Assessments and DMURS/National Cycle Manual compliant road networks.

11.2 Methodology

The purpose of this assessment is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed development. The scope of the assessment covers transport and sustainability issues including pedestrian, cyclist, and public transport connectivity. Recommendations contained within this chapter are based on existing and proposed road layout plans, site visits, traffic observations and historic junction vehicle turning count data. Our methodology incorporated a number of key stages, including;

- **Site Audit:** A site audit was undertaken to quantify existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed during this stage of the assessment.
- **Traffic Counts:** Junction turning count surveys were undertaken by IDASO Ltd. on Thursday, 9th June 2022 at the R445 and Kildare Chilling Company Junction and on Thursday 30th June 2022 at the R445 and Ruanbeg Manor Junction. The results of these surveys were analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed development.
- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of future person trips and subsequently vehicle trips as potentially produced by the proposed development.
- **Network Impact:** The specific level of influence generated by the proposed development upon the local road network was ascertained.



- **Network Analysis:** Computer simulations were used to assess the operational performance of key junctions in the post development 2026, 2031 and 2041 development scenarios in accordance with the NRA/TII document 'Traffic and Transport Assessment Guidelines' (2014).

The assessment of effects of the proposed development on material assets are assessed in terms of quality (positive, neutral or negative effects), significance (imperceptible, not significant, slight, moderate, significant, very significant or profound effects), extent, context, probability (likely, unlikely effects) and duration (momentary, brief, temporary, short term, medium term, long term, permanent or reversible effects) in line with the criteria set out in Table 3.4 'Description of Effects' of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, May 2022).

11.3 Receiving Environment

Site Location

The site is approximately 10.3 Ha and is predominantly a greenfield site having consistent agricultural use over the years. The site is comprised of a number of smaller field units with tree and hedge boundaries, and no existing structures present. The topography of the site varies with the site sloping from both north to southwest and north to southeast.

The proposed development is located on the northern side of R445 and the M7 (Kildare Bypass). The site is within the Kildare Council Development Plan (2023-2029) and included within the Kildare Local Area Plan (Current 2012-2018 and Draft 2023-2029).

The site is bounded by existing residential developments to the west and north, rural lands to the east, and the R445 and Kildare Chilling Company located to the south. The site is approximately 3km from Junction No.13 of the M7 motorway, and approximately 1.3km from Kildare train station.

The site location is shown in Error! Reference source not found. below.





Figure 11.1: Site Location Plan (Ref: <https://viewer.myplan.ie/>)

Land Use

The site is located in the Kildare County Development Plan 2023-2029 and Kildare Town has its own Local Area Plan (LAP). Progress on the Kildare Town LAP 2019-2025 is currently paused and it is noted that in the interim any planning decisions will be based on the 2012-2018 plan (correct as of May 2023).

The zoning of the proposed site is defined and illustrated in Map 8.1 of the *Kildare Town LAP 2012 - 2018 (Current)*. The land comprising the site boundary is zoned as:

- C: New Residential (C1 Phase 1 and C2 Phase 2)

Refer to Figure 11.2 for an extract of the map.



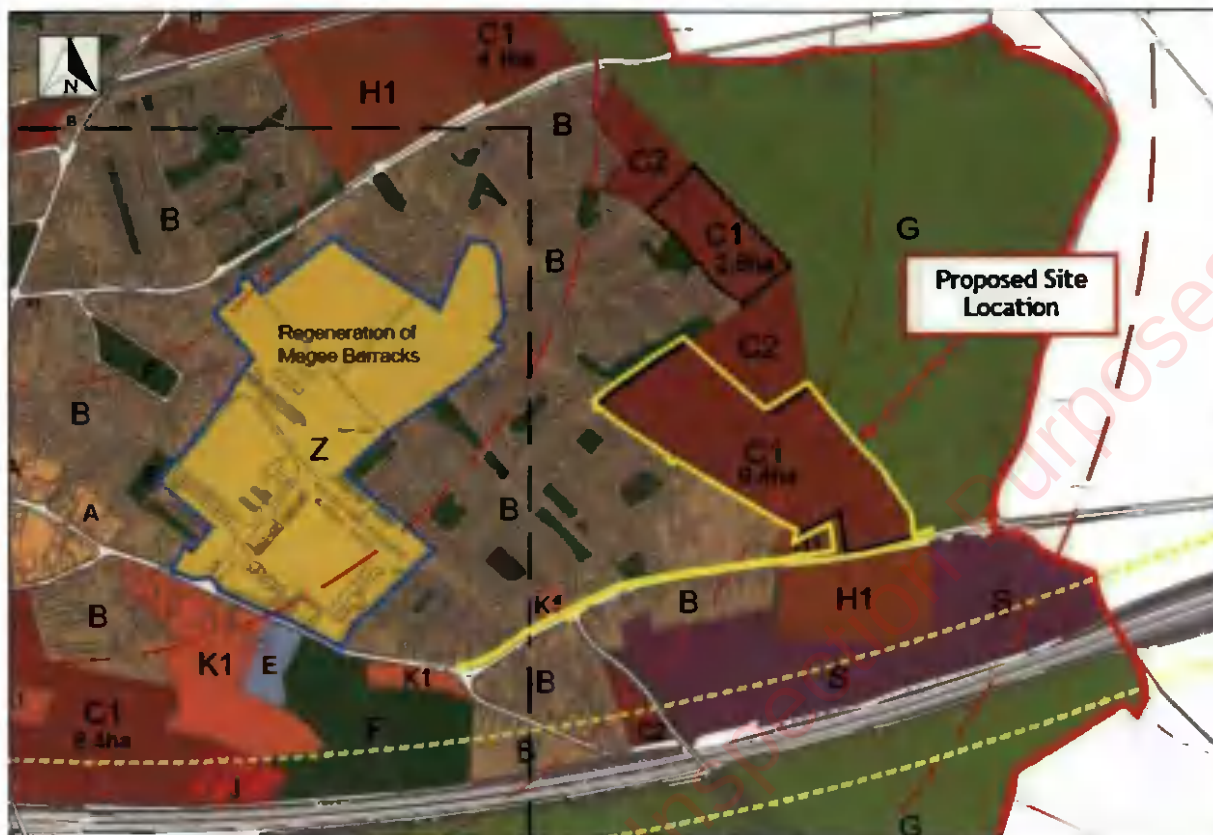


Figure 11.2: Kildare LAP 2012 – 2018 'Land Use Zoning' - Map 8.1

The zoning of the proposed site is defined and illustrated in Map 10.2a of the *Kildare Town LAP 2023 -2029 (Draft)*. The land comprising the site boundary is zoned as:

- C: Phase 2 New Residential
- F: Open Space and Amenity

Refer to Figure 11.3 for an extract of the map.



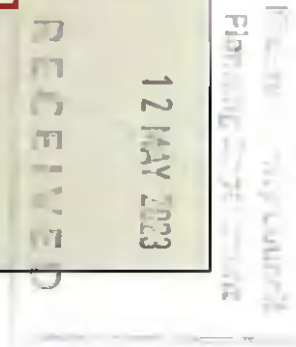


Figure 11.3: Kildare LAP 2023 – 2029 'Land Use Zoning Objectives' - Map 10.2a

Existing Road Network, Pedestrian and Cyclist Facilities

The site location in relation to the wider road network is detailed in Figure 11.4 below.





A brief description of the local road network and the major road junctions is provided below:

R445

The R445 is the link between Kildare Town to the west and the M7 motorway (Junction 12) and the Curragh Racecourse located to the east. The R445 is a single lane two-way carriageway with footpaths on both sides of the carriageway and no existing designated cycle lanes. Refer to Figure 11.5.

Note: The R445 is named 'Dublin Road' on Google Maps and/or 'N7' in other instances, however The Curragh Road is used on Ordinance Survey Maps. The R445 naming convention is carried throughout this chapter.



Figure 11.5: R445 (Looking East) © Google Maps

Ruanbeg Manor

Ruanbeg Manor is the access road to the Ruanbeg existing residential housing development. It is the link with the R445 and the Ruanbeg existing residential housing development (namely Ruanbeg Park, Ruanbeg Avenue, and Ruanbeg Lawns). Ruanbeg Manor is a single lane two-way carriageway with wide footpaths and grassed verges on both sides of the carriageway and no existing designated cycle lanes. Refer to Figure 11.6.



Figure 11.6: Ruanbeg Manor (Looking South) © Google Maps

Ruanbeg Avenue

Ruanbeg Avenue is the access road to the Ruanbeg residential housing development which incorporates Ruanbeg Park, Ruanbeg Avenue and Ruanbeg Lawns. It is the link with the R445 and the existing residential housing in Ruanbeg. Ruanbeg Avenue is a single lane two-way carriageway with a wide footpath and grassed verge on both sides of the carriageway and no existing designated cycle lanes. Refer to Figure 11.7.



Figure 11.7: Ruanbeg Avenue (Looking North) © Google Maps

Existing Public Transport Services - Bus

The following routes serve bus stops close to the proposed development site. See Figure 11.8 for an extract of Kildare's public transport network.

Go-Ahead Commuter (Stops no. 104031, 104021)

- Route 126: Rathangan – Mayor Street Lower
- Route 126E: Kildare – Merrion Square West
- Route 126U: Kildare – UCD

Kyanitedale Ltd (Stops no. 10031, 104021)

- Route 826: Kildare – Naas General Hospital

Bus routes are daily.



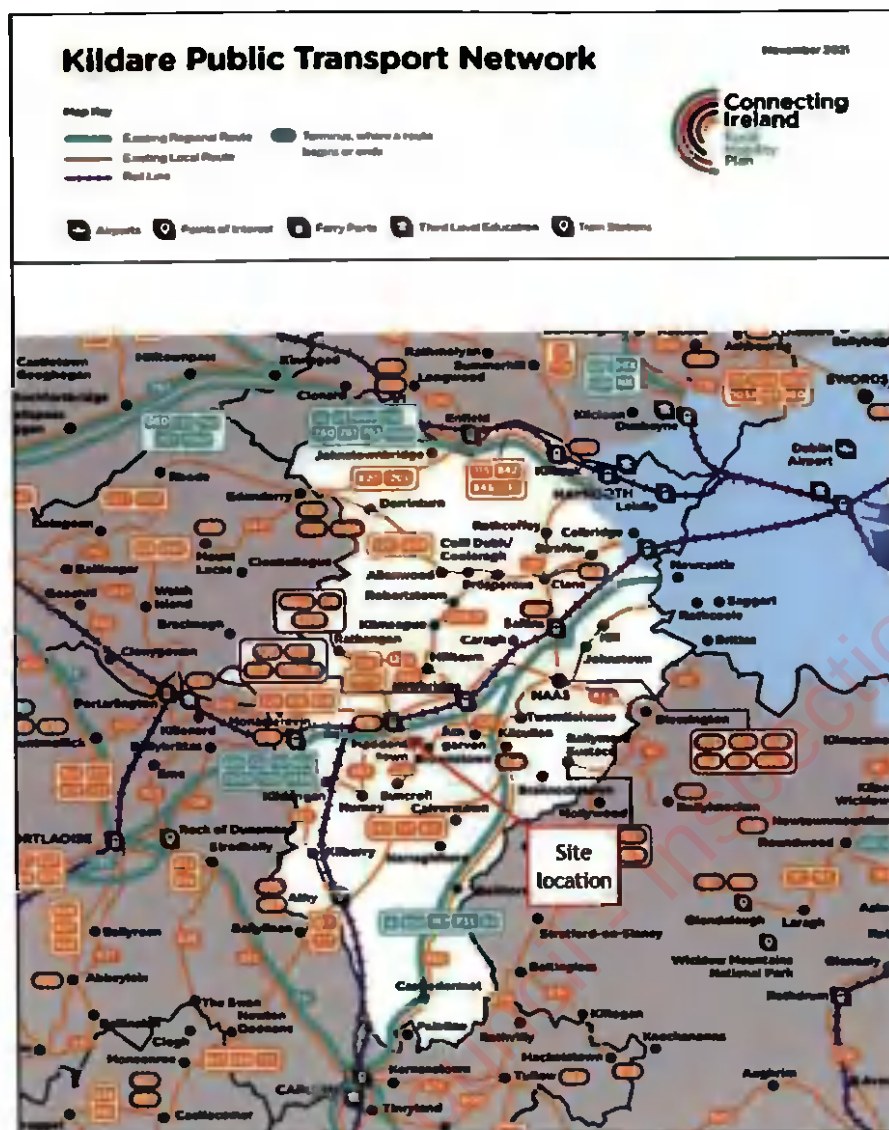


Figure 11.8: Kildare Public Transport Network (Ref: <https://www.nationaltransport.ie>)

The development is also served by TFI Local Link bus services as shown below in Figure 11.9.

Local Link (Stop no. 136421)

- Route 883: Athy to Newbridge

Bus routes are daily.





Figure 11.9: Local Link Transport Network (Ref: <https://www.transportforireland.ie>)

Existing Public Transport Services - Rail

Kildare Train Station is served by the following Iarnród Éireann services:

- Dublin Heuston - Cork (direct)
- Dublin Heuston - Cork (all intermediate stations)
- Dublin Heuston - Galway
- Dublin Heuston - Limerick and Ennis
- Dublin Heuston - Limerick via Nenagh
- Dublin Heuston - Tralee
- Dublin Heuston - Waterford
- Dublin Heuston - Westport and Ballina
- Galway - Limerick

- Grand Canal Dock and Dublin Heuston - Portlaoise

As shown in Figure 11.10 and Figure 11.11, the site is connected to the Dublin Area Train and Tram services via the Southwestern Commuter Line and to the Irish Rail network. The station is located approximately 2.3km from the entrance of the proposed development.

Train routes are daily.



Figure 11.10: Site Location Relative to Dublin Public Transport Network (Ref: <https://www.transportforireland.ie>)

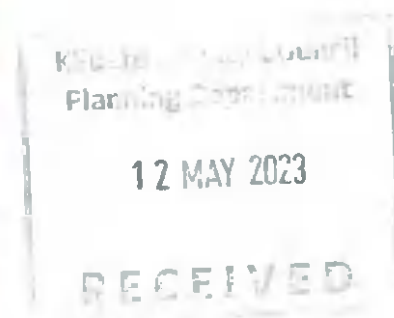


Figure 11.11: Site Location Relative to National Rail Network (Ref: <https://www.irishrail.ie>)

Error! Reference source not found. below describes the approximate distance and transport times from the proposed development site to various transport hubs and significant areas. Please note for bus journeys these times include walking, connections etc. Traffic conditions will vary, and the times may be different for car and bus times shown. All distances are taken as the distance by car. Walking and cycling distances may be shorter. The locations of the significant existing Transport Features are shown in Figure 11.12 below.

Table 11.1: Approximate Transport Times from the Proposed Development Site (© Google Maps)

Description	Distance	Time Taken (minutes)			
	(km)	Car	Bus	Cycle	Walking
Bus Stop ID: 10031	0.4	2	-	2	5

Bus Stop ID: 104031	0.6	2	-	3	7
Bus Stop ID: 104021	1.2	3	-	5	14
Bus Stop ID: 136421	1.8	4	-	8	23
HSE Kildare Primary Care Centre	1.2	3	-	5	14
Kildare Train Station	2.3	6	26	10	30
Round Towers GAA Club	2.3	6	-	9	28
M7 Motorway (Jct 13)	3.2	6	-	-	-

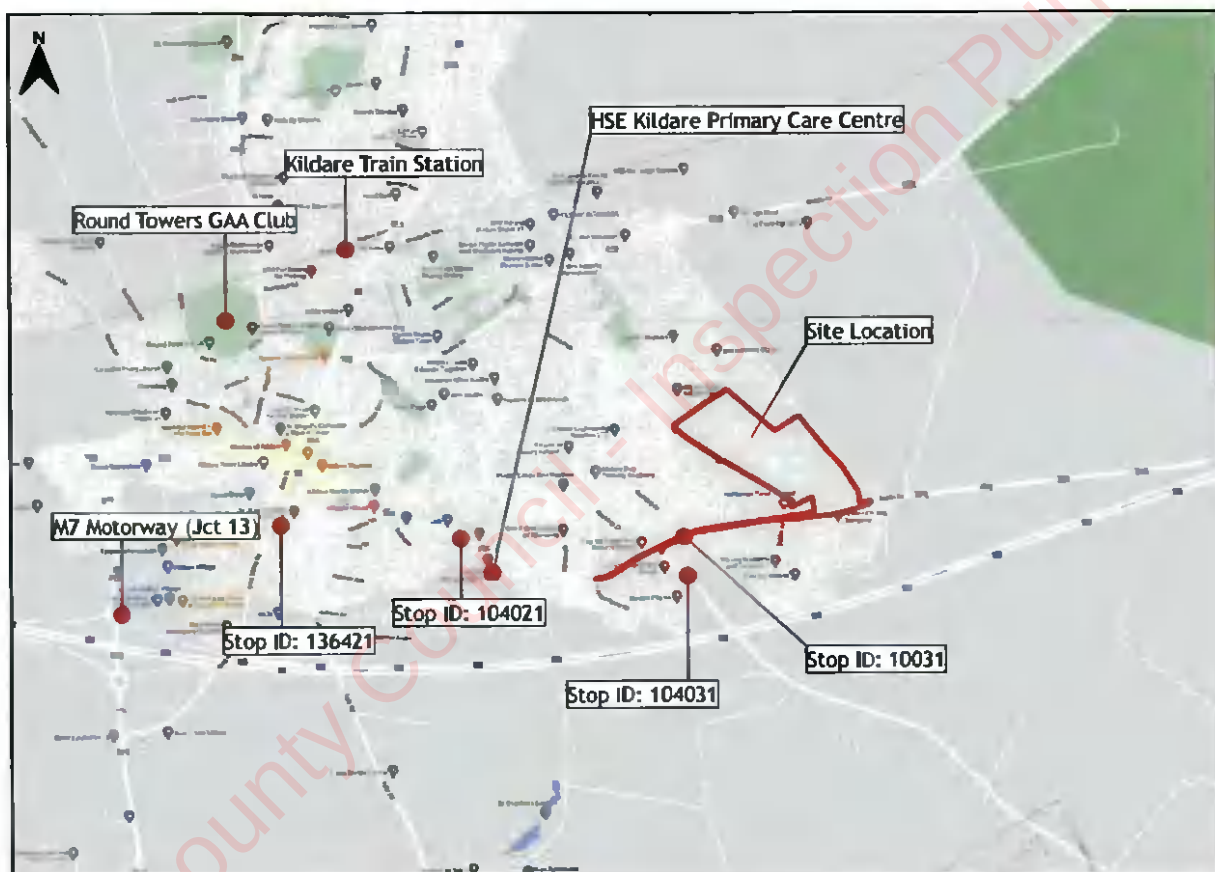


Figure 11.12: Significant existing Transport Features

Road Network Proposals

The Kildare County Council Development Plan 2023-2029 identifies a number of roads proposals and improvements to be carried out across the county in the short, medium and long term. It is noted that progress on The Kildare Town Local Area Plan (LAP) 2012-2018 (Current) plan does not identify any new road proposals in the vicinity of the site. See an extract of map 8.6 taken from the LAP in Figure 11.13 below.

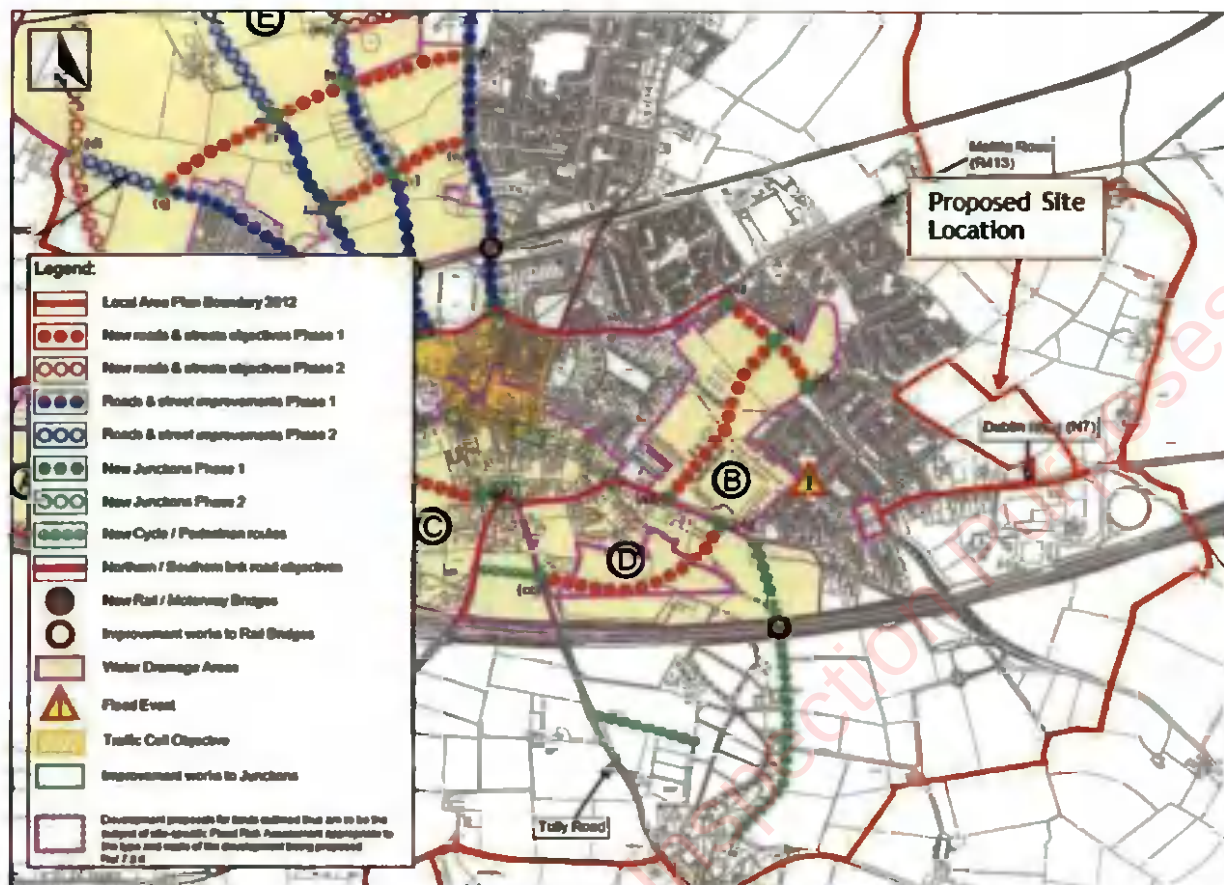


Figure 11.13: Kildare Town LAP – Excerpt from Map 8.6 (Ref: KCC LAP 2012-2018)

The Kildare Town LAP 2023-2029 (draft) outlines a variety of improvements to road, cycle and walking routes proposed west of the site. These are highlighted in Maps 7.1 and 7.2. Refer to Figure 11.14 and Figure 11.15 below.

General proposals and objectives as noted in the Development Plan are to reduce car dependency and increase the use of sustainable means of transport such as walking, cycling and the use of public transport.

The Kildare Town LAP 2023-2029 (draft) outlines a variety of road upgrades in Kildare Town as highlighted in Map 7.1, of which details are included in Figure 11.14. Road upgrades in the vicinity of the site include Former Magee Barracks Phase 1 & 2, located north-west of the site.

Further improvements to road, cycle and walking routes proposed west of the site are highlighted in Maps 7.2 and 7.3. These include public transport measures PT3 and PT4, as listed in Table 7.3 of the Kildare Town LAP 2023-2029. Refer to Figure 11.14 and Figure 11.15.

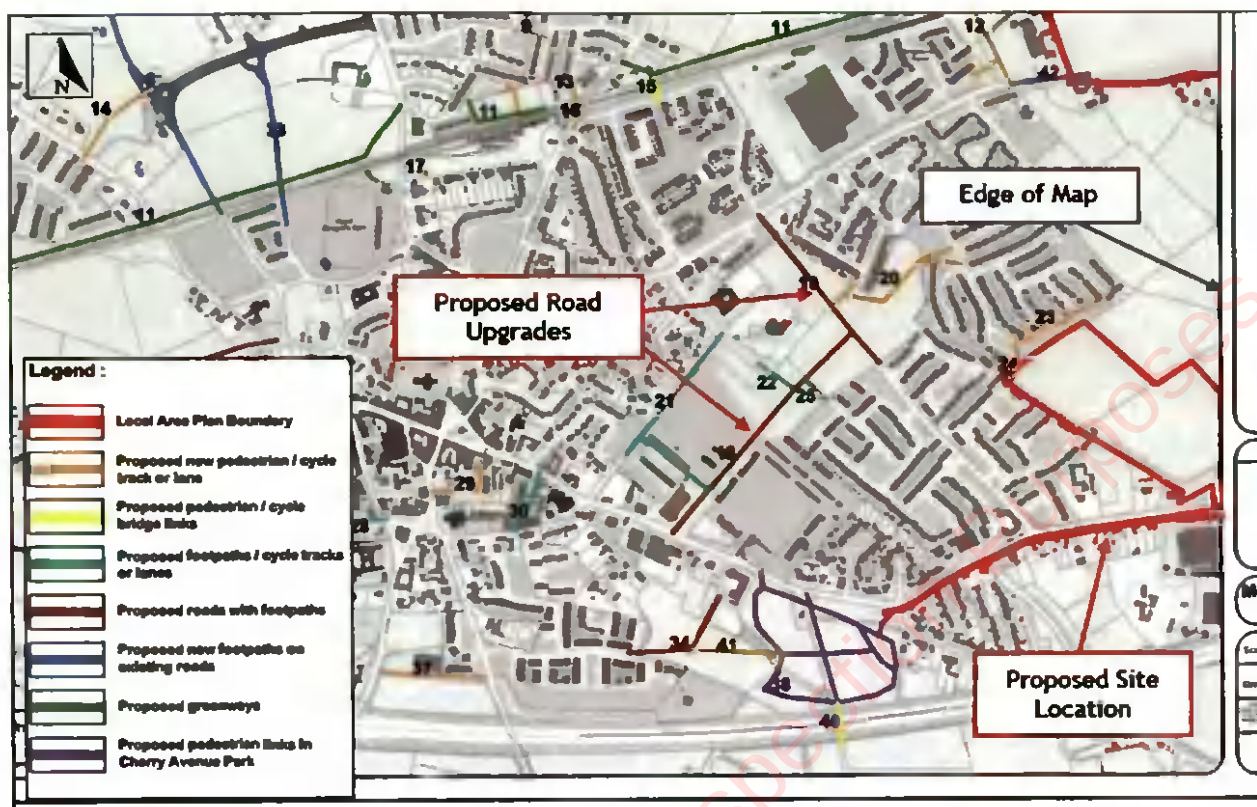


Figure 11.14: Kildare LAP 'Movement and Transportation: Permeability Measures' – Map 7.1



Figure 11.15: Kildare LAP 'Movement and Transportation: Cycling Measures' – Map 7.2

Proposed Pedestrian Facilities

The proposed development is to be provided with a footpath network within the development, as well as a new footpath along the frontage of the development.

The pedestrian footpath network provides routes to/from surrounding public transport network, including nearby bus stops located along the R445.

As part of the proposed development works, the access point on R445 will be upgraded. The works will include the upgrading of a section of the R445 along the southern border of the site to include a designated cycleway/footpath on either side of the road. A pedestrian crossing is also included as part of the upgrade.

It is proposed that vehicular traffic will access the proposed development at 2 no. locations: a primary entrance on the R445 located to the south of the site, and a secondary entrance via Ruanbeg existing residential development to the northwest of the site which is accessed from Ruanbeg Manor via the R445 also. Pedestrian and cycle access will also use these access locations. There will be a further access point from the Ruanbeg existing residential development for cycle and pedestrian access only. Refer to the architects site plan for further information.

The proposed development is to be provided with a footpath network within the development, as well as a new footpath along the frontage of the development. A signalised Puffin crossing is proposed to the east of the vehicular entrance (towards the Kildare town side) on the R445. Refer to the Traffic and Transport Assessment report which accompanies this submission for further information.

Pedestrian connectivity to Coolaghknock Gardens and Coolaghknock Drive is provided as part of the architectural site plan. Refer to architectural and landscape architect's drawings for details of the proposed connections, as well as PUNCH Road Marking drawings accompanying this submission.

The development is located approx. 0.4km (5-minute walk) from bus stops on the R445 with a key bus route serving the stop: 826. The site is located approx. 0.6 km (7-minute walk) from bus stops on the L3006 with key bus routes serving the stop: 126, 126E, and 126U. It is also located approx. 1.2km (14-minute walk) from another bus stop on the R445 with key bus routes serving the stop: 126, and 826. The development is also approximately approx. 1.8km (23-minute walk) from another bus stop on Bride Street with a key bus route serving the stop: 883.

The site is in close proximity to multiple schools at various education levels. These will be within walking distances for parents and their children. St. Brigid's Primary School is located in very close proximity to the site, as is Kildare Village Little Stars playschool. See Figure 11.16 for locations of local educational facilities.

The development is also located in the vicinity of employment areas. The site is 0.9 km from Kildare Chilling Company, 1.2 km from the HSE Kildare Primary Care Centre, 2.4 km from Tesco Superstore, and 3.0 km from DPD Ireland Kildare Depot. See Figure 11.17 for locations of key employment areas.

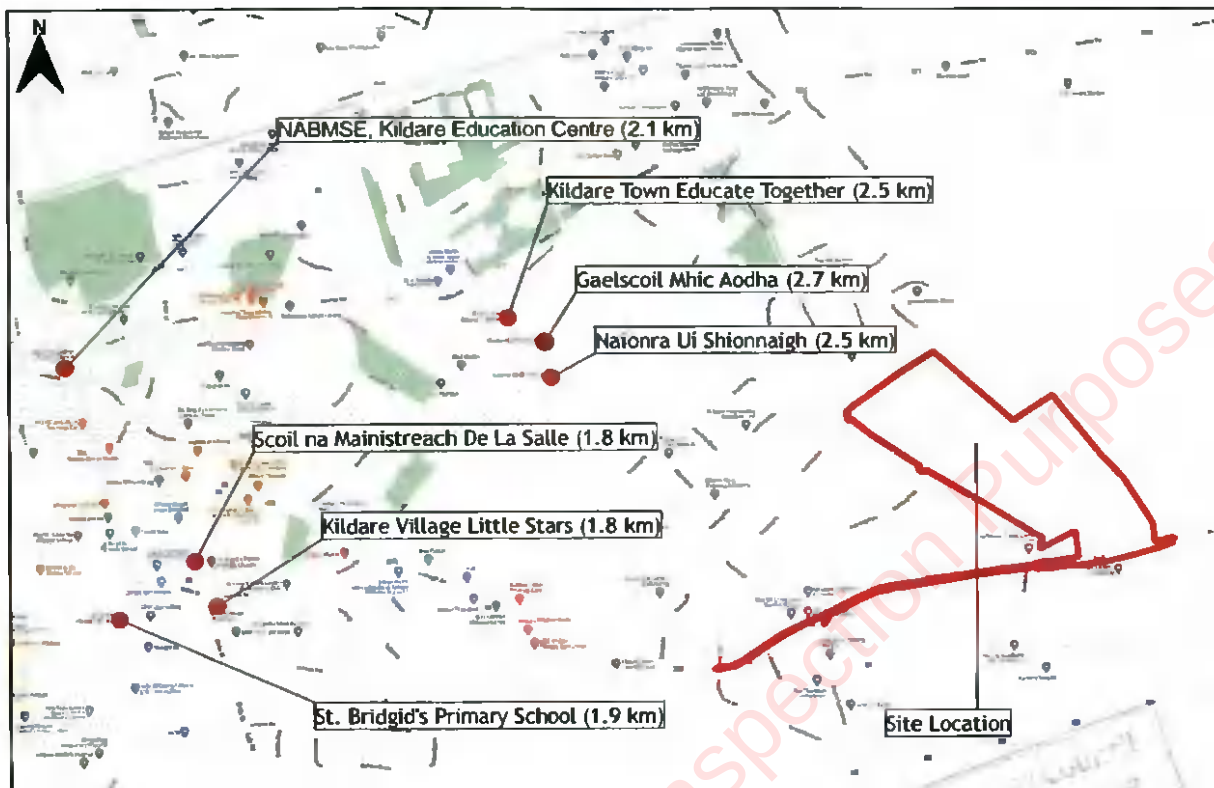


Figure 11.16: Site location in relation to local schools with approximate distances.

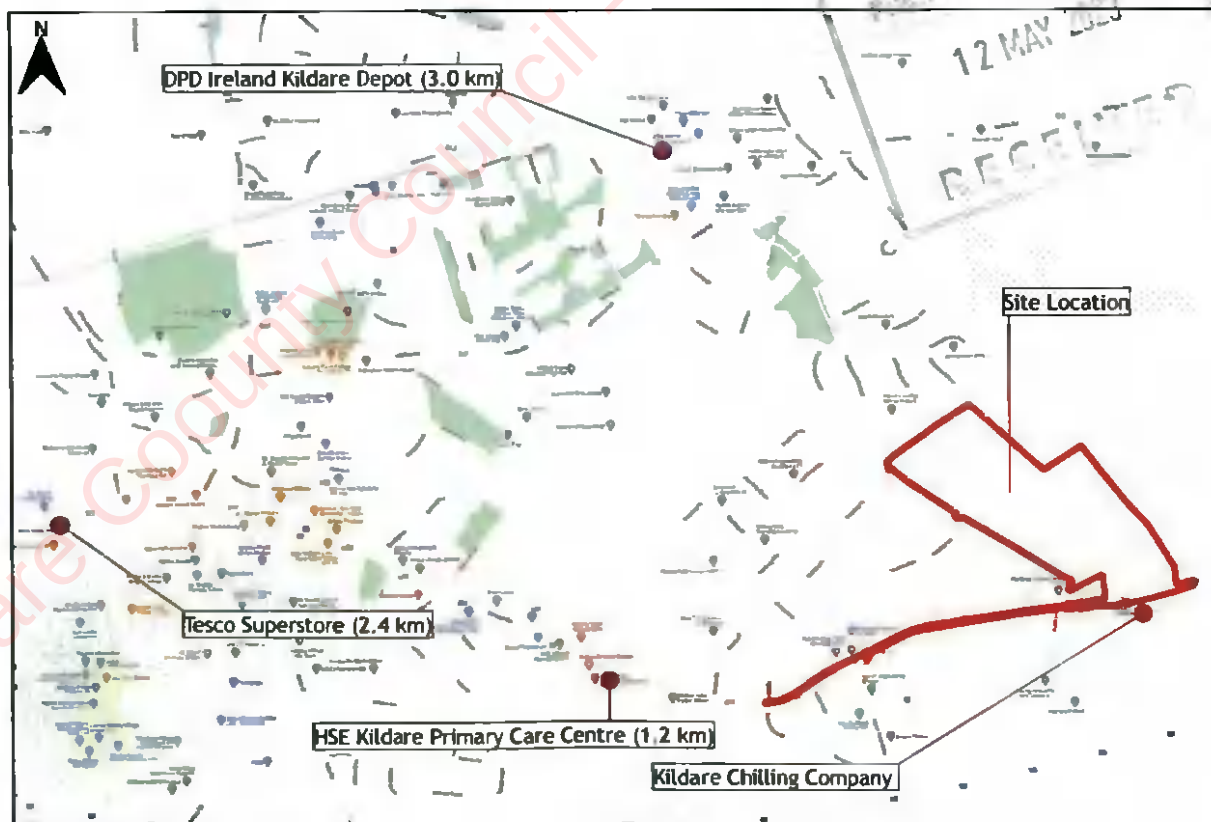


Figure 11.17: Site location in relation to key employment areas with approximate distances.

Proposed Cycle Infrastructure

While there are no existing cycle lanes on the R445 or on Ruanbeg Park, there are proposals from the National Transport Authority (NTA) for a cycle network linking Newbridge to Kildare. An extract from the proposed network is shown in Figure 11.18.

As can be seen there are no proposed cycle routes directly passing the site. However designated cycleways are proposed in the near vicinity, both to the north and south of the site as shown in Figure 11.18, which will provide additional cyclist connectivity for the proposed development.

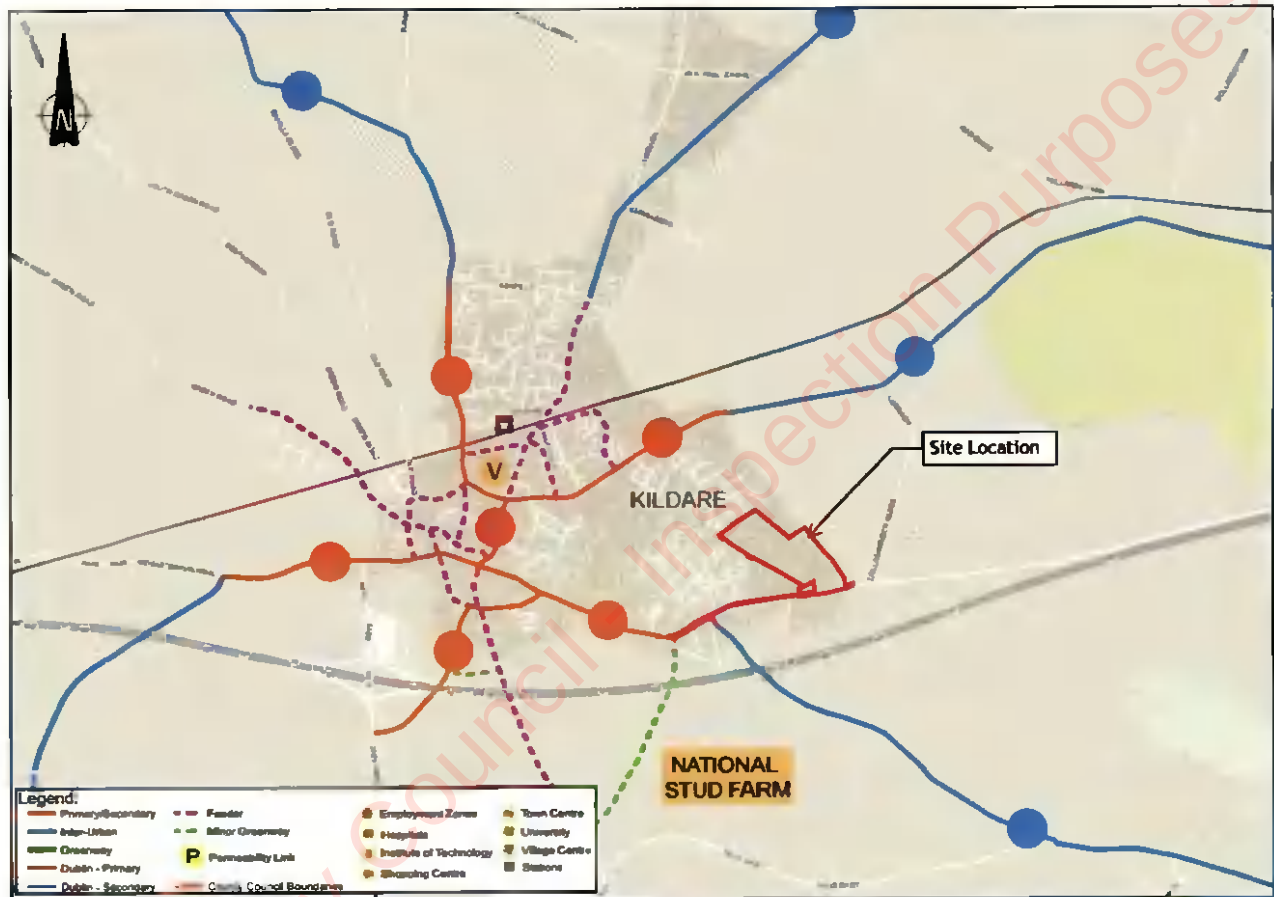


Figure 11.18: Proposed cycle routes as part of the Greater Dublin Area Cycle Network Plan
(Ref: <https://www.nationaltransport.ie>)

The Kildare Town Local Area Plan (LAP) 2023-2029 (Draft) outlines a variety of improvements to road, cycle and walking routes proposed west of the site. These are highlighted in Maps 7.1 and 7.2. Refer to Figure 11.19 and Figure 11.20 below.

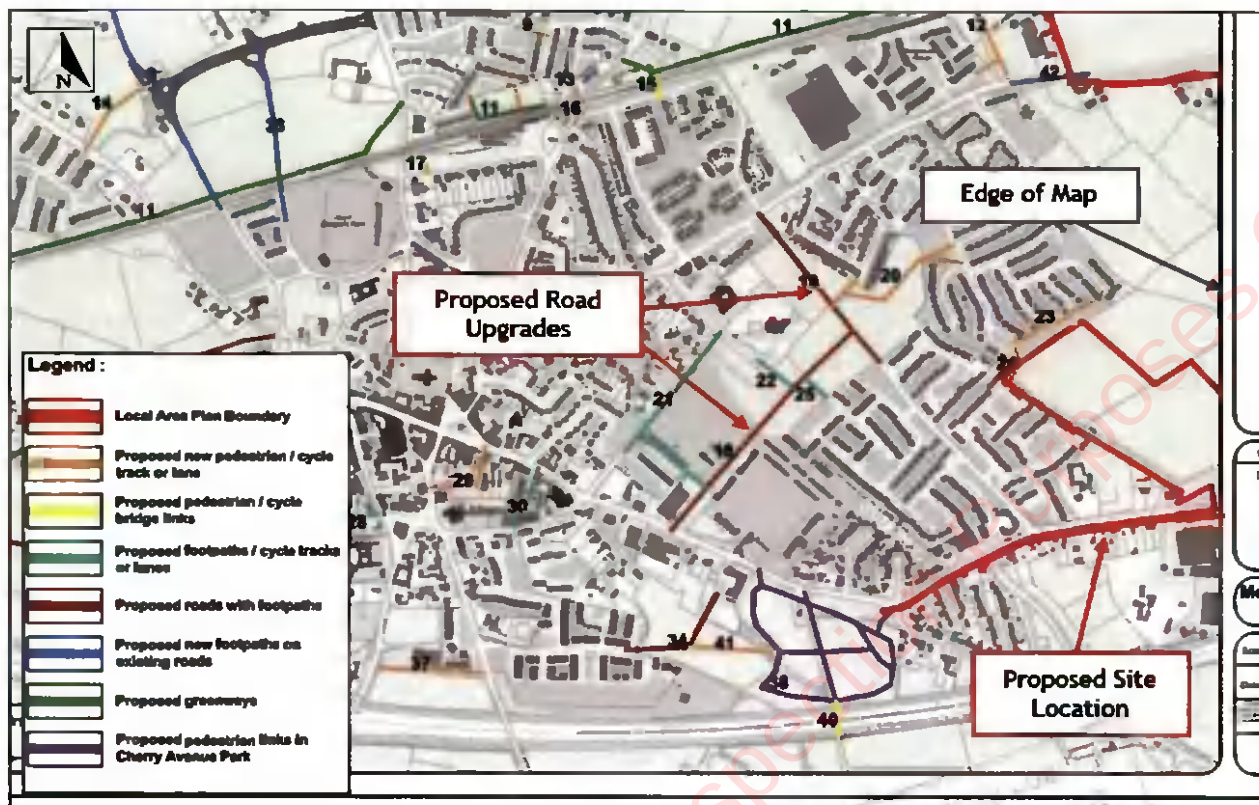


Figure 11.19: Kildare LAP 'Movement and Transportation: Permeability Measures' - Map 7.1



Figure 11.20: Kildare LAP 'Movement and Transportation: Cycling Measures' - Map 7.2

Cycle parking serving the proposed Ruanbeg development is provided in accordance the Kildare Development Plan 2023-2029 'Table 15.4'.

11.4 Characteristics of the Proposed Development

Development schedule

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

Site Access Arrangements

It is proposed that vehicular traffic will access the proposed development at 2 no. locations: a primary entrance on R445 located to the south of the site, and a secondary entrance via Ruanbeg existing residential development to the northwest of the site which is accessed from Ruanbeg Manor via R445 also. Additional pedestrian access will be provided via Ruanbeg Park.

Refer to the architects site plan for further information, and to Figure 11.21 below.

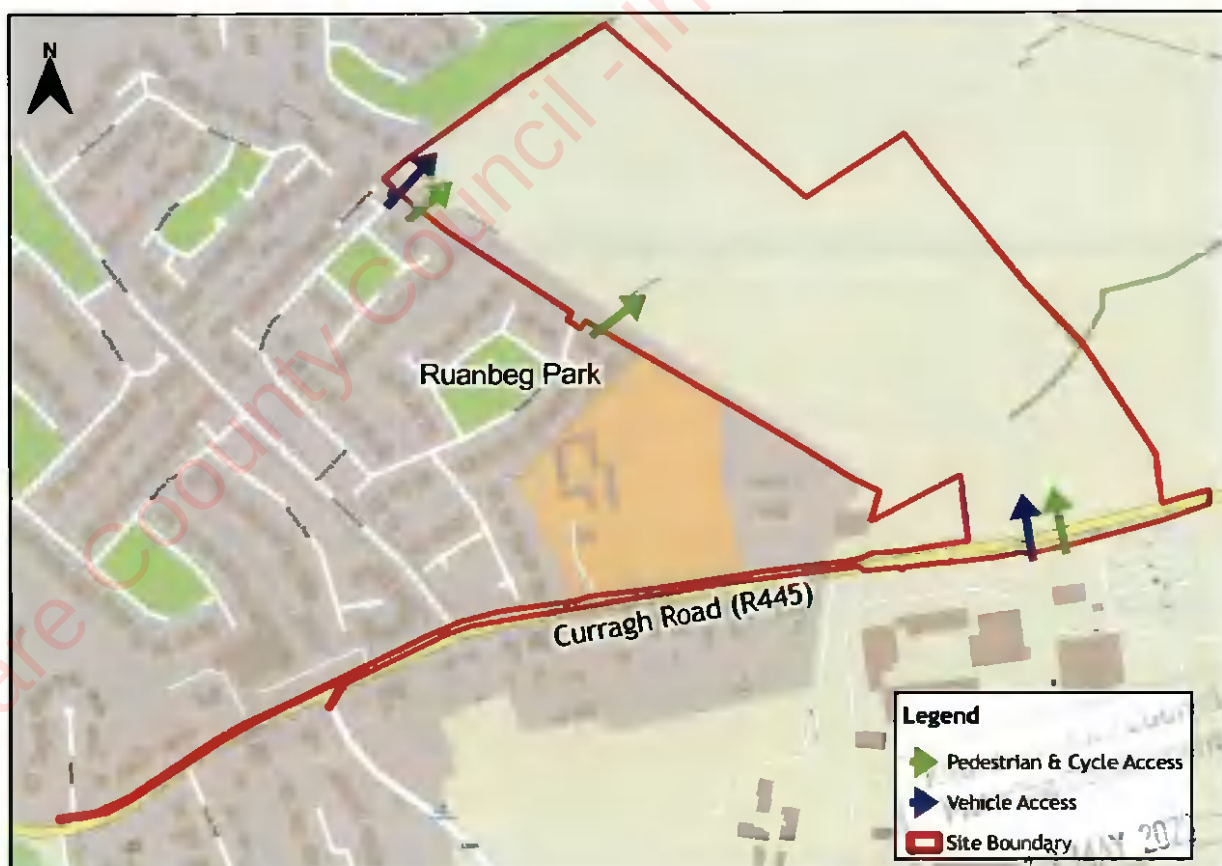


Figure 11.21: Proposed Site Access Locations

Proposed Internal Pedestrian and Cycle Network

The roads layout together with pedestrian and cycle facilities for the site have been developed considering the design principles set out in the Design Manual for Roads and Streets (2019). The hierarchy of the streets on the site are all local in nature which reflects the end destination typology of the site. The design speed for the site is 30 kph, and appropriate speed restriction signs and traffic calming will be set out through the site, and including:

- On site kerb radii at proposed junctions and bends reduced.
- Vertical and horizontal deflections e.g. raised tables and chicanes.
- Roads narrowed – 5.5m wide on minor roads and 6m on main spine road through development.
- 30 km/hr signage will be provided
- Road markings will be provided
- Informal pedestrian crossings will be provided at junctions to improve access for pedestrians
- Minor streets have been designated as 'Home zones' to provide a shared surface for vehicles and pedestrians

Road gradients are to be kept shallow to facilitate ease of pedestrian access through the site.

Road marking and signage will be provided in accordance with the current version of the Traffic Signs Manual.

Public Transport Proposals

There are no internal public transport proposals for the site, however the site is located close to a number of existing public transport services, as described previously in this section.

Car Parking

Car parking serving the subject development is provided at designated areas at ground level and is distributed throughout the development.

The proposed development encourages a positive modal shift at the development towards alternative sustainable modes of transport. It is an objective of this plan to limit the level of parking available on site wherever possible in order to minimise and discourage dependency on private car travel. This will also continue to take into consideration the necessary demand to prevent overspill parking issues in nearby locations. The provision of cycle parking and the availability of public transportation will serve to mitigate the requirements for residential parking. However, it is also necessary to acknowledge the location of the site and the current availability of public transport in the vicinity of the development.

Many locations in Kildare Town are within short cycling distances but may not be within comfortable walking distances for all. Furthermore, public transport is limited within Kildare Town and thus to allow residents commute easily within the town there is a need for the use of a private cars. Thus, it is seen as necessary to consider car usage for this development.

Car parking serving the development are provided in accordance with the Kildare County Council Development Plan 2023-2029 'Table 15.8'. The applicable car parking standards are noted in Table 11.2:

Table 11.2: Car Parking Requirements

Development type	Requirement
Houses	1 space each for units up to and including 3 bed units and 1 space + 0.5 visitor spaces for units of 4 units or greater
Apartments	1.5 spaces per unit + 1 visitor space per 4 apartments
Creche	0.5 per staff member plus 1 per 4 children

The parking requirements set out in the Kildare County Development Plan 2023-2029, section 15.7.8 are 'maximum' standards.

Refer to Table 11.3 which indicates the parking provisions for the proposed development site.

Disabled parking will be provided in accordance with Building Regulations and the Kildare County Development Plan.

The Kildare County Development Plan has no requirement for designated motorcycle user parking spaces.

Electric Vehicle Charging Points (EVCP) facilities are to be provided in accordance with the Kildare County Development Plan.

The 'standard' parking spaces will be demarcated with white lines. All car parking spaces will be 2.5m by 5.0m.

Table 11.3: Development parking provision.

Development type	Quantity	Parking spaces provided	Comment	Reference
Houses	206 dwellings	402	2 parking spaces provided for 3-4 bedroom houses 1 parking space provided for 2 bedroom houses	A
Age Friendly Units	15 dwellings	15	1 parking space per unit	B
Duplex Blocks	74 dwellings	125	1.5 parking space per unit plus 1 parking space per 5 units	C
Creche	78 children and 19 staff members	29	1 parking space per 4 children and 0.5 parking space per staff member	D
EV Parking Spaces	-	57	10% of total quantity provided	E
Accessible Parking	-	10	5% of total quantity provided	F
Total		571	Total of A + B + C + D. EV parking and accessible parking included within total	

Creche and Age Friendly accommodation parking

Both creche and age friendly accommodation is provided with Parking EV & Cycle spaces in close proximity.

A drop off point the length of 3 no. spaces has been provided at the creche entrance. There is space for a minibus to service both the age-friendly housing and the creche, since these will operate at varying times of the day. The minibus will operate on a managed basis, ensuring there would be no cars parked at the time of bus operation.

The creche has shower facilities and lockers for staff to promote use of cycle travel to and from the site to reduce reliance on the car.

Secure cycle storage is provided including both covered and Sheffield stands throughout the development including adjacent to the creche.

Allowance for EV parking is provided via a zone at the back of the parking adjacent to the creche to allow for a duct to run to charge EV when required.

Increased Parking for Houses

The Kildare Council Development Plan 2023-2029 identifies that there is a preferred maximum permitted car parking spaces below 2 no. parking spaces per house. However, Kildare County Council have discretion to permit parking outside this standard in certain circumstances. For the reasons outlined below it is considered 2 no. car parking spaces per house is more appropriate:

- The residential nature of the development as remote from high intensity transport infrastructure
- The provision of increased parking will mitigate the possibility of parked cars affecting waste collection truck movements. This applies both at the kerblines directly in front of the house as well as at turning areas in dead end streets.

Cycle Parking

Cycling is to be significantly encouraged as part of the development. Cycle parking is provided in accordance with the Kildare Development Plan 2023-2029 'Table 15.4'. The applicable cycle parking standards are noted in Table 11.4 below:

Table 11.4: Cycle parking space requirements

Development Type	Requirement
Houses	No Requirement
Apartment	1 space per bedroom + 1 visitor space per 2 apartments
Creche	1 space per 5 staff + 1 space per 10 children

Cycle parking for the proposed development is to be provided as summarised below:

- Residential cycle parking for houses is to be provided in private rear gardens

- Residential (resident and visitor) cycle parking for duplexes is to be provided in secure cycle storage areas
- The creche has shower facilities and lockers for staff to promote use of cycle travel to and from the site to reduce reliance on the car.
- Secure cycle storage is provided including both covered and Sheffield stands throughout the development including adjacent to the creche.
- Visitor cycle parking for creche to be provided in open areas maximised for convenience near the entrance of the proposed building clearly visible from the building entrance. This is done to enable drop offs to the creche.
- Both creche and age friendly accommodation is provided with Cycle spaces in close proximity.
- Sheltered/ secure storage parking area for day-time storage of children's bicycles/ scooters.
- Storage area for pushchairs to enable onward journey by foot.

The parking requirements set out in the Kildare County Development Plan 2023-2029, section 15.7.2 are 'minimum' standards.

Refer to Table 11.5 for the proposed cycle parking provision.

Table 11.5: Development cycle parking provision.

Development type	Bicycle Parking Provision	Parking spaces provided
Duplex Blocks	1 per bedroom	186
Creche	1 per 5 staff 1 per 10 children	12
Duplex Blocks (Visitors)	1 per 2 units	38
Total		236

11.5 Potential Impacts

Construction Phase

Construction traffic will generally be generated on weekdays (07:00-19:00, subject to conditions of a planning permission) and will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full time supervisor staff.
- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 16:00. It should be noted that a large proportion of construction workers are anticipated to arrive in shared transport. Temporary car parking facilities for the construction workforce will be provided within the site. These car parking spaces will be located adjacent to the site compound.

The impact to public transport is likely to be not significant for the following reasons:

- On-site employees are likely to travel by car.

- works.
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With the objective of quantifying the existing traffic characteristics along the surrounding road network, classified turning count traffic surveys of the existing 1) R445/Kildare Chilling Company Junction (east of the new Proposed Development junction), and 2) R445 and Ruanbeg Manor Junction, were completed by IDASO Ltd on the following dates:

- The locations of the surveyed Junctions and the Proposed Development Junction are shown in Figure 11.22 below.

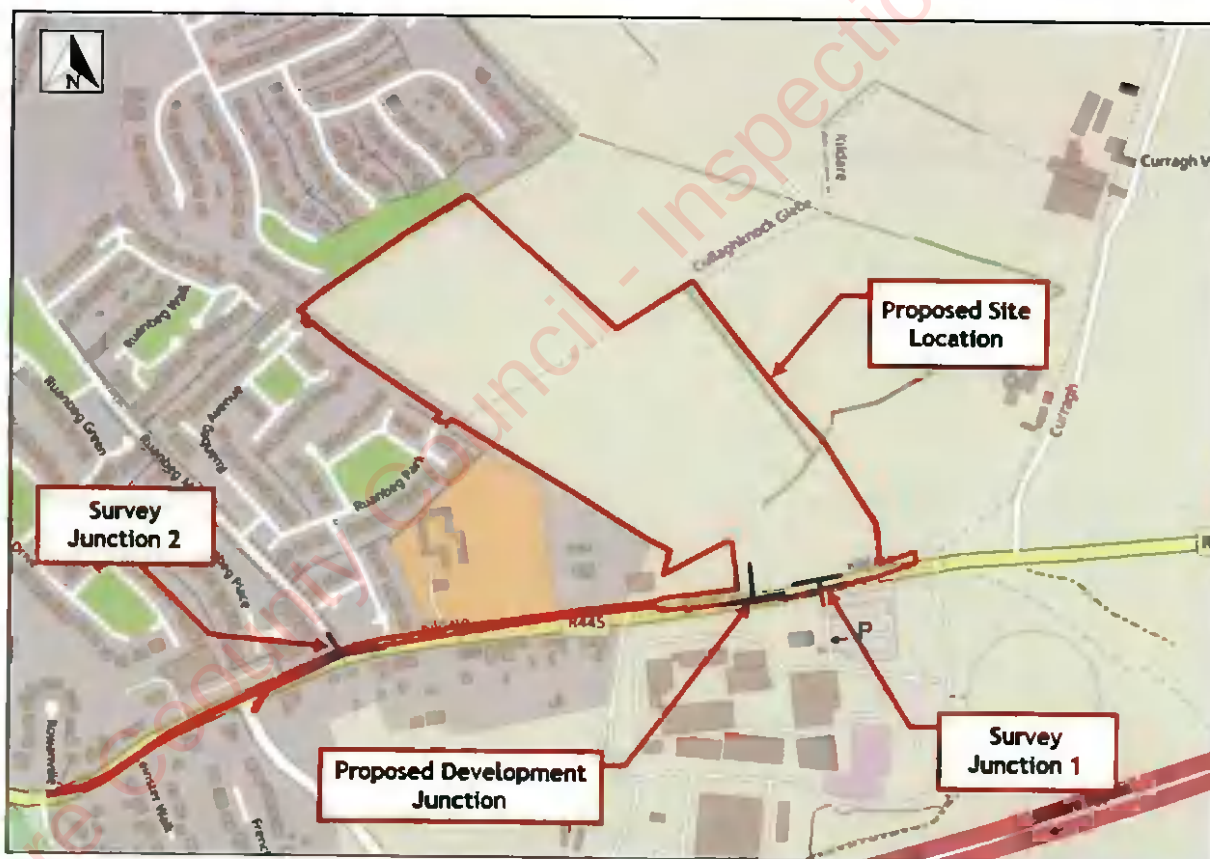


Figure 11.22: Location of Surveyed Junction and Proposed Development Junction.

The purpose of this section is to determine the overall number of trips that will be generated by the proposed development. The proposed development consists of 295 no. residential units (206 no. houses, 74 no. duplex units, 15 no. age-friendly units), and a creche (GFA 472.7 m²).

In order to estimate the likely volumes of traffic that will be generated by the proposed development, trip rates recommended by TRICS (Trip Rate Information Computer System) were extracted from the database and applied pro-rata to the number of relevant residential units and creche within the development.

For residential housing TRICS trip rate values were obtained for 'mixed private houses' as well as 'age friendly accommodation' (referred to as 'sheltered accommodation' by TRICS). The predicted peak hour traffic generation using these rates are shown in Figure 11.6 below.

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Table 11.6: Proposed Development Predicted Peak Hour Trip Generation - Using PUNCH calculated TRICS Rates

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			08:00-09:00		17:00-18:00		08:00-09:00		17:00-18:00	
	GFA (m ² /100)	No. Units	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Creche	4.727		3.682	2.879	2.398	3.129	17	14	11	15
Residential (Mixed)*		206+74=280	0.135	0.291	0.236	0.136	38	81	66	38
Residential (Age Friendly)		15	0.19	0.235	0.163	0.229	3	4	2	3
Total							58	99	80	56

*Note 'Mixed' Trip Rates include both 'houses' (206 no. units) and 'duplex' (74 no. units)

In addition to the TRICS predicted trip rates, trip rates were also calculated from the existing Ruanbeg Manor Junction traffic flow survey.

As the Ruanbeg Manor Junction only serves residential estates, the peak AM and PM arrivals and departures from the Ruanbeg Manor Junction were divided by the number of residential units accessed off Ruanbeg Manor (409 no. units) to calculate equivalent trip rates for residential units in the local area at peak hours. These trip rates were applied pro-rata to the number of relevant residential units within the development as shown in Table 11.7 below.

Table 11.7: Proposed Development Predicted Peak Hour Trip Generation - Trip Rates Based off Ruanbeg Manor Junction Traffic Survey

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			08:00-09:00		17:00-18:00		08:00-09:00		17:00-18:00	
	GFA (m ² /100)	No. Units	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart

Creche*	4.727		6.629	5.181	5.211	5.861	31	24	25	28
Residential		295	0.204	0.414	0.498	0.283	60	122	147	84
Total							91	147	172	111

*Note Creche Trip Rates above based of Magee Barracks Development TRICS rates

The trip rates in Table 11.7 are the most site specific and appropriate for the location and they also result in the highest predicted trip generation for the proposed development. In order to adopt a conservative approach these figures were used in the junction analysis.

Traffic Growth

In the absence of any specific local traffic growth information, it was assumed that baseline traffic will continue to grow at the levels recommended by the TII in the Project Appraisal Guidelines (PAG) – Unit 5.3 - Travel Demand Projections publication by the TII (October 2021). The Project Appraisal Guidelines describe three levels of transport model functionality. The static model, which reflects traffic volumes on the basis of link flows, is best suited to the proposed development. Such models do not attempt any route assignment, and hence are applicable for networks where no change in traffic flows will result from a proposed scheme. Figures from Table 6.1 'Link-Based Growth Rates' for the Kildare County area with Central Growth Rates were used for this assessment.

The year of opening of the scheme was assumed to be 2026. A 15-year analysis period for the scheme would give a design year of 2040. The central growth factors from the Project Appraisal Guidelines – Unit 5.3 publication are appropriate and are detailed below:

- TII Link Based Growth Rates: Annual Growth Factor for 2016-2030 = 1.0197(LVs) and 1.0378(HVs);
- TII Link Based Growth Rates: Annual Growth Factor for 2030-2040 = 1.0062(LVs) and 1.0155(HVs);
- TII Link Based Growth Rates: Annual Growth Factor for 2040-2050 = 1.0053(LVs) and 1.0187(HVs).

With regards to the volume of traffic using the road, generally the passenger car is adopted as the standard unit and other vehicles are assessed in terms of PCU's. Cars and Light Goods Vehicles are grouped together as Light Vehicles (LV). All other Goods Vehicles, Buses and Coaches are defined as Heavy Vehicles (HV).

Estimated future baseline traffic flows on the road network in the vicinity of the proposed development were calculated by applying these factors to the 2022 surveyed flows.

Assessment Scenarios

Capacity analysis was carried out for the junctions listed below:

1. Proposed Development Junction on the R445 (priority junction).

2. Existing Ruanbeg Manor on R445 (priority junction).

The following development scenarios were analysed with and without development for all junctions:

1. Survey year: 2022
2. Opening year: 2026
3. Design year: opening year + 5 years: 2031
4. Design year: opening year + 15 years: 2041

The traffic modelling in all scenarios takes account of predicted traffic from the granted projects described previously. Additionally, the junctions have been analysed with consideration given to the proposed future development to the north of the site. It is noted that this is separate from the proposal in question and has not been granted planning permission at the time of writing.

Network Impact

Junctions 9 software was used for priority junction analysis.

Junctions 9 Analysis Note: The ratio of flow to capacity (RFC) is an indicator of the likely performance of a junction under design year loading. Due to site to site variation, there may be a standard error of prediction of the entry capacity by the formulae of + or - 15% for any site. Thus, queuing should not occur in the various turning movements in the chosen design year peak hour in 5 out of 6 peak hour periods or sites if a maximum RFC of about 85% is used. Once the RFC is at 1.0 the Junctions 9 modelling software produces results regarding queues and delays that is unrepresentative of the actual or likely effects.

The results show the Proposed Development Junction and the existing Ruanbeg Manor Junction have capacity to cater for the existing traffic growth as well as the full local area development traffic currently predicted.

The worst-case scenario is presented in the results above by adding the development traffic to the existing peak hour traffic selected from the traffic count survey.

Table 11.8: Summary Results of Junction Analysis

Junction	2041 Without Development RFC	2041 With Development RFC	2041 With Future Development RFC
Proposed Development Priority Junction (With 100% Development Traffic)	n/a	0.48	0.61
Existing Ruanbeg Manor/R445 Priority Junction (With 50% Development Traffic)	0.57	0.82	0.84

From the above modelling results in Table 11.8, it is concluded that the surrounding road network and adjacent existing junctions/roundabouts will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.

11.6 Potential Cumulative Impacts

This assessment has considered the cumulative impacts that are likely, considered significant and which is reasonably foreseeable together with the impacts from the subject development proposals. The analysis detailed represents a worst-case appraisal in terms of potential cumulative impacts for a typical weekday as it considers;

- the key two busiest periods of the day (e.g., AM and PM peak hours) in each of the adopted design years. During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods. Assessing future design years utilising TII growth rates as per best practice ensures that any additional demands upon the transport networks are fully considered.
- the additional site-specific demands associated with the committed development proposals and the proposed future development to the north of the site.

Committed Developments Trip Generation

Adjacent planning consents/applications granted/submitted in the area have been reviewed. In assessing the traffic impacts of the subject development, the developments shown in Table 11.9 below were considered based on the current data available.

Table 11.9: Other Projects in the Area (Ref: KCC Online Planning Enquiry System)

Planning Reference	Status	Description
ABP-305007-19	Granted Permission	Proposed development at the Former Magee Barracks, Hospital Street, Kildare, Co. Kildare which will consist of the demolition of 17 no. existing buildings (with a GFA of 16,320sqm), and the construction of a development comprising of 375 no. residential units, a neighbourhood centre comprising of 3 no. single-storey retail units, a cafe, a two-storey childcare facility, and associated play area, all internal roads, car parking, pedestrian and cycle paths, public open space, and all associated site and infrastructural works on an application site of c.11.35ha.
18273	Granted Permission	Demolition of existing structures including the gatehouse and an ancillary building. The construction of a single storey, licensed, discount foodstore with a gross internal area of 2,192sqm incorporating an off-licence area, including car parking and cycle parking.
18149	Granted Permission	The demolition of 6 No. existing buildings (with a GFA of c. 2,180sqm) and the removal of hard surfacing on the subject site, and the construction of a part 1, part 2 and part 3 No. storey Health Care

Planning Reference	Status	Description
		Facility for a Cancer Treatment Clinic (Proton Therapy) with a GFA of c. 3,555sqm, including a terrace and plant areas at roof level, on a site area of approximately 2.5 hectares. The associated site and infrastructural works, 80 no. surface car parking spaces, and cycle parking.

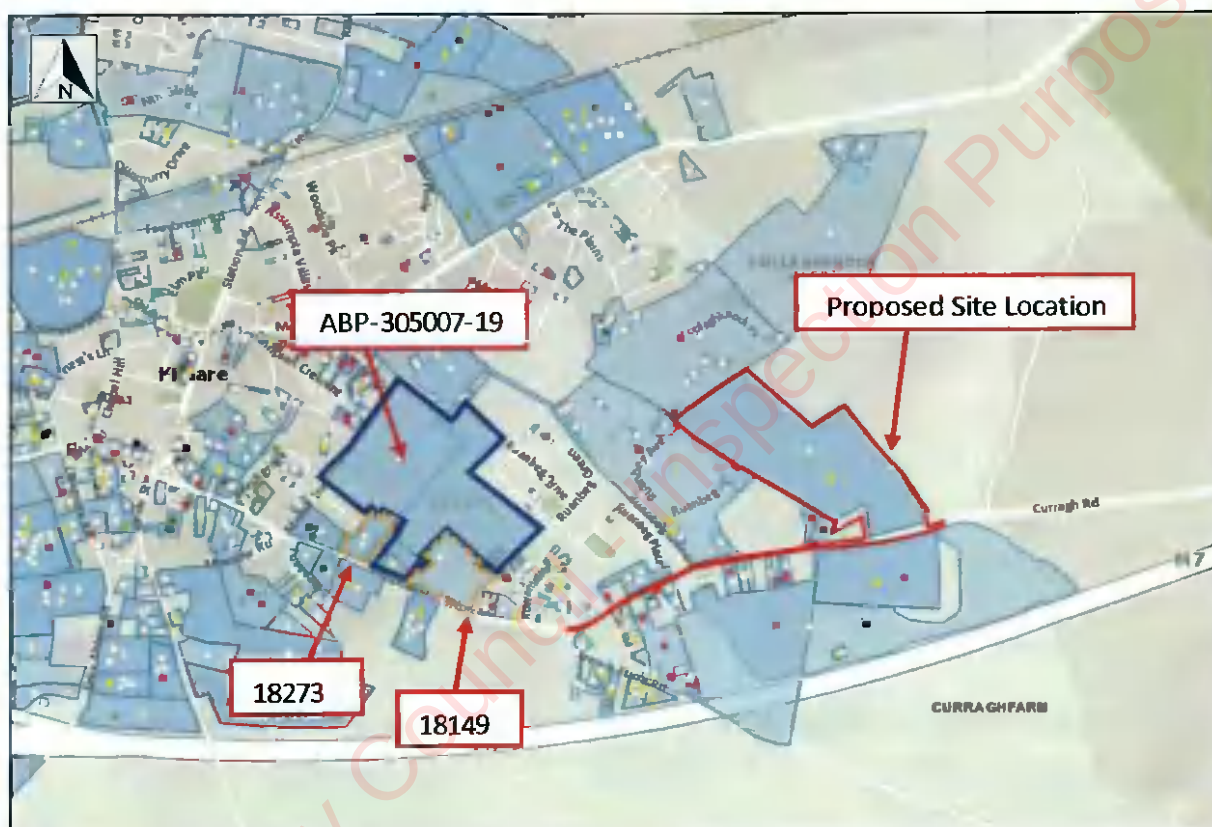


Figure 11.23: Planning Grants reviewed adjacent to the site (Ref: KCC Planning Enquiry Online Map)

The largest development application in the vicinity of the site is the SHD (Planning ref: ABP-305007-19). A Traffic Impact Assessment undertaken by Roadplan Consulting (July 2019) was reviewed as part of this report.

It is noted that as part of their assessment Roadplan included predicted peak hour flows from adjacent proposed developments described above (Planning references 18273 and 18149) in their trip generation.



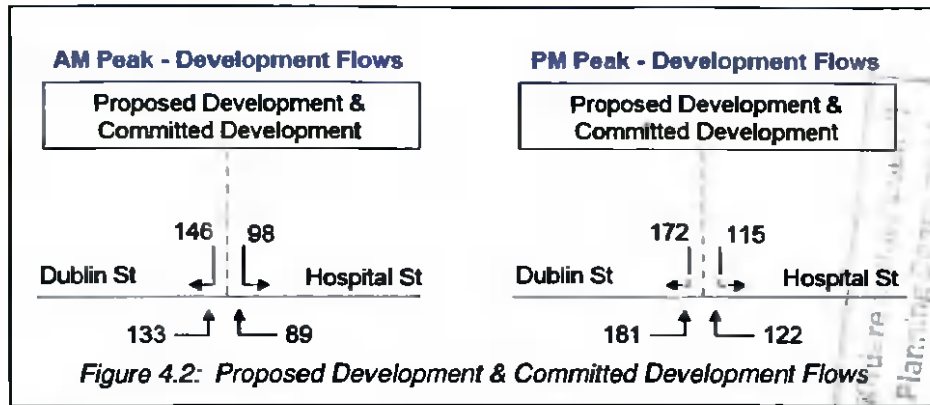


Figure 11.24: Roadplan Predicted Peak Hour Flows From Adjacent Granted Projects Described Above.
(Ref: Roadplan: Proposed Mixed Development At Magee Barracks Traffic Impact Assessment (2019), Figure 4.2)

The above predicted AM & PM peak flows arriving from and departing to Hospital St (west of R445) have been included in the junction analysis undertaken as part of this assessment.

Trip rates recommended by TRICS used in 2019 Traffic Impact Assessment undertaken by Roadplan Consulting for the nearby approved Magee Barrack Development (Planning Reference: ABP-305007-19) were reviewed and applied to the proposed development as shown in Table 11.10.

Table 11.10: Proposed Development Predicted Peak Hour Trip Generation

Land Use	Calculation Factor		Trip rate				Additional Number of Trips			
			08:00-09:00		17:00-18:00		08:00-09:00		17:00-18:00	
	GFA (m ² /100)	No. Units	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Creche	4.727		6.629	5.181	5.211	5.861	31	24	25	28
House*		206+15 =221	0.164	0.416	0.354	0.228	36	92	78	50
Duplex		74	0.083	0.361	0.361	0.139	6	27	27	10
Total							74	143	130	88

*Note 'House' Trip Rates from Magee Barrack Development were adopted for both 'houses' (206 no. units) and 'age friendly accommodation' (15 no. units)

Future Residential Development on Adjoining Lands

Access to adjacent land to the north east of this development is to be provided through the proposed development. Predicted traffic flows from this development have been allowed for as part of the junction analysis, on the basis of the below information supplied by the developer:

- Site area: 2.52 Ha
- Units per hectare: 35
- Estimated no. dwelling units: 88

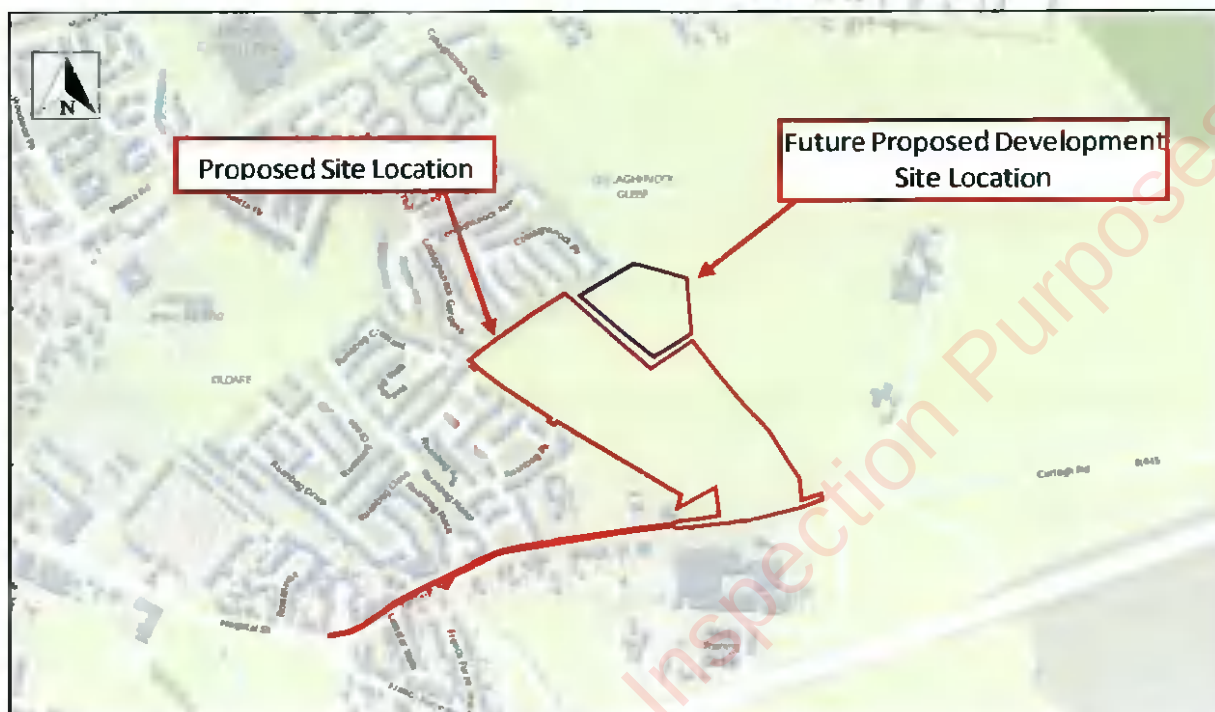
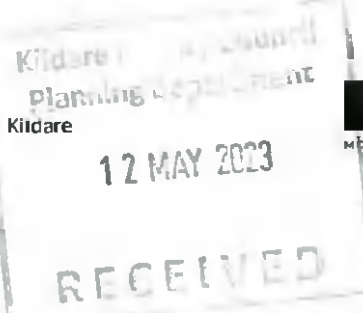


Figure 11.25: Location of Lands for Further Development Adjacent Proposed Site.

In order to estimate the likely volumes of traffic that would be generated by the further future development (separate to this application) on the adjoining lands north of the proposed development site the trip rates in Table 11.11 were also applied.

Table 11.11: Potential Future Development on Adjoining Lands Predicted Peak Hour Trip Generation

Land Use	Calculation		Trip rate				Additional Number of Trips			
	Factor		08:00-09:00		17:00-18:00		08:00-09:00		17:00-18:00	
	GFA (m ² /100)	No. Units	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Residential		88	0.204	0.414	0.498	0.283	18	36	44	25
Total							18	36	44	25



11.7 Mitigation Measures

Construction Phase

The Contractor must submit a Construction Traffic Management Plan (CTMP) to the Local Authority for approval. Haulage vehicle movements should be fully coordinated to comply with the requirements of the agreed plan:

- Construction vehicles must not stop or park along the routes at any time;
- Haulage vehicles must not travel in convoys greater than two vehicles at any time;
- Site entrance to remain free of parked or stationary vehicles at all times;
- All loading of demolition material will occur within the site boundary;
- All off-loading of deliveries will take place within the site, remote from the public road and will access via the agreed construction access point.
- The Contractor will be required to provide wheel cleaning facilities, and regular cleaning of the main access road.
- Temporary car parking facilities for the construction workforce will be provided within the site. These car parking spaces will be located adjacent to the site compound. The surface of this car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.
- Monitoring and control of construction traffic will be ongoing during construction works. Construction traffic will minimise movements during peak hours.
- Construction Traffic routes minimising traffic impact on surrounding residential development will be used by construction vehicles.
- Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site.
- All works on-site will be undertaken during hours of the day in accordance with KCC requirements.
- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- The surrounding road network will be signed to define the access and egress routes for the development including dedicated 'haul' routes to / from the development site.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A construction Mobility Management Plan will be developed by the appointed contractor to encourage all construction personnel to utilise the vast range of sustainable travel options available when travelling to/from the subject proposed development site.

Construction of the proposed scheme will cause temporary short-term traffic impacts on the local road network. Enforcement of a CTMP will ensure that construction traffic impacts are minimized through the control of site access / egress routes and site access locations and any necessary temporary lane closure requirements.

Operational Phase

With the objective of mitigating the potential impact of the proposed residential development above during its operational stage, and with the objective of promoting sustainable travel for all residents, workers, and visitors to the development; the following initiatives have been identified and subsequently form an integral part of the subject development proposals.

- **Management** – A Mobility Management Plan is to be rolled out with the aim of guiding the delivery and management of a range of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the proposed development site. The MMP will be developed in partnership with KCC to specifically consider the opportunities of shaping all journeys and promoting sustainable transport habits throughout the scheme.
- **Management** – The availability of parking spaces is a key determinant of mode choice and car usage. With the objective of minimising travel by car and encouraging the use of sustainable modes instead, it is proposed to limit car parking provision wherever possible. This approach will help to reduce car dependency, reduce traffic congestion and pollution, improve the quality of the environment, and help tackle climate change in addition to encouraging sustainable travel while acknowledging the current availability of public transport in the area.
- **Facilities** – It is proposed to increase the number of high-quality cycle parking provided in the development to encourage the use of cycling as a sustainable mode of transport.

11.8 Predicted Impacts

Construction Phase

All traffic associated with the Construction Phase will be subject to a Construction Environmental Management Plan (CEMP). The scope of the CEMP will be agreed in advance Kildare County Council. The objective of the plan is to minimise traffic disruption in the vicinity of the site and ensure the safety of both residents and construction staff.

Operational Phase

The traffic associated with the Operational Phase of the proposed development is described in Table 11.12 below.

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Table 11.12: Operational Phase: Description of Impacts / Effects

Junction	Location	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Proposed Development Junction on the R445	The proposed primary access point to the site is located on R445. R445 is the link between Kildare Town to the west and the M7 motorway (Jct 12) and the Curragh Racecourse located to the east. R445 is a single lane two-way carriageway with footpaths on both sides of the carriageway and no existing designated cycle lanes. The proposed junction is a priority (non-signalised) junction and includes a westbound right turning lane, cycle lanes and pedestrian footpaths on both sides of the carriageway.	From the modelling results of the Traffic & Transport Assessment the surrounding road network and adjacent existing junctions will have neutral effects on the current operational capacity of the surrounding network of roads and junctions.	The proposed changes to the site include a right turning lane for westbound traffic; new road markings and signage; the addition of cycle lanes. The effect will cause noticeable changes in the character of the environment. However due to the neutral quality of impact it is expected that the significance of impact will be not significant .	The junction has been designed and modelled for a Design Year of 2041. However, it could be assumed that the junction will remain in use beyond that year. Thus, duration of effects is long term .
2	Existing Ruanbeg Manor/ R445	The proposed secondary point is located further west on the R445 at Ruanbeg Manor. It is the link with the R445 and the Ruanbeg existing residential housing development. Ruanbeg Manor is a single lane two-way carriageway with wide footpaths and grassed verges on both sides of the carriageway and no existing designated cycle lanes. Alterations to this junction are not included as part of the scope of this submission.	From the modelling results of the Traffic & Transport Assessment the surrounding road network and adjacent existing junctions will have neutral impact on the current operational capacity of the surrounding network of roads and junctions.	There are no proposed changes to the junction. Junction modelling shows that the junction has capacity for increased traffic up to the design year. Thus, significance of impact will be imperceptible .	The junction has been designed and modelled for a Design Year of 2041. However, it could be assumed that the junction will remain in use beyond that year. Thus, duration of effects is long term .

11.9 'Do Nothing' Scenario

In the absence of the proposed development, the existing junctions on the surrounding road network will be subject to the forecasted network traffic growth. The operational capacity of the junctions have been assessed for the "Do-Nothing" scenario in the analysis above for the purpose of comparing the junctions with and without the proposed development.

11.10 Worst Case Scenario

The analysis carried out represents a worst-case appraisal of a typical weekday as it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with

additional reserve capacity to that forecast for the peak hour periods. Similarly, weekend traffic is generally lower both from the site generated traffic and the external road network traffic. The analysis has also considered nearby committed scheme and the proposed development to the north of the site which does not currently have planning permission.

11.11 Monitoring & Reinstatement

Construction Phase

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

Operational Phase

During the Operational Phase, a Mobility Management Plan (MMP) will be implemented to manage and monitor the modal split and endeavour to influence the modal shift from private car use to alternative transport modes.

The MMP is a document that evolves over time and requires ongoing implementation, management and monitoring, and for successful implementation requires organisational support, Mobility Manager, an internal Travel Co-ordinator and financial resourcing.

To implement the MMP the following inputs are required:

- a) Senior Management support and commitment,
- b) A Mobility Manager as the travel plan coordinator,
- c) A Steering group to oversee the plan,
- d) Working groups on various related issues.

To ensure effective results from any initial sustainable travel investment it is imperative to obtain the agreement of all the stakeholders and obtain the support of external partners such as the Local Authority, public transport operators, etc. Ideally the MMP will be managed by a Mobility Manager or Travel Coordinator with the clear mandate to implement and evolve the plan.

The MMP will endeavour to influence the modal split from the outset of the completed development. Due to the location of the site and the alternative transport modes available, the historic reliance on the car can be challenged. The issuance of welcome packs to the initial residents containing e.g. timetables of public transport and details of nearby facilities can be considered. Information on public transport routes and options could be provided within the secure bicycle storage facilities.

The document: National Transport Authority Workplace Travel Plans - A Guide for Implementers may be used as a reference. There is also a UK document: Making Residential Travel Plans Work: Guidelines for new development published by the UK Department of Transport 2005 which is relevant.

Residents travel surveys should be carried out in the early stages and annually to monitor the initial success of the travel plan and to gain a better understanding of the residents' travel habits. These survey results can also serve as a sustainable travel performance benchmark to indicate how the MMP is performing in comparison to previous years and the sustainable travel targets initially outlined in the plan.

Reinstatement

The construction work areas will be reinstated following completion of development with landscaped areas provided where proposed. The works will be restricted to the footprint of the site for the proposed scheme. Excavated topsoil and subsoil will be refused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

11.12 Difficulties in Compiling Information

No significant difficulties were encountered while undertaking this assessment.

11.13 References

Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)

Available at: [https://www.epa.ie/publications/monitoring--](https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf)

[assessment/assessment/EIAR_Guidelines_2022_Web.pdf](https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf) (Accessed: 18/04/2023)



12. Material Assets

12.1 Introduction

This chapter of the EIAR will comprise of an assessment of the likely impact of the proposed development on existing surface water, water supply, foul drainage and utility services in the immediate area surrounding the site and assesses the impact of the proposed development on these aspects of the existing environment. Where necessary, proposed mitigation measures have been identified to minimise any impacts.

The material assets considered in this chapter of the EIAR will include Surface Water Drainage, Foul Drainage, Water Supply, Electricity, Gas and Telecommunications.

The water supply, wastewater drainage and surface water drainage component of this chapter was prepared by Mark Richardson BA BAI(Hons) CEng and Rachel Lee BSc (Hons) ME MIEI of PUNCH Consulting Engineers. Mark Richardson is an Associate with PUNCH Consulting with over 18 years' experience in experience in drainage and civil engineering, in Ireland and abroad, is a member of Engineers Ireland and is a chartered engineer in Ireland. Rachel Lee is a design engineer with PUNCH Consulting and has 4 years' experience in the industry. Rachel has developed considerable knowledge in the planning and design of roads, drainage and flood risk management.

Inputs were obtained from Keith Phelan (BEng Tech) of MandE Consulting Engineers. Keith has worked in the industry for 23 years and graduated from DIT Kevin Street in 2009 with a degree in electrical building services engineering. His extensive experience in designing site services includes the design of ESB services, public lighting, and Information & Communications Technology, as well as experience in dealing with Gas Networks Ireland

Material assets may be of either human or natural origin and the value may arise for either economic or cultural reasons. This chapter considers physical resources in the environment which pertain to the provision of utilities. The objective of the assessment is to ensure that these assets are used in a sustainable manner, so that they will be available for future generations, after the delivery of the proposed development.

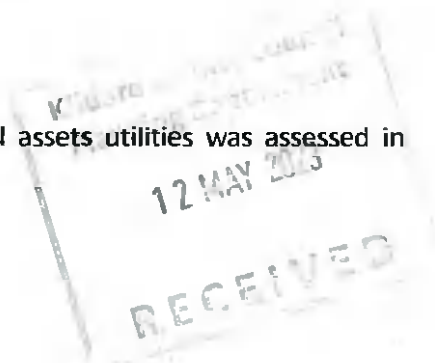
With regard to Material Assets, the August 2017 Draft EIAR Guidelines published by the EPA state:

"The meaning of this factor is less clear than others. In Directive 2011/92/EU it included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."

Please note that the impacts and mitigation measures associated with Traffic are addressed in Chapter 11. Impacts and mitigation measures associated with Waste are addressed in Chapter 12.

12.2 Methodology

The potential impact of this development in relation to material assets utilities was assessed in accordance with:



- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Statements (2022);
- Environmental Protection Agency (September 2015): Draft - Advice Notes on current Practice (in the preparation of Environmental Impact Statements);
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the Preparation on Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the Information to be contained in Environmental Impact Statements

Economic assets of natural origin, which include biodiversity, land & soil and water, are addressed elsewhere in this EIAR, in particular Chapter 5, 6 and 7 respectively. Cultural Assets of a Physical Type and Cultural Heritage of a Social Type are addressed in Chapter 13 of this EIAR.

A desktop study was carried out on existing material assets associated with the site of the proposed development. Projections of resource use were undertaken for both the construction and operational phases of the proposed development, and the impacts assessed. Mitigation measures are proposed where appropriate.

Consultations

Consultations were held with the following for the purposes of preparing this chapter:

- A pre-application enquiry was made to Irish Water for a 350-unit development. At that time, Irish Water confirmed that a connection could be facilitated for the water, and wastewater subject to upgrades.
- A pre-application enquiry was made to ESBN for a 350-unit development. ESBN confirmed that with the diversion of the existing overhead being routed through the development, this would allow for the upgrading of the local infrastructure for future electrical supplies.

List of Abbreviations

The following abbreviations are specific to this chapter of the EIAR:

EU	European Union
DI	Ductile Iron
ESB	Electrical Supply Board
PE	Polyethylene
GNI	Gas Networks Ireland
MV	Medium Voltage
LV	Low Voltage
FFL	Finished Floor Level
EPA	Environmental Protection Agency
DoECLG	Department of the Environment Community and Local Government
DoEHLG	Department of Environment Heritage and Local Government

12.3 Receiving Environment

In describing the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the proposed development will fit is assessed. This takes account of any other proposed developments that are also likely to proceed in the short to medium term.

This section considers the key aspects relating to material assets of the proposed development site and the surrounding area, namely ownership and access, potable water supply, wastewater discharge, electricity supply, gas supply and telecoms.

Please note that Material Assets - Traffic and Material Assets - Waste Management are addressed in more detail in chapter 11 and 12 respectively.

The following aspects of the proposed development will affect material assets within the vicinity of the proposed development site:

- Access
- Transport Infrastructure
- Waste Management
- Foul Water Disposal
- Surface Water Disposal
- Potable Water Supply
- Natural Gas Supply
- Electrical Supply
- Telecommunications

Access

There is an existing site gate from the R445.

Foul Water Disposal

The proposed site is currently a greenfield site having consistent agricultural use over the years. Existing record drawings show no foul drainage within the site. On the basis of available records provided by Irish Water / Kildare County Council, there are no foul water drainage present within the development site. The following foul water drainage exists adjacent to the development site:

- 1) 150mm uPVC dedicated foul sewer flowing east-west on the northern border of the site. This sewer connects to Collaghknock Gardens Wastewater Pumping Station (WWPS).
- 2) 225mm uPVC dedicated foul sewer north of the site, which connects to Collaghknock Glebe Wastewater Pumping Station (WWPSO).
- 3) 225mm uPVC dedicated foul sewer flowing east-west adjacent to Ruanbeg Ave located to the west of the site.
- 4) 150mm uPVC dedicated foul sewer flowing east-west adjacent to Ruanbeg Park located to the west of the site.

Please refer to **Error! Reference source not found.** for an extract of the existing record drawings illustrating the existing foul drainage arrangement.

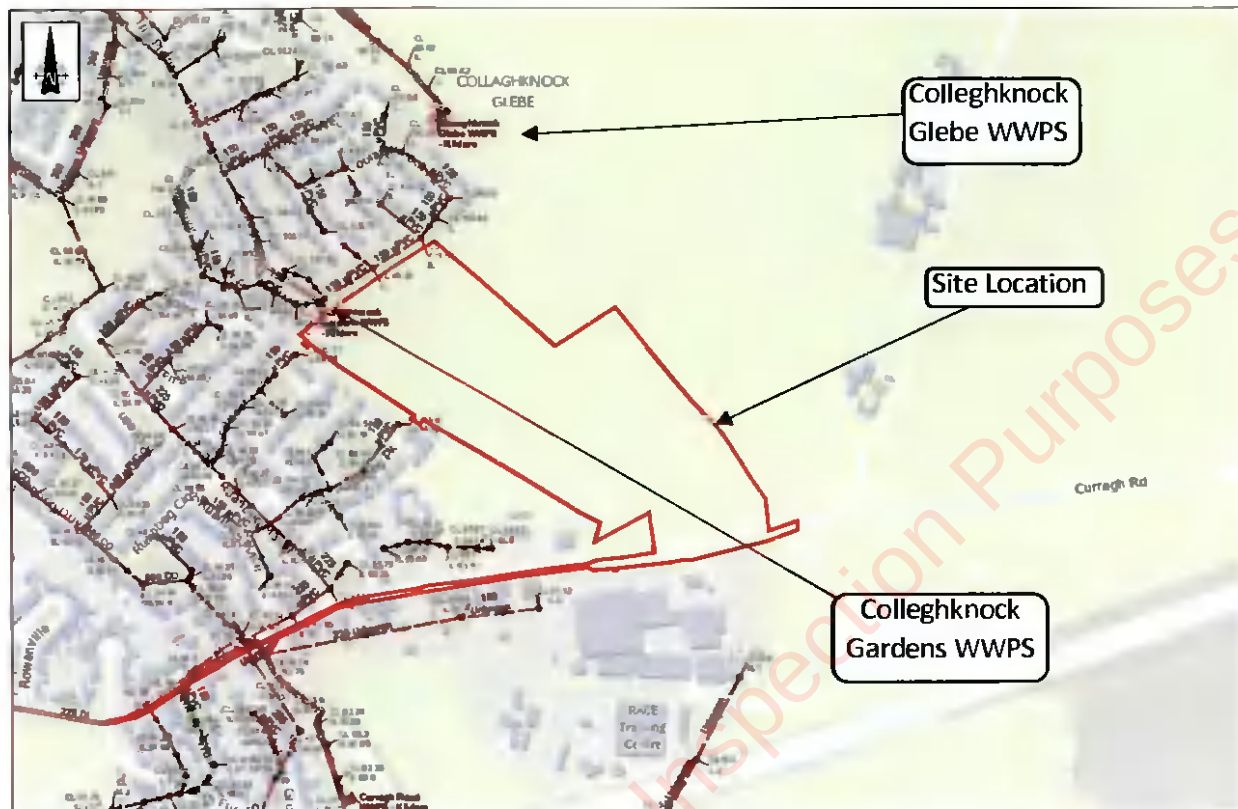


Figure 12.1: Extract from Irish Water Record Drawing (© Irish Water)

Surface Water Disposal

The proposed site is currently a greenfield site having consistent agricultural use over the years. Existing record drawings show no surface water drainage within the site. Record drawings provided by Irish Water/KCC indicate the presence of an existing 225mm uPVC surface water sewer outside the western boundary of the site. Figure 12.2 below shows an extract from maps received from Irish Water/KCC.

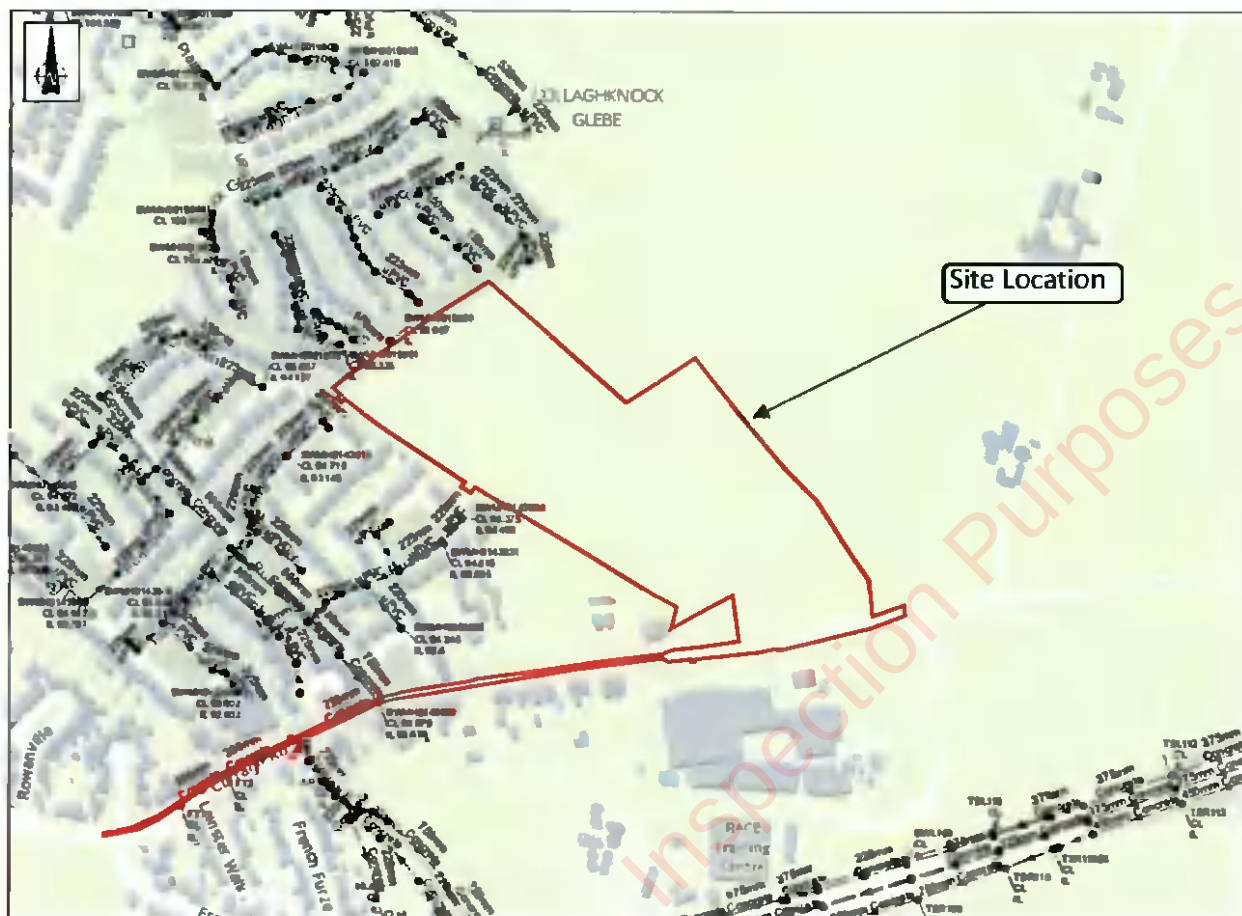


Figure 12.2: Extract from Irish Water Record Drawings (© Irish Water)

Potable Water Supply

Irish Water record drawings indicates the following watermain infrastructure to exist adjacent to the site.

- 1) 3" cast iron watermain located on the R445 towards the southern border of the site.
- 2) 101.6mm uPVC watermain located on the R445 towards the southern border of the site.
- 3) 100mm uPVC watermain located in the residential developments to the west of the site.

Please refer to Figure 12.3 for an extract of the existing record drawings illustrating the existing water supply arrangement.

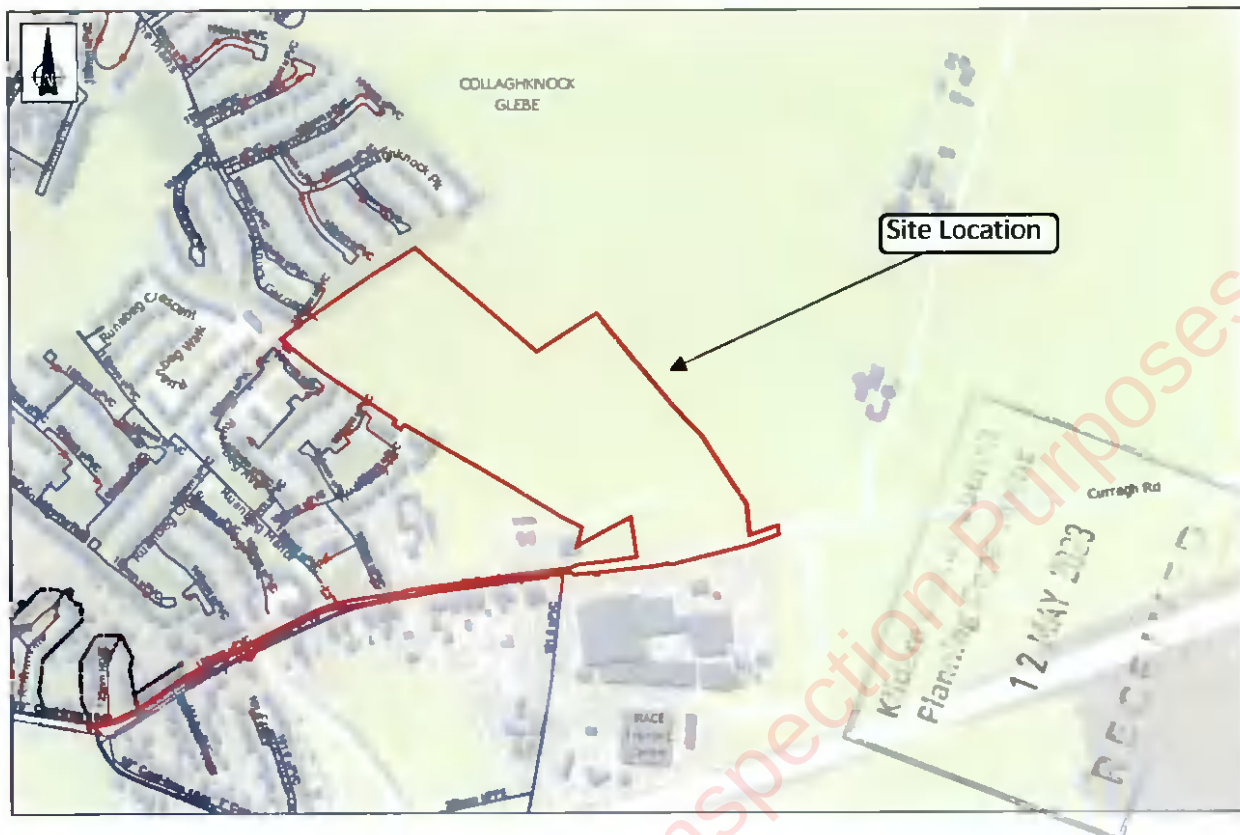


Figure 12.3: Existing watermain surrounding the site (© Irish Water)

Telecommunications, Natural Gas and Electricity Supply

Utility record information on the existing infrastructure were obtained from the following:

- Irish Water
- Electricity Supply Board Networks (ESB)
- Gas Networks Ireland
- Telecommunications Network

A desk study of records received in digital format from the various utility companies/authorities, survey information and supplementary sources was undertaken. Consultations with the utility companies/authorities were conducted in order to identify their particular requirements during construction and for permanent arrangements.

Natural Gas Supply (GNI)

The proposed development does not have an existing connection into the local GNI network. The proposed development has a live gas supply to the south of the site along the R445, which according to GNI records, is located on the opposite side of the development.

Gas Network Ireland have been contacted and an existing GNI map for the area surrounding the proposed development has been obtained and outlined below.

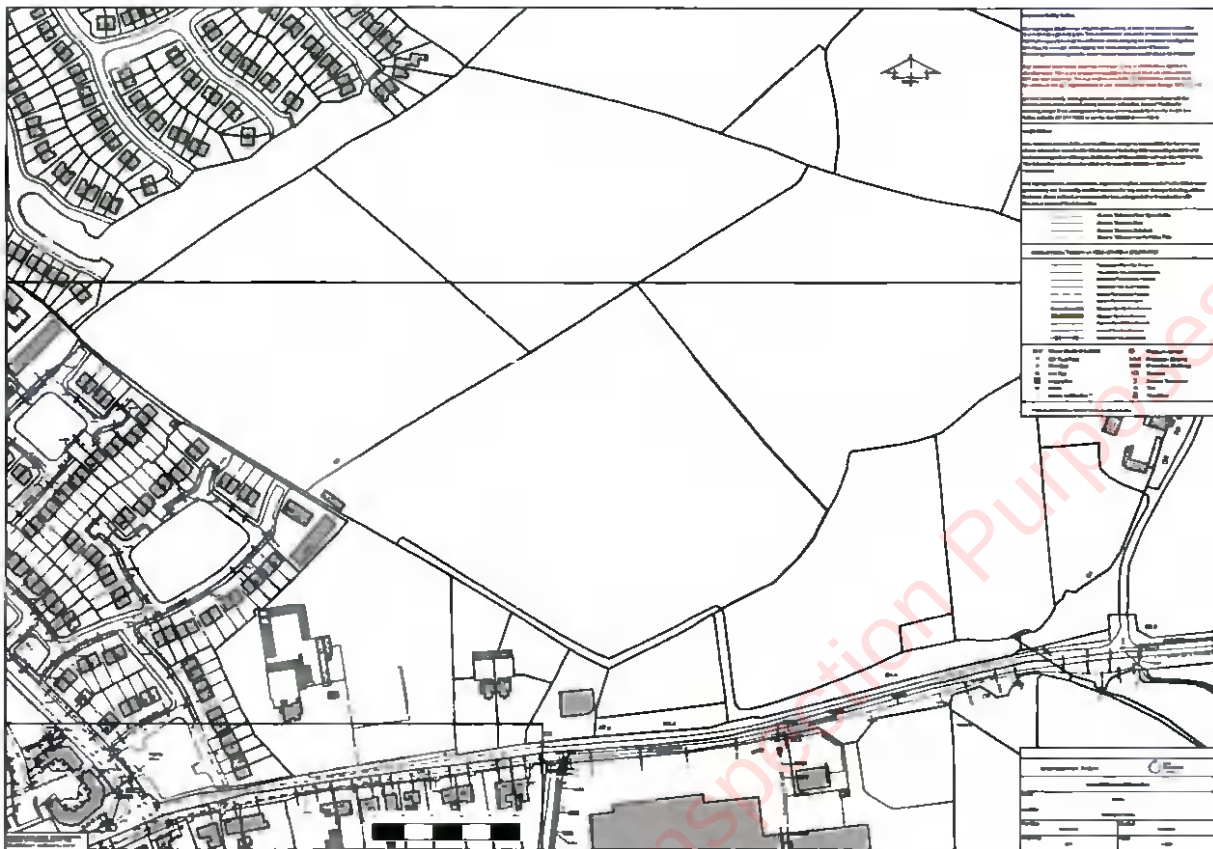


Figure 12.4: Existing GNI Local Networks Extract Map (© GNI)

Electrical (ESB) Supply

The proposed development does not have an existing connection into the local ESB network. There is a live ESB Electrical network supply to the south of the site along the R445.

There is an existing overhead 10kV line crossing the site. This overhead line will be diverted underground by ESB as part of the proposed development works which will be used to provide a new network of substation to serve the development.

ESB Networks have been contacted and an existing ESB network map for the area surrounding the proposed development has been obtained and outlined below.

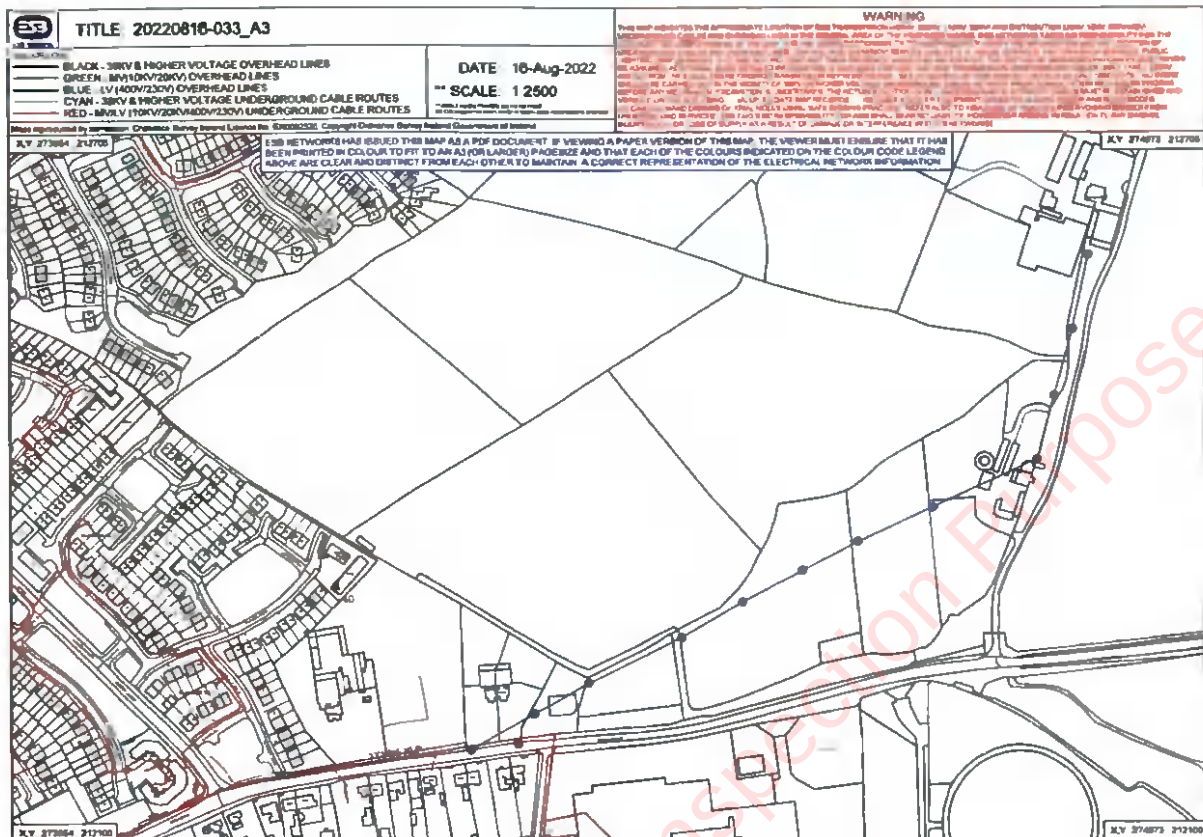


Figure 12.5: Existing ESB Local Networks Extract Map (© ESBN)

Telecommunications

Virgin Media (VM) Supply

The proposed development does not have an existing connection into the local VM network. The proposed development has a live Virgin Media network supply to the south of the site along the R445.

VM have been contacted and an existing VM map for the area surrounding the proposed development has been obtained and outlined below.

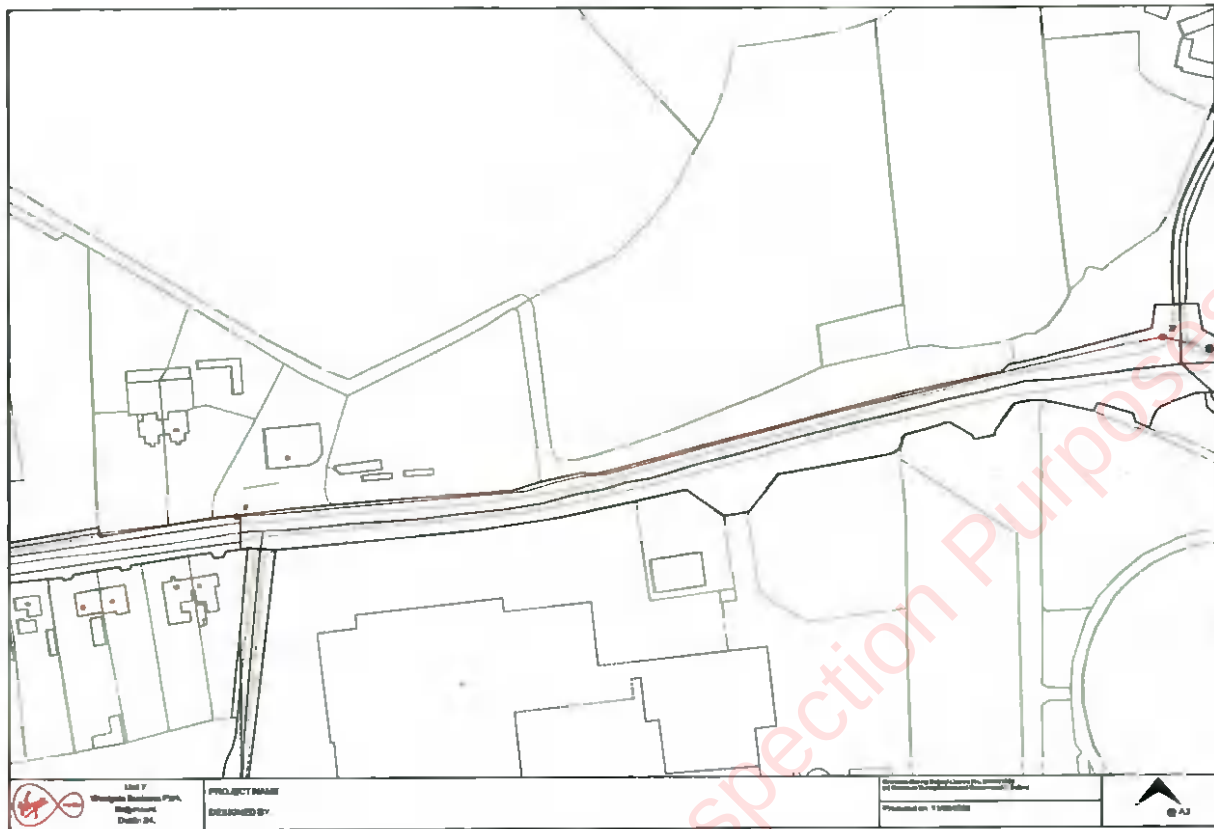


Figure 12.6: Existing VM Local Networks Extract Map (© Virgin Media)

EIR Supply

The proposed development does not have an existing connection into the local Eir network. The proposed development has a live Eir network supply to the south of the site along the R445.

Eir have been contacted and an existing Eir map for the area surrounding the proposed development has been obtained and outlined below.

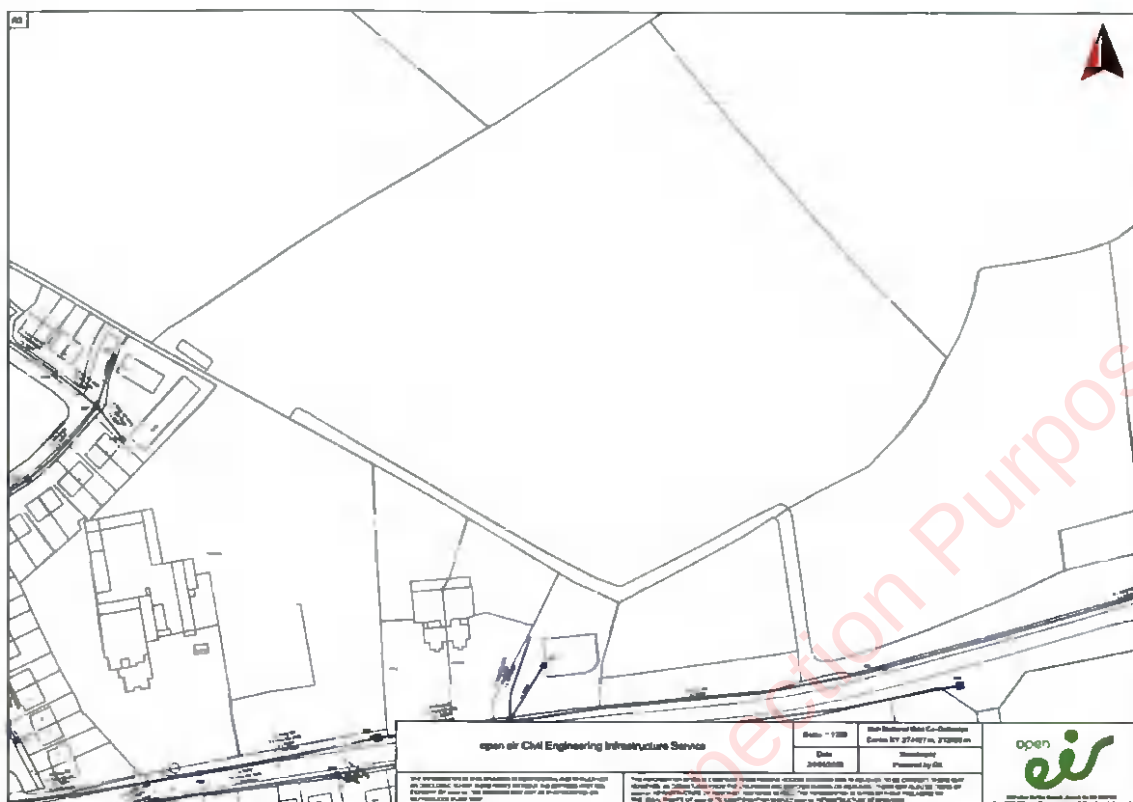


Figure 12.7: Existing Eir Local Networks Extract Map (© Eir)

SIRO Supply

The proposed development is a greenfield site and does not have an existing connection into the local SIRO (ESB) network. However, as SIRO utilise the existing ESB network, the proposed development does have a live ESB network to the south of the site along the R445 and SIRO will be able to utilise the new ESBN infrastructure once installed.

SIRO have been contacted and they confirmed they will be able to provide a SIRO service to the proposed development.

12.4 Characteristics of the Proposed Development

The proposed development is described in Chapter 3. A full description of the proposed development is also stated in the statutory notices. The following elements are relevant to the assessment of effects in this Chapter.

The proposed development will involve the construction of the following service networks. Note that Transport Infrastructure is discussed in Chapter 11:

- Access
- Transport Infrastructure
- Waste Management
- Foul Water Disposal
- Surface Water Disposal
- Potable Water Supply

- Natural Gas Supply
- Electrical Supply
- Telecommunications

Foul Drainage – Proposed Works

Wastewater gravity drainage is proposed through the development to services all dwellings and the proposed creche. In general, wastewater drainage is proposed in the roadway.

It is proposed to drain the northern portion of the site by gravity to a proposed wastewater pumping station. A foul sewer rising main then connects into the foul drainage network serving the southern portion of the site and then drains fully by gravity to a discharge point on the R445.

The proposed pumping station is to be designed to accommodate future connections from Coolaghknock Glebe Wastewater Pump Station and Coolaghknock Gardens Wastewater Pump Station.

Additional wastewater flows are to be allowed for from a proposed future development to the north, for 88 dwellings. Please refer to Figure 12.8.

- Site area: 2.52 Ha
- Units per hectare: 35
- Estimated no. dwelling units: 88

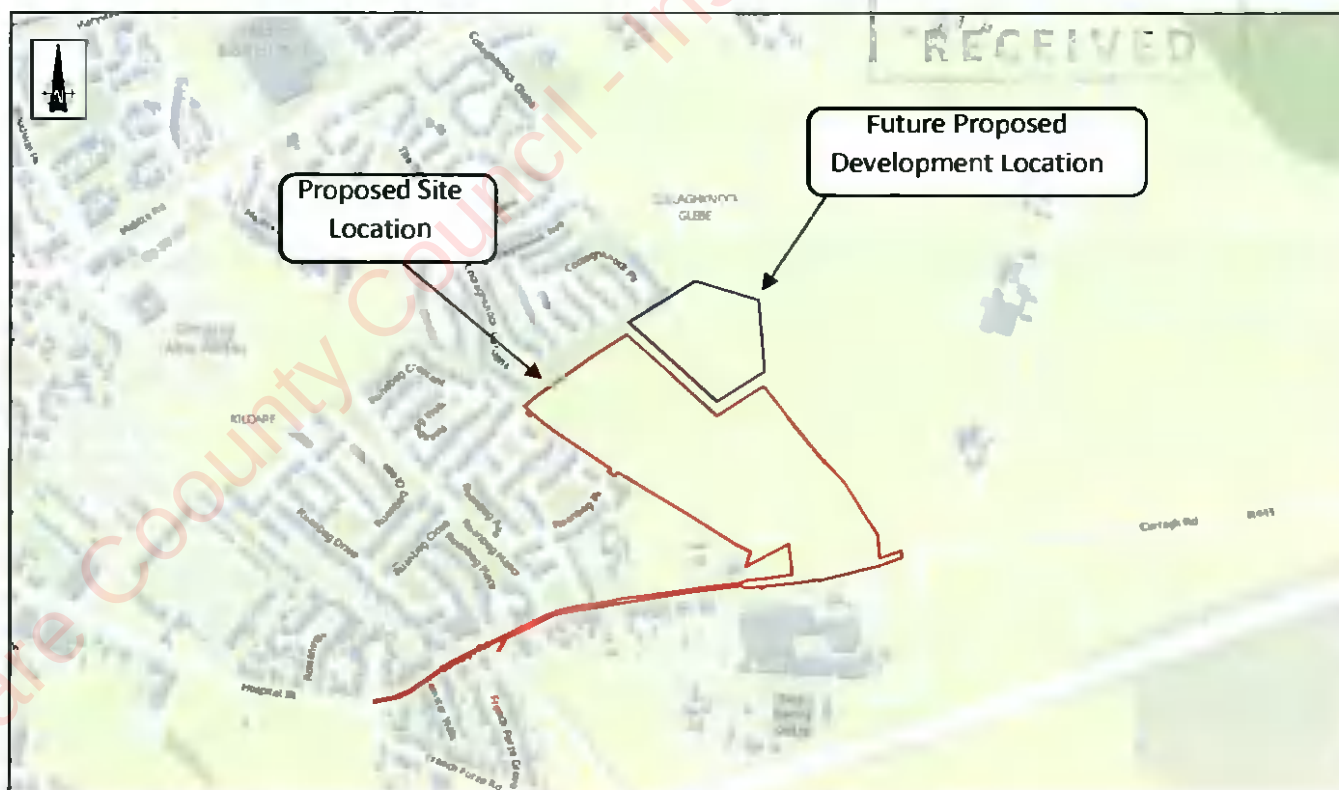


Figure 12.8: Location of Lands for Further Development Adjacent Proposed Site.

It is expected that the off-site foul sewer works will be undertaken by Irish water to facilitate the development and will follow a formal Irish water Connection Application. The sewer upgrade works will have a significant benefit to Irish water since they will assist in servicing wastewater for the surrounding area.

Error! Reference source not found. describes the foul water drainage design parameters used. Outputs are provided for dry weather flow, 4.5 times dry weather flow and 6 times the dry weather flow.

Table 12.1: Foul Water Drainage Design Parameters.

Description	Value
Residential Flow Rate	150 l/person/day
Creche Flow Rate	50 l/person/day
Persons per Dwelling	2.7
Infiltration (additional flow)	10%
Peaking Factor	4.5 DWF where over 750 persons 6 DWF where under 750 persons
Minimum Self Cleansing Velocity	0.75m/s
Minimum Pipe Diameter	150mm

Table 12.2 below summarises the wastewater flows for the development in addition to the additional flows to be allowed for from the neighbour to the north. Different peak flows are applied to the different drainage elements, and the total peak is based on the total flow. The total number of persons is split between residential and commercial since these will each have different drainage parameters associated with them.

Table 12.2: Foul Water Flows.

Category	Quantity	Flow Rate	Daily Flow (l/day)	DWF (l/s)	Design Peak Flow (l/s)
Residential Development	295 units =>796.5 persons	165 l/per/day	131,423	1.52	6.84 (4.5 DWF)
Creche	19 staff 78 children => 97 persons	55 l/per/day	5,335	0.06	0.28 (4.5 DWF)
Additional Development to north	88 units =>237.6 persons	165 l/per/day	39,204	0.45	2.72 (6 DWF)
Total	1034.1 persons in residential 97 persons at Creche		175,962	2.04	9.16 (4.5 DWF: peak of total daily flow)

Surface Water Disposal – Proposed Works

Piped surface water drainage is proposed throughout the development to service the entire development. Given the presence of gravel geology at the site, it is currently proposed to discharge surface water to groundwater by infiltration.

3 no. below ground geocellular infiltration tanks are proposed that will allow infiltration. The northern portion of the site discharges to Soakaway Attenuation Tank A within a landscape area.

The southern portion of the site has 2 no. discharge locations, Soakaway Attenuation Tank B & C both of which are located in landscape areas. Sections of the site discharges directly into the soakaways, with alternative pipe runs discharging into ponds with overflows which then discharge into the soakaway structures.

Please refer to EIAR Chapter 7 for Water chapter.

Potable Water Supply – Proposed Works

Watermains are proposed throughout the development to service the proposed dwellings and creche.

It is proposed to construct a 225mm diameter watermain connecting to an existing watermain located on the R445. It is intended to extend the watermain network to serve the proposed development based on the calculated demand.

It is noted that the red line boundary extends along the R445 towards a junction with French Furze Road. This is due to the anticipated upgrades of the existing 150mm Irish Watermains along the R445 to a 225mm watermain, in order to accommodate the proposed development flows.

It is expected that the off-site water supply works will be undertaken by Irish water to facilitate the development and will follow a formal Irish water Connection Application. The watermain supply works will have a significant benefit to Irish water since they will assist in providing water supply for the surrounding area.

The watermain layout has been designed in accordance with “Irish Water Code of Practice for Water Infrastructure”. All watermains are to be constructed in accordance with Irish Water Code of Practice and the Local Authority’s requirements. Fire coverage is to be reviewed and certified by the fire consultant.

This feed will provide potable and firefighting water to the proposed development. A bulk water meter shall be provided at the site boundary at the location of the proposed connection to the existing watermain.

Design loading for foul drainage is used to evaluate the water demand on the site. With reference to Irish Water’s Code of Practice for Water Infrastructure, the average daily flow is calculated as the number of persons multiplied by the flow rate per person. The average day peak week flow is taken to be 1.25 x the average flow, and the peak demand is taken to be the average day peak week flow multiplied by a peaking factor of 5.

Additional water flows are to be allowed for from the development to the north, for 88 dwellings as discussed in Section on “Foul Drainage – Proposed Works” and Figure 12.8.

Table 12.3 describes the watermain design parameters used.

Table 12.3: Watermain Design Parameters.

Description	Value
Residential Flow Rate	150 l/per/day
Creche Flow Rate	50 l/per/day

Persons per Dwelling	2.7
Average Demand	1.25 DWF
Peak Demand	5 DWF

Table 12.4 below summarises the water supply flows for the development in addition to the additional flows to be allowed for from the neighbour to the north.

Table 12.4: Water Supply Flows.

Category	Quantity	Flow Rate	Daily Flow (l/day)	DWF (l/s)	Average Demand (1.25DWF) (l/s)	Peak Demand (5DWF) (l/s)
Residential Development	295 units =>796.5 persons	150 l/per/day	119,475	1.38	1.73	8.64
Creche	19 staff 78 children => 97 persons	50 l/per/day	4,850	0.06	0.07	0.35
Additional Development to north	88 units =>237.6 persons	150 l/per/day	35,640	0.41	0.52	2.58
Total	1034.1 persons in residential 97 persons at Creche		159,965	1.85	2.31	11.57

Natural Gas Supply (GNI) – Proposed Works

The gas supply infrastructure for the proposed development site (if required) will involve the extension of the existing infrastructure currently in place to the south of the site. Currently, however, there is no requirement for a natural gas connection to serve the proposed development.

Based on the Gas Networks Ireland map indicated above, the chances of damaging the existing infrastructure will also be neutral.

Electrical (ESB) Supply – Proposed Works

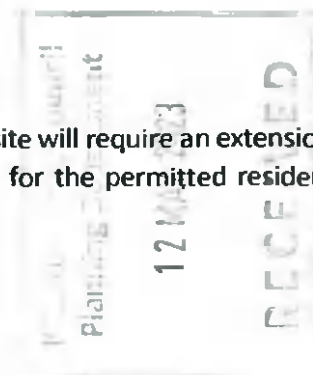
Subject to formal agreement with ESB it is envisaged that a minimum of three ESB substations shall be provided for the electrical requirement of the proposed residential development.

A formal application to confirm the nature of the ESB supply shall be completed once the formal address for the residential development is agreed with KCC.

Telecommunications

Virgin Medio (VM) Supply – Proposed Works

The telecommunication infrastructure for the proposed development site will require an extension of the existing infrastructure currently in place and under construction for the permitted residential development to the North & East of the site.



Eir Supply – Proposed Works

Subject to formal agreement with Eir, it is envisaged that Eir will provide a service to the proposed residential development. The Eir services shall be designed within the proposed residential scheme in accordance with Eir requirements for residential developments.

A formal application to confirm the nature of the Eir supply shall be completed once the formal address for the residential development is agreed with KCC.

SIRO Supply – Proposed Works

Subject to formal agreement with SIRO, it is envisaged that SIRO will provide a service to the proposed residential development. The SIRO services shall be designed within the proposed residential scheme in accordance with SIRO requirements for residential developments.

A formal application to confirm the nature of the SIRO supply shall be completed once the formal address for the residential development is agreed with KCC.

12.5 Potential Impacts

This section provides a description of the potential direct and indirect impacts that the proposed development may have during both the construction and operational phases of the proposed project. This is provided with reference to both the Characteristics of the Receiving Baseline Environment and Characteristics of the Proposed Development sections while also referring to the (i) magnitude and intensity, (ii) integrity, (iii) duration and (iv) probability of impacts. Impact assessment addresses direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions.

Access

Construction Phase

The details of the deliveries and access to the construction site will be via R445 and will be subject to agreement with the Planning Authority as part of the Contractors Construction Management Plan, including traffic management. Any alterations to the local road network are likely to have a short-term negative impact on road users.

Operation Phase

The traffic and transport impact of the proposed development is assessed in Chapter 11 of this report.

Foul Water Disposal

Construction Phase

Temporary foul drainage will be required for construction site sheds. The exact discharge location for this has not been determined. The impact is considered to be medium-term and imperceptible.

Constructing the proposed foul sewer connections may require temporary interruptions to the existing foul drainage network. The impact is considered to be short-term and imperceptible.

Operation Phase

The impact of the proposed development on the public foul sewerage system will be to increase the quantity of wastewater discharging to the existing 225mm diameter foul sewer on the R445. It is noted

that the development will incorporate water conservation measures in the sanitary facilities throughout. These will include low flow dual flush toilets, and monobloc low volume push taps. These will reduce the foul discharge from the development.

A pre-application enquiry was made to Irish Water for a 350-unit development. At that time, Irish Water confirmed that a connection could be facilitated for the wastewater subject to upgrades.

The potential impact from the operational phase is likely to be long term and low.

Surface Water Disposal

Construction Phase

The contractor will be required to implement best practice measures in accordance with Kildare County Council planning requirements during construction.

The potential impact from the construction phase of the proposed development on the existing surface water network is likely to be short term and medium.

Operational Phase

In the absence of any attenuation infiltration tank, the potential impacts from surface water flows are expected to be significant.

Since there is no proposed connection to existing surface water networks, the expected impact is neutral.

However, the potential impact from the operational phase of the proposed development on the existing groundwater would be significant in the absence of any attenuation infiltration tank.

Refer to EIAR Chapter 7 for further details.

Potable Water Supply

Construction Phase

Temporary water supply will be required for construction site sheds and for site cleaning. The exact supply location for this has not been determined. The impact is considered to be medium-term and imperceptible.

There is potential for some short-term impacts by way of disruption in water supply to facilitate connecting the development to the existing public water supply network. This could lead to minor disruption in water supply to nearby buildings for short periods. The potential impact on the local public water supply network would be short term and imperceptible.

Operational Phase

The impact of the operational phase of the proposed development on the public water supply is an increase in demand on the existing supply.

A pre-application enquiry was made to Irish Water for a 350-unit development. At that time, Irish Water confirmed that a connection could be facilitated for water supply subject to upgrades.

The potential impact of the proposed development on the public water supply network is likely to be long term and low.

Natural Gas Supply

Construction Phase

As there will be no requirement for natural gas during the construction phase, the impact will be neutral.

Based on the Gas Networks Ireland map indicated above, the chances of damaging the existing infrastructure will also be neutral.

Operational Phase

The proposed development will not have any requirement for natural gas, so the impact will be neutral.

Electrical Supply

Construction Phase

In order to carry out the works at the proposed site, an application will be made to ESBN in order to obtain a temporary metered electrical supply. The size of this load will be determined by the quantity of the electricity-using equipment required and size of the compound that will be used at the peak of the construction period.

The potential impact to the security of the electrical supply to the surrounding area will be neutral.

Operational Phase

Based on the current number of dwellings and creche, the development is expected to have a minimum of three (3) MV unit substations. However, this figure will need to be confirmed by ESBN once the formal application has been made.

The impact of these substations will be assessed by ESBN to ensure that the impact on the neighbouring developments will be neutral.

Information and Communications Technology

Construction Phase

The developer may or may not make an application for a single supply to a local service provider based on their own requirements, however, this supply will not have any significant impact on the existing infrastructure and its impact will be neutral.

Operational Phase

Based on the presence of at least three main telecoms providers, the development will be very well served for telecommunication services. The proposed impact on the neighbouring developments would be considered beneficial.

12.6 Potential Cumulative Impacts

The cumulative effects of development on utilities have been assessed taking other planned, existing and permitted developments in the surrounding area into account. The following section sets out the cumulative impacts relevant to each environmental topic. Such developments include:

- An additional 2.52 Ha site comprising of 88 no. dwellings has been allowed for to the north of the development site. Refer to Figure 12.8.
- Proposed residential development at the Former Magee Barracks, Hospital Street, Kildare, Co. Kildare (ABP-305007-19) was granted permission on 24/10/2019.

These developments are similar in nature and will involve additional works of similar type to the proposed development.

Cumulative Impacts – Future Potential Development, Natural Gas Supply

With the use of gas as a form of home heating beginning to wane, the impact on any future developments will be neutral.

Cumulative Impacts – Future Potential Development, Electrical Supply

The construction of future housing developments around the proposed site can be more easily served by ESBN because of the installation of new substations within the current application. The impact would be considered positive.

Cumulative Impacts – Future Potential Development, Information and Communications Technology

The construction of future housing developments around the proposed site can be more easily served by a main telecoms providers because of the installation of infrastructure within the current application. The impact would be considered positive.

12.7 Mitigation Measures

Construction Phase

The following mitigation measures are proposed for the construction phase of the proposed development with reference to Material Assets - Utilities:

- The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.
- Relevant services providers are to be consulted in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services, such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains.
- Neighbouring sites are to be advised of construction methodologies in advance of works, in situations which may affect them.
- All retained underground services are to be protected.
- All decommissioned infrastructure will have to be sent to a licenced waste disposal facility or an accepting landfill for disposal.
- A construction methodology will be required by the contractor to be tailored to reduce, where possible, dust noise and air pollution; to minimise interference with the environment and the neighbouring areas.
- Any spoil or waste material generated from the construction process is to be temporarily stored at an approved location on site, before being removed to an accepting licensed waste disposal facility.
- All infrastructure is to be appropriately tested by an approved method during the construction phase, all in accordance with Irish Water / KCC Requirements.

- Connections to the service providers are to be carried out to the approval and / or under the supervision of the Local Authority or relevant utility service provider, prior to commissioning.
- All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase.
- Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption.
- All excavations within the public area are to be back-filled in a controlled manner and surface reinstated to the satisfaction of the Local Authority.
- With the advent of new technologies being utilised in new houses resulting in higher electrical loads, e.g. air-to-water heat pumps, electric vehicle re-charging facilities, etc. the ESB infrastructure shall be designed to cater for this uplift in electrical requirements. This entails to installation of three substations to serve the new development.

Planning Department

12 MAY 2023

Operational Phase

To reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals.

The proposed surface water SUDs measures and infiltration tanks will mitigate the impacts from surface water flows on existing groundwater and reduce discharge to be similar to greenfield equivalent rates.

12.8 Predicted Impacts

Summary of Impacts

Section 12.5 above details the potential impacts of the proposed development on existing material assets – utilities. Following the implementation of the mitigation measures described above the following impacts are predicted for the proposed development.

- There is potential for some short-term construction stage impacts to existing foul and water services due to works to facilitate connecting the development to the existing public networks. This could lead to minor disruption in supply to nearby buildings for short periods. Constructing of these connections should be completed at off-peak times. The impact on the local public water supply network would be short term and imperceptible.
- The proposed surface water drainage is to discharge to and be mitigated by site SUDs measures and 3 no. below ground geocellular infiltration tanks. Sections of the site discharges directly into the soakaways, with alternative pipe runs discharging into ponds with overflows which then discharge into the soakaway structures. Refer to Chapter 7 for further details regarding water and flooding impacts. The surface water operational impact of the proposed development is expected to be long term and low.
- The development will increase the demand on existing service providers including foul, water, electricity and Telecoms. The impact from this is likely to be long term and low.

Cumulative Impacts

Cumulative Impacts – Other Developments

A number of significant infrastructure projects are proposed for the surrounding area. These have been discussed in Section 12.6. The cumulative impacts of the proposed developments and the adjacent developments proceeding at the same time are likely to have an imperceptible impact on the local material assets, built services provided the mitigation measures outlined below are incorporated during the works.

Cumulative Impacts – Future Potential Development, Construction

Future potential development will require similar construction mitigation to the proposed development. Future connections will be via the services constructed as part of this initial planning application development. As a result, there will be reduced impact on the surrounding area, and the impact will be reduced relative to the initial development.

The specific impact of this construction is not yet known, however will be developed once the future developments are further determined.

Cumulative Impacts – Future Potential Development, Access

Future potential developments to the north will increase the loadings and infrastructural requirement for the area. Access is covered within Chapter 11 of the EIAR.

Cumulative Impacts – Adjacent and Future Potential Development, Foul Sewerage

Future foul sewer connections for a proposed 88 no. unit dwelling to the north has been accounted for within the foul loadings for the current Ruanbeg development as shown in Table 12.2. The proposed pumping station is to be designed to accommodate future connections from Coolaghknock Glebe Wastewater Pump Station and Coolaghknock Gardens Wastewater Pump Station.

The cumulative impact of this future development is expected to be long term and low.

Cumulative Impacts – Future Potential Development, Surface Water

Future potential developments to the north of the site will be proposed to have surface water treated prior to entry into the development site. Surface water from these potential future sites will transverse through the Runbeg site towards a pond structure located to the south west of the site. Overflow from the pond will outfall to future drainage on Ruanbeg Manor to the southwest of the site. This downstream new/ upgraded drainage to service pond and upstream areas will be by others.

There is no increase in surface water to be treated by the proposed development site. As such there is no cumulative impact to consider.

The cumulative impact of this future development is expected to be neutral.

Cumulative Impacts – Future Potential Development, Potable Water Supply

Future water supply connections for a proposed 88 no. unit dwelling to the north has been accounted for within the water supply loadings for the current Ruanbeg development as shown in Figure 12.8.

The cumulative impact of this future development is expected to be long term and low.

Cumulative Impacts – Future Potential Development, Natural Gas Supply

With the use of gas as a form of home heating beginning to wane, the impact on any future developments will be neutral.

Cumulative Impacts – Future Potential Development, Electrical Supply

The construction of future housing developments around the proposed site can be more easily served by ESBN because of the installation of new substations within the current application. The impact would be considered positive.

Cumulative Impacts – Future Potential Development, Information and Communications Technology

The construction of future housing developments around the proposed site can be more easily served by a main telecoms providers because of the installation of infrastructure within the current application. The impact would be considered positive.

Residual Impacts

Residual impacts from on built services during the operational phase, given the new infrastructure and upgrades to the existing networks, is considered to be permanent with a positive impact to all end users.

12.9 'Do Nothing' Scenario

If the proposed development does not proceed there would be no additional demand or loading on any material assets, utilities. There would also be no new infrastructure provided.

As stated above, if the proposed development does not proceed there would be no positive additional impact on the existing utilities (ESB and Telcos) in the area.

12.10 Worst Case Scenario

Assuming all mitigation measures are implemented, there should be no significant impact from surface water wastewater or water supply.

In the event that infiltration attenuation tanks are not provided, there would be a significant increase in surface water discharge from the site.

The worst case scenario for this development to proceed would be if there was an impact on the utility services to the existing neighbouring developments. To avoid this, the developer will use best practice methods to detect and avoid any negative impact on the existing infrastructures.

12.11 Monitoring & Reinstatement

Monitoring – Construction Phase

Water consumption will be monitored for the development during construction through the use of water meters.

All water mains to be pressure tested and cleaned in accordance with the Irish Water code of practice prior to connecting to the existing potable water supply network.

All sewers to be pressure tested and cleaned in accordance with the Irish Water code of practice prior to connecting to the existing sewer.

Monitoring – Operational Phase

Water consumption will be monitored for the development during construction through the use of water meters.

All new infrastructure, which serves the proposed development, is to be routinely inspected with any maintenance carried out, as required. Any monitoring of the built services required during the operational phase of the proposed project will be outlined in the operational and maintenance manual.

Reinstatement

In the event of the proposed development being discontinued there will be minimal impact to the environment. The primary impact of the development is the increase in demand on the existing service providers. This impact will not happen in the event of the proposal being discontinued.

12.12 Difficulties in Compiling Information

There were no difficulties encountered in compiling this chapter.

12.13 References

- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018
- Guidelines on the information to be contained in environmental impact assessment reports, EPA, 2022
- Advice notes on current practice in the preparation of Environmental Impact Statements, EPA 2003.
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG, 200)
- Development Management Guidelines (DoEHLG, 2007)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoECLG, March 2013).
- DRAFT Kildare Town Local Area Plan 2023-2029



13. Waste Management

13.1 Introduction

This section addresses the subject of waste management for a Large-Scale Residential Development (LRD) at Ruanbeg Kildare town, Co. Kildare. Waste management is addressed for the construction, and operational phases of the project.

A Resource and Waste Management Plan (RWMP) (Appendix 13.1) has been prepared for the construction phase of the development in advance of the commencement of the construction works. A separate Operational Waste & Recycling Management Plan (OWRMP) (Appendix 13.2) has also been prepared for the operational phase of the development.

The RWMP has been prepared in accordance with the 'Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects by the EPA in 2021. These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

Proposed Development Site Location and Brief Description

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

Statement of Competence

In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".





Figure 13.1: Site Layout

13.2 Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
 - Waste Management (Collection Permit) Regulations (S.I. No. 820 of 2007) as amended
 - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I. No. 821 of 2007) as amended
 - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
 - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015) amended by S.I. 182 of 2019.
 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)

- European Union (Batteries and Accumulators) Regulations 2014(S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
- European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.

This Chapter is based on the proposed development and considers the following aspects:

- Legislative context.
- Demolition phase.
- Construction phase (including site preparation, excavation, and levelling); and,
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland.
- Description of the typical waste materials that will be generated during the demolition, construction, and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in *National Waste Reports*, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the current facilities on site.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery, and disposal of these materials. The 2020 National Waste Statistics web resource, which is the most recent study published, along with the national waste statistics web resource (December 2022) reported key statistics for 2020.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal.

Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported, and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction and demolition phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006 and the *2021 draft Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports, British Standards and other relevant studies and reports including BS 5906:2005 Waste Management in Buildings – Code of Practice, the Eastern-Midland Region Waste Management Plan 2015 – 2021, the EPA National Waste Database Reports 1998 – 2012 and the EPA National Waste Statistics Web Resource.

13.3 Receiving Environment

The subject site is located at Ruanbeg Kildare town, Co. Kildare. In terms of waste management, the receiving environment is largely defined by Kildare County Council as the local authority responsible for setting and administering waste management activities in the area. (e.g. Kildare County Council waste management (segregation, storage, and presentation of household and commercial waste) bye-laws 2018.) This is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*.

The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan.
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in December 2017 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12th December 2020 in accordance with the requirements of the Waste Framework Directive. The Kildare County Development Plan 2023 – 2029 also sets policies and objectives for the area which reflect those set out in the regional waste management plan.

There is numerous waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

13.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey age friendly accommodation block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

Additional pedestrian access is provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development. A full development description is provided in Chapter 3 of this EIAR.

The project will involve the development of the proposed Ruanbeg site over a construction period 3-5 years. When considering a development of this nature, the potential waste management impact on the surroundings must be considered for each of two distinct stages:

- Construction Phase.
- Operational Phase.

As stated, the construction phase will involve extensive excavation over the development site and the erection of a new development and associated communal facilities over a phased construction period. These issues are discussed in detail in the following sections. Waste activities relating to the construction, and operation of the development in terms of waste management are discussed.

Demolition Phase

There are no demolition works required as part of the development.

Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, there will be excavations associated with foundations and roads. The project engineers, Punch Consulting have estimated that the approximate volume of removed topsoil is 8,500 m³. This will need to be disposed off site. The approximate volume of subsoil to be excavated is 10,600 m³.

In order to establish the appropriate reuse, recovery and/or disposal route for the material to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out prior to construction on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

In the unlikely event that surplus soils/stones are generated it may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland, In the event of hazardous material being encountered, it will be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will be generated from construction workers e.g., organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP. Table 13.1 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA National Waste Reports, the GMIT and other research reports.

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	100

Table 13.1: Waste materials generated on a typical Irish construction site.

Table 13.2 shows the predicted construction waste generation for the proposed development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average largescale development waste generation rate per m², using the waste breakdown rates shown in Table 13.1 and the schedule of areas supplied by the project architects.

Waste Types	Tonnes	Reuse		Recycle/Recover		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	304.22	10	30.422	80	243.376	10	30.42
Timber	250.43	40	100.172	55	137.7365	5	12.52
Plasterboard	60.34	30	18.102	60	30.17	10	6.34
Metals	85.87	5	4.2935	90	77.283	5	4.29
Concrete	64.4	30	19.32	65	41.86	5	3.22
Dther	114.01	20	22.802	60	68.406	20	22.80
Total	879.27		195.11		598.83		79.60

Table 13.2: Estimated on and off-site reuse, recycle and disposal rates for construction waste.

Operational Phase

An Operational Waste & Recycling Management Plan (OWRMP) (Appendix 13.2) has been prepared for the development. The plan will seek to ensure the development contributes to the targets outlined in the Eastern Midlands Regional (EMR) Waste Management Plan 2015 – 2021. Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the proposed development are summarised below.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Kildare County Development Plan 2023 – 2029*.

Waste Volume (L/week)				
Waste type	Age-friendly Units	Duplexes	Houses	Totals (L)
Organic Waste	75	370	1030	1,475
Mixed Dry Recyclables	855	7585	25630	34,070
Glass	75	370	1030	1,475
Mixed Municipal Waste	855	7585	25630	34,070
Total	1,860	15,910	53,320	71,090

Table 13.3: Residential Waste Prediction (m3/per week)

Waste Volume (L/week)

Non-Residential Floor Areas	Area (Sq.m)	Area (sq.) GIA	Area (sq.) NIA	DMR (Recycling)	Food Waste	MNR (Residual)	Glass	Total (L)
Crèche & Crèche Playground	523.0	481.2	402.71	2013.55	30	2013.55	10	4,067.1
Total	523.0	481.2	402.71	2013.55	30	2013.55	10	4,067.1

Table 13.4: Commercial/Creche Waste Predictions (L/per week)

All waste leaving the site will be recycled or recovered, with the exception of those waste streams where appropriate recycling/recovery facilities are currently not available. All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities. All waste leaving the site will be recorded and copies of relevant documentation maintained.

Hazardous Waste

Hazardous waste may be generated from WEEE, batteries, fluorescent tubes, and cleaning products. Any waste classed as hazardous will be required to be taken to a specialise waste company e.g., Rilta.

13.5 Potential Impacts

Construction Phase

This section details the potential waste impacts associated with the proposed development.

The proposed development will generate a range of non-hazardous and hazardous waste materials during the construction phase. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will need to be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials. Acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arising at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of top soil and sub soil which will need to be excavated to facilitate the proposed development. The project engineers Punch Consulting have advised that the approximate volume of subsoil to be excavated is 10,600 m³ and will be re-used onsite. The approximate volume of additional fill material to underside of pavement and building structural level is 64,030 m³.

The approximate volume of removed topsoil is 8,500 m³. This will need to be disposed off site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

The potential effect of construction waste generated from the proposed development is considered to be **short-term**, and **not significant**.

Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy. This would lead to an increased volume of waste been disposed of site.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g., paper mills and glass recycling).

The waste materials generated on a daily basis will be stored in dedicated waste storage areas.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

Waste collection vehicles will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously. Time and resources should be dedicated to ensuring efficient waste management practices. An Operational Waste & Recycling Management Plan has been submitted with the planning application.

The potential impact of operational waste generation from the development is considered to be **long-term** and **not significant**.

13.6 Potential Cumulative Impacts

The cumulative impact of the additional wastes generated by the proposed development has been considered. The existing waste management infrastructure and procedures for management of waste are sufficient and as such there will be no significant cumulative impact in terms of waste from the proposed development. The potential for cumulative impacts has been considered in relation to the following developments:

- RACE, Dublin Road, Kildare, Co Kildare (Planning Ref. 221538).
- 1 Coolaghknock Avenue, Melitta Road, Kildare Town, Co. Kildare (Planning Ref. 221069).
- 455 Curraghfarm, Dublin Road, Kildare Town, R51 W504 (Planning Ref. 22244).
- Curragh Farm, Dublin Road, Kildare Town, Co. Kildare. R51 W504 (Planning Ref. 22243).

Following the examination of planning applications in the vicinity of the proposed development site there is no potential for cumulate effects if the project building phase overlaps with other developments due to the nature, scale, size, and proximity of these other developments.

13.7 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction Phase

A project specific RWMP (Appendix 13.1) has been prepared in line with the requirements of the guidance document issued by the DoEHLG. Adherence to the high-level strategy presented in this RWMP (Appendix 13.1) will ensure effective waste management and minimisation, reuse, recycling, recovery, and disposal of waste material generated during the construction phase of the proposed development.

Punch Consulting Engineers have estimated that the approximate volume of removed topsoil is 8,500 m³. This will need to be disposed of site. The approximate volume of subsoil to be excavated is 10,600 m³ and this will be re-used onsite. Contractor(s) will endeavor to ensure material taken offsite is reused or recovered off-site or disposed of at authorised facility.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste'.
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling, and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
 - Concrete rubble (including ceramics, tiles, and bricks).
 - Plasterboard.
 - Metals.
 - Glass; and
 - Timber.
- Left over materials (e.g., timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible.

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably banded areas, where required).
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works.
- All construction staff will be provided with training regarding the waste management procedures.
- All waste leaving site will be reused, recycled, or recovered where possible to avoid material designated for disposal.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources.

Operational Phase

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Kildare County Council Development Plan 2023 - 2029*.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
 - Organic/catering waste (including garden waste from landscaping activities).
 - Dry Mixed Recyclables.
 - Mixed Non-Recyclable Waste.
 - Glass.
 - -Waste electrical and electronic equipment (WEEE) including computers, printers, and other ICT equipment.
 - Batteries (non-hazardous and hazardous)
 - Fluorescent bulb tubes and other mercury containing waste (if arising).
 - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development will be reused, recycled, or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities; and

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated

Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved.

13.8 Predicted Impacts

The implementation of the mitigation measures outlined in Section 13.7 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

Construction Phase

A carefully planned approach to waste management as set out in Section 13.7 and adherence to the RWMP during the construction phase will ensure that the impact on the environment will be *short-term, neutral, and imperceptible*.

Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 13.7 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be *long-term, neutral, and imperceptible*.

13.9 'Do Nothing' Scenario

If the proposed development did not go ahead there would be no waste generated at this site and operational waste generated from this site would stay at its current level.

13.10 Worst Case Scenario

The 'worst-case' scenario, is that, should a RWMP not be implemented, the target recycling rates outlined in the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021 and all relevant waste guidance targets will not be achieved. In addition, if waste is not managed and stored correctly on site, this may lead to litter or pollution issues on the site or adjacent sites. However, this is thought to be unlikely having taken into consideration the mitigation measures outlined above.

13.11 Monitoring & Reinstatement

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The RWMP will specify the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste

contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operational Phase

During the operational phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWRMP. There may be opportunities to reduce the number of bins required in the communal Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin requirements will improve efficiency and reduce waste contractor costs. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

13.12 Difficulties in Compiling Information

There were no difficulties encountered during the production of this chapter of the EIA.

13.13 References

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, May 2022).
- Draft Advice Notes for preparing Environmental Impact Statements (EPA, September 2015).
- Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002).
- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003).
- EPA National Waste (Database) Reports.
- The Kildare County Development Plan 2023-2029.
- Waste Management Act 1996 (No. 10 of 1996), as amended.
- Eastern-Midlands Waste Region Waste Management Plan, 2015-2021, Eastern-Midlands Region, 2015.
- The Kildare County Council Waste Management (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws 2018.
- Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste).
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
- Waste Management (Facility Permit and Registration) Regulations 2007, as amended
- Waste Management: Changing Our Ways, The Department of the Environment and Local Government, 1998.
- Preventing and Recycling Waste: Delivering Change, The Department of the Environment and Local Government, 2002.
- Taking Stock & Moving Forward, The Department of the Environment and Local Government, 2004.
- National Strategy on Biodegradable Waste Management, Department Environment, Heritage, and Local Government, 2006.
- A Resource Opportunity – Waste Management Policy in Ireland, Department of the Environment, Community and Local Government, 2012.
- A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025, Department of Communications, Climate Action, and Environment 2020.
- Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous, Environmental Protection Agency, 2015.

- Waste Management in Buildings – Code of Practice, British Standard, BS 5906:2005, 2005.
- Mobile Waste and Recycling Containers Part 1: Containers with 2 wheels with a capacity up to 400 l for comb lifting devices — Dimensions and design, British Standard, BS EN 840-1:2012, 2012.
- Mobile waste containers. Containers with four wheels with a capacity from 750 l to 1700 l with flat lid(s), for wide trunnion or BG-and/or wide comb lifting devices. Dimensions and design, British Standard, BS EN 840-4:1997, 1997.
- Municipal Waste Statistics for Ireland, EPA Waste Data Release, 31 October 2018





14. Cultural Heritage

14.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the proposed residential development on the Cultural Heritage of the site at Ruanbeg, Kildare, Co. Kildare (Figure 14.1) and its environs.

The chapter has been prepared by John Purcell of John Purcell Archaeology, who holds a BA in archaeology, attained in 1997 and has been a licence eligible archaeologist since 2002, and is the director of the company since its establishment in 2003. Accordingly, John has 25 years experience in archaeological and cultural heritage assessment. This chapter includes a desktop study and a site inspection. The desktop section of this chapter was compiled using: The Records of Monuments and Places; buildings of Ireland, Excavations Bulletin; historic maps; aerial photographs; place names and historic books and journals. A geophysical survey was undertaken by JML Surveys in June 2022 (Appendix 14.1). Field walking was undertaken by the author in August 2022.

The recorded and potential cultural heritage resource within the proposed development site and the surrounding its boundary were assessed in order to compile a complete cultural heritage context. The site subject of the proposed residential development does not include any recorded archaeological remains. The geo physical survey recorded a number of potential features although an archaeological interpretation is cautious.

This assessment will accordingly gauge the level of development impact and include recommendations for the mitigation of features of cultural heritage interest present within the development area.

14.2 Methodology

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

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- National Monuments Acts, 1930-2014
- The Planning and Development (Strategic Infrastructure) Bill, 2006
- Heritage Act 1995
- Frameworks and Principles for the protection of Archaeological Heritage 1999
- Architectural Heritage (National Inventory) and Historic Monuments and the Local Government (Planning and Development) Act 2000

Study Methodology – Desktop Study

This assessment consists of a paper survey identifying all recorded sites within the vicinity of the proposed development and a site inspection. The methodology has been conducted based on the guidelines from the Department of Culture, Heritage and the Gaeltacht (DAHG).

The desktop survey undertaken consisted of a document and cartographic search utilising a number of sources including the following:

- Record of Monuments and Places (RMP); The RMP records known upstanding archaeological monuments, the original location of destroyed monuments and the location of possible sites identified through, documentary, cartographic, photographic research and field inspections.
- The RMP consists of a list, organised by county and subdivided by 6" map sheets showing the location of each site. The RMP data is compiled from the files of the Archaeological Survey.
- National Inventory of Architectural Heritage; The inventory of architectural heritage lists all post 1700 structures and buildings in the country. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.
- County Development Plans; The Development plan was consulted to ascertain if any structures listed in the Record of Protected Structures (RPS) and/or any Architectural Conservation Areas (ACAs). The Record of Protected Structures lists all protected structures and buildings in Meath. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.
- Cartographic Sources; The following maps were examined: Down Survey, 1st edition Ordnance Survey Maps (1836-1846) and 2nd edition Ordnance Survey Maps (1908), Rocque Map and the Cassini Map.
- Literary Sources; Various published sources, including local and national journals, were consulted to establish a historical background for the proposed development site. Literary sources are a valuable means of completing the written record of an area and gaining insight into the history of the environs of the proposed development. Principal archaeological sources include: The Excavations Bulletin; Local Journals; Published archaeological and architectural inventories; Peter Harbison, (1975). Guide to the National Monuments of Ireland; and O'Donovan's Ordnance Survey Letters.
- Previous archaeological assessments and excavations for the area were reviewed. This includes the 2009 geophysical survey and the subsequent archaeological testing undertaken in 2010.

A comprehensive list of all literary sources consulted is given in the bibliography/references section of this Chapter below.

Site Inspection

An archaeological field inspection survey seeks to verify the location and extent of known archaeological features and to record the location and extent of any newly identified features. A field inspection should also identify any areas of archaeological potential with no above ground visibility. Many monument types do not leave surface markers. Wooden sites such as prehistoric house or burials may only be recorded through excavation works.

Site visits were undertaken in August 2022.

Assessment Criteria

The criteria used to assess the significance of the impact of a development on an archaeological landscape, site, feature, monument or complex are defined as follows:

- **Profound:** Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed by a proposed development.
- **Significant:** An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological feature/site.
- **Moderate:** A moderate direct impact arises where a change to the site is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised, and which is reversible. This arises where an archaeological feature can be incorporated into a modern-day development without damage and that all procedures used to facilitate this are reversible.
- **Slight:** An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological feature or monument.
- **Imperceptible:** An impact capable of measurement but without noticeable consequences.

14.3 Receiving Environment

The proposed development is to the east of Kildare Town in the townlands of Curragh Glebe and Collaghknock Glebe. The site has been in use as pasture. The development consist of three fields delineated by mature trees. The townland boundary between Curragh Glebe and Collaghknock is located at the south of the site. The open commonage, The Curragh is located to the east. The M7 is to the south.

14.4 Characteristics of the Proposed Development

The proposed development will consist of a Large-scale Residential Development of 295 no. units. The development will include one, two, three and four bed units in the form of two storey detached, semi-detached / terraced houses, along with 3 no. three storey duplexes/apartments and a single storey

sheltered housing block. The development also includes a creche along with associated car parking, bicycle parking, landscaping, and open spaces. Vehicular and pedestrian access will be provided from the Dublin Road (R445) and via Ruanbeg Avenue. Additional pedestrian access will be provided via Ruanbeg Park. All other site works including boundary treatments and site services to facilitate development.

14.5 Brief Archaeological and Historical Background

Archaeological Background

Mesolithic to Bronze Age

Hunter-gatherer communities or Mesolithic people reached Ireland around 8000 BC. Early Mesolithic sites in Ireland are frequently found in coastal areas or further inland along river valleys. These settlers have left little trace on the landscape. Most Mesolithic sites are found accidentally, often by recovering Mesolithic stone tools from ploughed fields. The recovery of artefacts and identification of sites is usually where farmland is ploughed or in areas where developments include a topsoil strip. Most of the known Mesolithic material has been found on archaeological excavations. The Mesolithic period is divided into two periods – early (c. 8000–6500 BC) and late (6500–4000 BC) based on the type of tools.

The arrival of agriculture in the Neolithic Period led to a more sedentary way of life. The most visible remains associated with this period are megalithic tombs. These are recorded across the country. Over 90 Neolithic houses have been recorded across Ireland. These are usually not visible at ground level and are only recorded during archaeological testing and excavation.

The commonest prehistoric monument are barrows. These are associated with the Bronze/Iron Age burial tradition (c. 2400 BC - AD 400) and are defined by an artificial mound of earth or earth and stone, normally constructed to contain or conceal burials. These sites vary in shape and scale and can be variously described as bowl-barrow, ditch barrow, embanked barrow, mound barrow, pond barrow, ring-barrow and stepped barrow. The incidence and frequency of these sites in the area attests to the extent of prehistoric settlement in this area from earliest times.

Iron Age to Early Medieval Period

In late Bronze Age Ireland the use of the metal reached a high point with the production of high quality decorated weapons, ornament and instruments, often discovered from hoards or ritual deposits. The Iron Age however is known as a 'dark age' in Irish prehistory. Iron objects are found rarely, but there is no evidence for the warrior culture of the rest of Europe, although the distinctive La Tène style of art with animal motifs and spirals was adopted. Political life in the Iron Age seems to have been defined by continually warring petty kingdoms vying for power. These kingdoms, run on an extended clan system, had their economy rooted in mixed farming and, in particular, cattle. Settlement was typically centred on a focal hillfort.

Settlement in the Early Medieval Period is defined by the ringfort. These are the commonest monument across the country and have been frequently recorded in the environs of the town.

The introduction of Christianity to Ireland in the fifth century had a profound impact on Gaelic society, not in the least in terms of land ownership and the development of churches and religious houses. A number of early Christian Monuments are located in the vicinity of the site these include Holy Wells and Bullaun stones.

Historic Period

Following the Norman Conquest of the county a number of Motte and Baileys were constructed in the area, including the site at the rear of the site. These consist of square, rectangular or occasionally circular area, sometimes raised above the ground, enclosed by a wide, often water-filled, fosse, sometimes with an outer bank and with a wide causewayed entrance. They date to the late 13th/early 14th centuries and were primarily fortified residences/farmsteads of Anglo-Norman settlers though they were also built by Gaelic lords. These represent the first Anglo Norman foray in the area. After the moated sites a series of Tower Houses were built across the county by the Normans descendants and local families.

Post Medieval Ireland

Seventeenth century Ireland saw massive upheaval a result of the Confederate wars, the Cromwellian response and the Wars of the two kings. The impact on the country was profound. It has been estimated that up to a third of the population was wiped out because of famine, disease and war. Soldiers were given land as payment resulting in further upheaval of the local population and the establishment of large estates. These came to dominate the landscape from this period onwards. Religious intolerance in other parts of Europe resulted in the expulsion of the Huguenot from France which were welcomed by the English Crown into Ireland.





Figure 14.1: Extract from the RMP for the development with the site marked

Archaeological Monuments

The proposed development does not include any registered monuments, however there are a number in the wider vicinity. These are listed below:

KD022-052----

Class: Barrow - ring-barrow

Townland: CURRAGH (Kildare ED)

A circular area is enclosed by a fosse and an external bank (max diam. c. 15m). It has a very 'fresh' appearance, and may have been a military field-kitchen.

KD022-037----

Class: Burial

Townland: COLLAGHKNOCK GLEBE

According to Lucas (1969, 103), an adult female burial was found near the surface (D 0.55m) in a natural sand hill or esker. Apparently unprotected, the skeleton was orientated SW-NE, with the skull at the SW. No grave goods were noted.

KD022-051----

Class: Linear earthwork

Townland: CURRAGH (Ballysax East ED)

Two sections of earthwork are defined by two, low, parallel, earthen banks with an intervening fosse: one runs NNE-SSW between the Little Curragh and the Curragh Racecourse (est. traceable L. c. 2000m), the other runs perpendicularly E from the first, crossing the Curragh between the Curragh Racecourse and St. Legers Bottoms (est. traceable length L. 3000m). O'Riordáin (1950, 270-71), having excavated a small section near the junction of the two earthworks and found a fairly broad, deep fosse (Wth c. 2.1m; D c. 1.2m) flanked by insubstantial earthen banks, concluded that it was neither road nor boundary, and suggested that it might have been used for driving livestock across the Curragh. In 1998, limited archaeological excavation (O'Keeffe 1999, 4: Excavation licence no. 98E0059) across the presumed N-S line of the monument at the E edge of the Curragh (located at ITM 674952 712976) in advance of a gas pipeline found no evidence of a pre-modern earthwork.

KD022-049----

Class: Barrow - ring-barrow

Townland: CURRAGH (Kildare ED)

A raised circular area (diam. c. 20m) containing a small central mound (diam. 3.2m), defined by an inner bank, a fosse, and traces of slight outer bank (overall diam. 32m). Partial excavation by O'Riordáin (1950, 259-269: Site 6) revealed a two-period monument. Phase 1: comprised a low central mound of earth and stone covering the extended inhumation of an adult (head to NW), enclosed by two concentric fosses (c. 6m and c. 8m from the centre) and two smaller fosses close to the central mound - a possible multiple ring-barrow. O'Riordáin suggested that the larger fosses had external banks and that the smaller fosses provided material for the central mound. Phase 2: a cemetery of twelve extended inhumations (head to W), including two children, three adults, two adult females and four adult males was enclosed by the large fosse and bank visible today, and the central mound was also enlarged during this phase. Finds (none directly associated with burials) included six pieces of flint (two worked), one polychrome glass bead (white, yellow and blue), several sherds of medieval pottery and three other sherds with horizontal-line decoration.

KD022-118----

Class: Burial ground

Townland: KILDARE

In September 2014, previously unrecorded burials were discovered during site works in advance of a development on Hospital St., Kildare town. The discovery was reported to the relevant authorities and an archaeological investigation of the area occurred (pers. comm. Mr. Rob O'Hara, Archer Heritage PlanningLtd.).

Thirty six burials were discovered within an area measuring c. 30m x c. 20m on a SW-facing hill-slope. Twenty one were relatively complete burials; eight were partially complete burials and seven were ex-situ disarticulated spreads of bone perhaps from multiple sources and which appeared to be located on the path of furrows running NW-SE across the site. Some may have been reburied bone. Most in-situ bone was fragmented or truncated to some degree. Disarticulated bone was collected

from topsoil during stripping and clean-up. There were distinct clusters of burials some with different orientation perhaps indicating different groups of burials over a number of generations. The burials were almost exclusively adult, with one older juvenile and other potential juveniles. No neonates were noted. The majority were supine extended burials with different placement of hands and arms.

KD022-029001-

Class: Historic town

Townland: GREYABBEY, KILDARE, TULLY EAST, TULLY WEST

On a low ridge at the W-edge of the Curragh. According to Bradley et al. (1986 vol. 3, 196-265), the name Kildare is derived from Cill Dara, 'the church of the oak', a tree which, according to the 7th century writer Cogitosus, stood beside St. Brigid's early-6th century monastery (KD022-029002-). The Annals of Clonmacnoise record that in 1012, 'all the Town of Kildare was burnt by a thunderbolt but one house', suggesting a secular, urban-type settlement had developed in association with the monastery. A borough was established at Kildare before 1176, and became the principal manor of Strongbow's Lordship in north Leinster, and the earliest fortification may have been a motte (KD022-029025-). By the end of the 13th century, Kildare contained a castle (KD022-029004-), a cathedral (KD022-029005-), and both Franciscan (KD022-029006-) and Carmelite friaries (KD022-029007-). A parliament was held there in 1309-10. In 1316, John Fitzthomas, newly created earl of Kildare, was granted the town and castle. Bradley et al (op. cit., 199) suggest a population of about 1,000 in the town in the early-14th century. In 1515, the town received a new charter, and a weekly market and burgesses were licensed to enclose the town with walls and a fosse (KD022-029009-). It was the scene of an engagement in 1598, during the Nine Years War, when it was so badly damaged that it was described by Fynes Moryson (1907, ii, 351) as, 'altogether disinhabited'. The cathedral was ruined and roofless in 1604, and a number of properties were described in 1607 as 'ruinous' or 'lately burned'. However, the town recovered to become an important garrison site during the Confederate War of 1641-53. Around 1659, the Census of Ireland noted a population of 359 (Pender 1939, 395). (Gwynn and Hadcock 1970, 320; Orpen 1911-20, 374-381; Gilbert 1884, ii, 339)

RMP	Type	Townland	Proximity (m)
KD022-052	Ring barrow	Curragh	500m
KD022-037	Burial	Collaghknock Glebe	550m
KD022-051	Linear Earthwork	Linear	750m
KD022-049	Ring barrow	Curragh	900m
KD022-029001	Historic Town	Greyabbey	1.45KM
KD022-118	Burial Ground	Kildare	1km

Table 14.1: Recorded monuments

Architectural Heritage

The site does not include any structure listed in the National Inventory of Architectural Heritage (Figure 14.1). None are located within 400m of the study area. The site does not include any other structures.

Previous archaeological Excavations

The database of Irish excavations is a comprehensive list of previous archaeological excavations by townland. There are no entries in the database for Curragh Glebe.

Cartographic Evidence

An analysis of the cartographic evidence for the site was undertaken. This included;

- The 17th Down Survey of Ireland.
- First edition Ordnance Survey Maps.
- 25" map

Down Survey

The Down Survey map was undertaken between 1656 and 1658 by Sir William Petty, thus recorded the lands confiscated after the Cromwellian Wars. The maps record townland boundaries, rivers, roads, towns, churches, fortifications and land use.

The town of Kildare is visible on the map but no details are visible for the study area.



Figure 14.2: Down Survey map with the site marked

First edition Ordnance Survey Maps

The Ordnance Survey map was the first detailed large scale survey of Ireland and was surveyed between 1829 and 1842. The maps are very accurate and show details of boundaries and structures. The first edition map shows a similar layout as at present. The southern section of the site is sub divided into a number of fields. No features indicative of archaeological remains were visible in the map.



Figure 14.3: First edition OS map for the site

25 Inch Map

The 25" map were surveyed between 1890 and the early 1900's and shows in detail the townland boundary and properties. At this stage the current field system was visible. The fields had been enlarged. No features indicative of archaeological remains were visible in the map.



Figure 14.4: 25" map for the site

Site Survey and Geophysical Survey

Site Survey

A site visit was undertaken on a dry overcast day in August 2022. All areas of the proposed development were assessed. No difficulties were encountered. The survey has shown that the study area consists of three interlinking fields. These are currently in use as pasture. The townland boundary between Curragh Glebe and Collaghknock Glebe was assessed. Sometimes townland boundaries can reflect ancient territories and evidence of these can be identified during surveys. The hedgerow between the townland was examined and no archaeological features were identified. No features indicative of archaeological remains were identified.



Plate 14.1: Looking north over the study area



Plate 14.2: Looking northeast over the site



Plate 14.3: Looking southwest over the site

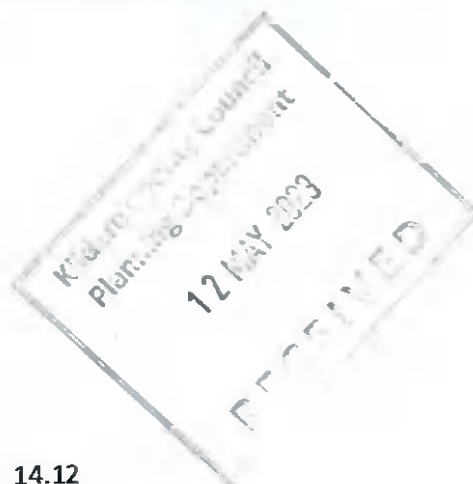




Plate 14.4: Looking west over the western extent of the site

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Plate 14.5: Looking south over the site



Plate 14.6: Southeast extent of the site

Geo Physical Survey

A geophysical survey was undertaken by JML Surveys in June 2022 (Licence number 22R0168, attached). The survey showed the data was dominated by modern magnetic disturbance and numerous ferrous responses, indicative of modern litter. An area of increased responses in Area A may be of interest, however interpretation is cautious. The increased response may represent a spread of buried modern litter. Unusual responses in Area B comprise of a large ferrous response and an area of increased response. No clear archaeological interpretation can be provided and it is speculated that more recent ground disturbance and activity is represented here. In Area C, linear responses and trends are indicative of former field divisions and agricultural activity. These appear to correlate with the location of a farm building as depicted in the historic OS 6inch map.



Figure 14.5: Results of Geophysical survey

14.6 Potential Impacts

Construction Phase

This cultural heritage assessment has employed a variety of sources in conjunction with non-intrusive walkover survey to make a coherent assessment of the cultural heritage risk associated with the project. No archaeological features were identified during the walkover survey of the site. The geophysical survey identified two areas of possible archaeological interest.

In the absence of the mitigation measures described below, the impact on these possible archaeological features, as a result of the construction phase would be profound. Ground works at the site in the absence of mitigation could result in accidental damage to sub surface remains and obliterate sensitive remains. Heavy machinery crossing and storage of material would damage deposits not visible at ground level. Should the development proceed as planned, and with the appropriate mitigation strategies the impact on the enclosure will be low and will not cause significant consequences to the archaeological remains at the site.

Operational Phase

There are no potential impacts on archaeological cultural heritage expected as a result of the operational phase of the proposed development, as it is anticipated that issues of archaeological and cultural heritage interest will have been resolved prior to or during the construction phase.

14.7 Potential Cumulative Impacts

It is currently anticipated that matters of archaeological and cultural heritage interest will be resolved in advance of the operational phase. There will be no cumulative effect on the archaeological landscape as a result of the proposed development.

The development of further sites in the vicinity of the study area in the future are not anticipated to have an impact on archaeological heritage. Such future developments would be subject to planning permission, together with standard procedures in the assessment, identification and preservation of archaeological and cultural heritage features. Once the requirements of the Council and the DHLGH are met on all sites, the cumulative impact of development in this area on archaeology and cultural heritage is considered to be neutral, not significant and permanent.

14.8 Mitigation Measures

Construction Phase

Prior to any construction at the site a programme of archaeological testing should be undertaken. Please refer to Cultural Heritage Response letter (Appendix 14.2). This will allow for any sub surface archaeological remains at the site to be identified. These works will be under licence to the National Monuments Service (NMS) at the Department of Housing, Local Government and Heritage (DHLGH).

Should any archaeological features be identified the NMS should be immediately notified and a strategy for the resolution of the remains should be formulated. This may include preservation in situ or preservation by record or excavation.

Operational Phase

It is expected that all archaeological issues will be resolved in advance of construction. As a result there is no mitigation required at operational phase.

14.9 Predicted Impacts

Construction Phase

Should mitigation strategies be enacted there is no predicted impact on the archaeological resource of the site at construction phase. Should mitigation not be implemented the impact on as yet unrecorded archaeological deposits at the site would be profound.

Operational Phase

It is expected that all archaeological issues will be resolved in advance of construction. As a result there is no predicted impacts at operational phase.

14.10 'Do Nothing' Scenario

Should the development not proceed this will have no impact on or enhance the archaeological heritage of the site. Should this proposed development not proceed, given the sites sought after

location, its zoning for residential development and the pressing need for housing, it is likely that development will proceed in the near future.

14.11 Worst Case Scenario

Should the appropriate mitigation strategies not be implemented, and development proceed the archaeological landscape would be damaged.

14.12 Difficulties in Compiling Information

No difficulties that could hinder the archaeological assessment were encountered.

14.13 References

Department of Arts, Heritage, Gaeltacht & the Islands, 1999, Policy and Guidelines on archaeological excavation.

Herbison, 1975, Guide to the National Monuments of Ireland, Gill and MacMillan.

Mallory J.P. and MacNeill, T.E. 1991, The Archaeology of Ulster, Institute of Irish Studies, Queens University Publications.

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15. Interactions

15.1 Introduction

As a requirement of the Planning and Development Regulations 2001, as amended, and the EPA Guidelines (2022), not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

Under the Regulations interactions between the various environmental factors, are to be assessed as well as the vulnerability of the proposed development to the risk of natural disaster.

15.2 Assessment

Where an interaction is likely, it is given a reference number in the matrix and detail of the interaction is recorded below. The significance, quality – whether it is positive, negative or neutral – and the duration of the interaction is assessed. The interactions are listed in numerical sequence, purely for referencing purposes. Each of these interactions have been addressed in the relevant EIAR chapters.

	Population	Biodiversity	Soil	Hydrology	Noise	Air and Climate	Landscape	Traffic	Waste	Cultural Heritage	Material Assets
Population											
Biodiversity											
Soil	1	10									
Hydrology	2	11	16								
Noise	3	12									
Air and Climate	4	13	17								
Landscape	5	14	18								
Traffic	6										
Waste	7										
Cultural Heritage	8										
Material Assets	9	15									

Table 15.1: Table of interactions (Below Table)

1. Population & Human Health / Soils

There is potential for dust generation during construction works, which under dry and windy conditions could lead to localised dust impacts for the small number of properties proximate to the development site. However, the implementation of dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust. As a result, the impact will be temporary, imperceptible and neutral/ negative.

2. Population & Human Health / Hydrology

Failure or mismanagement of the potable water supply could lead to its contamination during the construction phase. A range of mitigation measures, as outlined in Chapter 7, will be put in place during the construction phase of the development to ensure this does not occur. The correct implementation of these mitigation measures will ensure that the potential impacts on hydrology and water services during the construction phase will be imperceptible and short term.

3. Population & Human Health / Noise

Increased noise levels during the construction phase will be temporary and are not expected to have a long-term significant adverse effect upon the local population. The application of binding noise limits, hours of operation, along with implementation of the mitigation measures, as identified in Chapter 8 and the CEMP, will ensure that noise and vibration impact will have a negative, moderate, and short-term impact on the surrounding environment.

The impact due to the increased traffic associated with the operational development is expected to be neutral, imperceptible, and long-term.

4. Population & Human Health / Air

The completed development will generate additional emissions to the atmosphere due to traffic associated with the development. However, air quality in the vicinity of the site is expected to remain within air quality standards, and the impact is expected to be imperceptible.

During construction, there may be potential for slight dust nuisance in the immediate vicinity of the site. However, dust control measures, such as wheel washes, covering of fine material etc. will minimise the impacts on air quality. As a result, the impact will be temporary, imperceptible and neutral/ negative.

5. Population & Human Health / Landscape

Existing residents and visitors to the "Ruanbeg" and Dublin Road area interact with the landscape, such that they will be aware of a significant change at this site from a vacant greenfield site to a new residential development with a mix of unit types, building heights, open spaces etc.

6. Population & Human Health / Traffic

Chapter 11 notes that, provided the mitigation measures and management procedures outlined in the Construction Environmental Management Plan are incorporated during the Construction Phase, the residual impact upon the local receiving environment is predicted to be temporary in the nature and slight in terms of effect.

Once complete, the proposed development will operate well within capacity during the AM and PM peak hours in the 2026 + Proposed Development (Opening Year) scenario and would continue to do so for the future assessments.

7. Population & Human Health / Waste

As noted in Chapter 13, a carefully planned approach to waste management as set out in the mitigation measure, and adherence to the Resource Waste Management Plan (which include mitigation) during the construction phase will ensure that the effect on the environment will be *short-term, imperceptible and neutral*.

During the operational phase, a structured approach to waste management as set out in Chapter 13 and adherence to the OWMP (which include mitigation) will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be long-term, imperceptible and neutral.

8. Population & Human Health / Cultural Heritage

There are no protected structures on site or any areas of architectural conservation in the area so these will not be impacted. Prior to commencement it is recommended that an archaeological assessment is carried out in line with the recommendations in chapter 14. With the implementation of the mitigation measures in Chapter 14 the impact of the proposed development on cultural heritage will be minimal, if any.

9. Population & Human Health / Materials Assets

There is the potential for contamination of potable water supply, gas leaks or explosions, loss of supply of services. With the implementation of the mitigation measures in Chapter 12 the impact of the proposed built services on human health is likely to be imperceptible.

10. Biodiversity / Soils

With the protective measures noted in Chapter 5 in place during Construction Phase and for excavation works, any potential impacts on soils and geology at the Site and surrounding area will be avoided and there will be no significant adverse impacts on the land, soils and geology of the subject lands are envisaged. There are no predicted significant adverse impacts are predicted on land, soils or geology associated with the Operational Phase of the Proposed Development.

11. Biodiversity / Hydrology

A deterioration in water quality would impact upon aquatic flora and fauna, would negatively affect the fishery industry and in very severe cases, may impact upon any water-based leisure activities and amenities of the area. A deterioration in water quality could occur during construction works through the release of suspended solids during soil disturbance works, the release of uncured concrete and hydrocarbon spillages, and during the operational phase due to the discharge of treated effluent. Suspended solids potentially entrained in surface water run-off during construction works can impact upon aquatic habitats through deposition, reducing clarity and by potentially increasing nutrients which are bound to the suspended solids. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. Consequently, an impact on fish would affect fauna, such as the otter (*Lutra lutra*), who prey on fish.

During construction works, there would be a potential risk to water quality from releases of uncured concrete and hydrocarbons from the operation of heavy construction plant and associated equipment. Uncured concrete has the potential to alter the pH of waters locally, while hydrocarbons can lead to potentially toxic and / or de-oxygenating conditions within waters. The proposed development would not be anticipated to have a significant impact on aquatic flora and fauna due to a deterioration in water quality of any nearby watercourses (See Figure 5.8 in Chapter 5) during either the construction or operational phase. During the construction phase, ground water quality would be protected through the implementation of mitigation measures, which include the use the regular maintenance and inspection of construction plant and the appropriate storage of potentially polluting substances.

During the operational phase, no impact on water quality is anticipated as wastewater will flow to the existing main municipal sewer (Kildare D0178-01). The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive (Irish Water, 2021). Surface/stormwater run-off will flow through a drainage system and attenuation system within the site to prevent any sediments or hydrocarbons impacting on groundwater. During the operational phase the site will not have an impact on watercourses given the lack of a direct hydrological connection.

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12. Biodiversity / Noise

During the construction phase, noise may be generated due to increased vehicle movements and the operation of construction plant. It is anticipated that there would be a moderate impact, for a limited period of time, on any fauna within the vicinity of the development. Control and mitigation measures would be implemented to reduce noise, including measures relating to equipment operation and maintenance and timing of activities. Given the transient nature of construction works, and provided mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon fauna.

During the operational phase noise would be typical of an urban residential development. There would be would no significant impact on fauna within the vicinity of the proposed development.

13. Biodiversity / Air

An adverse impact on air quality has the potential to cause dust nuisance and cause disturbance to fauna. The risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national / global scale. Air emissions would be typical of residential buildings, being primarily from heating and therefore low impact in-and-of-itself. In-combination residential impacts would be controlled by national energy policies and grant schemes. While there would be increased dust emissions during the construction phase, these would not be considered to pose a significant risk owing to the transient nature of construction works and the construction timeframe.

During the construction phase of the development, there would be potential for dust emissions, which could impact upon flora and fauna in the surrounding area. The potential impact of dust would be temporary, given the transient nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required,

including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required.

14. Biodiversity / Landscape

The changes to the landscape of the subject site are predicted to have a neutral imperceptible effect on biodiversity.

The proposed landscape masterplan includes the planting of native trees and other vegetation along with the introduction of ponds throughout the site. This will have a positive, moderate, likely and permanent on biodiversity.

15. Biodiversity / Material Assets

The proposed development would alter flora cover and the species of fauna supported due to land take and soil disturbance works. This impact would be minor due to the low ecological value of the habitats present at the proposed development. The habitats of note at the development site are hedgerows and treelines with the majority of hedgerows to be maintained and trees removed will be replanted. The landscape plan includes areas that are less intensively managed such as meadows and wetland planting schemes that will provide a more diverse range of habitats within the proposed development.

16. Soils / Hydrology

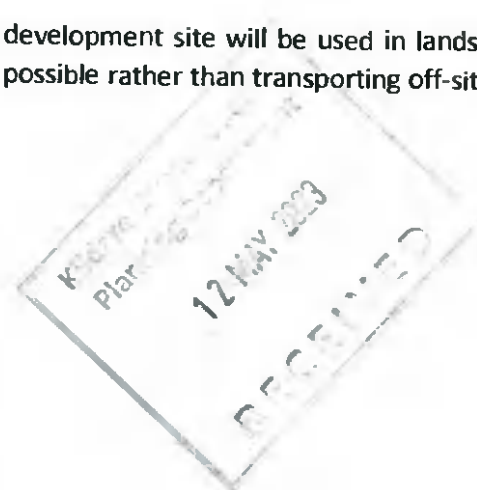
The construction phase could result in uncontrolled sediment erosion, contaminated silty run-off, and pollution of surface waters by mobilised suspended solids. Mitigation measures, as outlined in Chapter 7 and the CEMP, will be implemented during construction to prevent these potential impacts. As a result the impact will be imperceptible and short-term.

17. Soils / Air

Exposed soil during the construction phase of the proposed scheme will give rise to increased dust emissions. Chapter 9 notes that when the dust management measures, as outlined in Chapter 9, are implemented, fugitive emissions of dust from the site will be neutral effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

18. Soils/Landscape

Residual soils arising as a result of excavation at the development site will be used in landscaping works in the proposed public open spaces as much as possible rather than transporting off-site. This impact will be imperceptible and long-term.



16. Schedule of Mitigation Measures

16.1 Introduction

Given the complexity of the proposed development and this EIAR, this chapter seeks to provide a complete summary of mitigation measures proposed in Chapters 4 to 16. The appointed contractor will be required to adhere to the mitigation contained in the EIAR. Monitoring of the effectiveness of mitigation measures put forward in the EIAR document by the competent authorities is also integral to the process.

16.2 Construction Phase

Population and Human Health	A Construction and Environmental Management Plan (CEMP) has been prepared by Panther Ecology Limited and will be implemented during the construction phase to reduce the detrimental effects of the construction on the environment and local population and is submitted with this application. Construction noise and vibration impacts are expected to vary during the construction/demolition/ site clearance phase depending on the distance between the activities and noise sensitive buildings and that best practice control measures will ensure impacts at off-site noise sensitive locations are minimised. These are outlined in detail in Chapter 8. Chapter 11 Traffic and Transportation and the CEMP submitted with the application include traffic management measures to minimise the impact of construction traffic. These measures are put forward to avoid any significant negative environmental impacts on the population and human health. No additional mitigation measures are considered necessary.
Biodiversity	Terrestrial Biodiversity Protection Protocol As a matter of standard construction practice, the development would be constructed in accordance with the following methods and guidelines: • All construction works would be confined as far as possible to the development footprint; • Where possible, vegetation removal works would be scheduled outside of the 1st of March to the 31st of August period, so as not to disturb nesting bird species; • If works should take place beside any trees that will remain as part of the landscape plan, then a root protection zone will be established to ensure no construction works will disturb the root zone (See Appendix S.5); • The Tree Protection Plan has been prepared with regard to the British standard BS 5837:2012 Trees in relation to design and construction recommendations this standard gives recommendations and guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees, including shrubs, hedges and hedgerows, with structures; • The construction works contractor will take cognisance of the NRA's document "Guidelines for the Protection and Preservation of Trees,

Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes", 2006. In particular, the construction works contractor will take cognisance of the guidelines with regards soakaway, sewage system and drainage ponds area and the determination of the root protection area of the existing trees to be retained within the development site;

- A Landscape Plan has prepared as part of the development and has taken into consideration the urban setting and the use of native species where possible, with native tree species only used along the east and northeast boundary in proximity to the Curragh Buffer zone (See Appendix 5.7);
- The landscape plan includes areas of meadow, wildflower meadows, wetland planting and bioretention areas. These areas are being planted with native flora that will increase biodiversity and pollinator activity within the proposed development;
- All planting of trees and hedges to be undertaken during bare root season November to April. The balance of tree & shrub planting and lawn & meadow seeding to be completed within 12 months of the completion of construction work of the development.

Badger

Mitigation measures will be put in place regard for Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2006).

- The building site will be made safe for mammals with hazards such as open holes/excavations covered over or fitted with ramps to allow for escape. Guidelines on both active and inactive sets must be followed
- "The destruction of a successfully evacuated badger sett may only be conducted under the supervision of qualified and experienced personnel under licence from the NPWS. The possibility of badgers remaining within a sett must always be considered; suitable equipment should be available on hand to deal with badgers within the sett or any badgers injured during sett destruction"
- Where possible, no construction works will be conducted outside of normal working hours, to reduce potential noise disturbance to nocturnal species.
- Should a Badger be found during the construction phase of the project, an officer of the NPWS will be notified prior to the resumption of construction works.
- Before site clearance works begin a badger survey must be completed. If a badger sett is found within or outside boundary but within 150m then a Badger Conservation Plan must be put in place before works commence.

Bats

- No chemicals will be used within the development site and will not be used near treelines and hedgerows or any drainage system;
- The planting of landscape features integrated to the wider network of green corridors such as hedgerows, woodland and scrub, the landscape plan has maintained connectivity along the north east boundary of the site;

Kildare County Council Planning Department 12 MAY 2023 RECEIVED	• Bat boxes can be installed to suitable mature trees along the site boundary; • Bats rely on linear habitats such as hedges to fly through the landscape. The landscape plan includes the protection of the majority of hedgerows along the boundary with future replanting of mature trees in the south 15m industrial buffer zone; • Felling of moderate roost potential trees should be only undertaken in the period late August to late October/early November; • Felled trees should be left for 48 hours, to allow for any potential bats to escape; • See Bat Conservation Ireland Guidelines on hedgerow management for bats. https://www.batconservationireland.org/wp-content/uploads/2022/07/ManagingHedgerows-for-Bats.pdf Artificial Lighting during construction phase • Construction works in the hours of darkness, when bats are active (April – October), will be kept to a minimum; • Lighting of hedgerows / treelines will be avoided where possible; • Should lighting be required during construction works, it will be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used; • Directional lighting will be used where possible, by use of louvres or shields fitted to the lighting; White light emitting diode (LED) will be used where possible, which is considered to be low impact in comparison to other lighting types Birds And Other Fauna • No hedgerow or tree removal works to take place during the bird breeding season; • Bird boxes should be installed within the development site; • Stormwater from the proposed development would comprise of clean rainwater run-off from roof and paved areas and would be directed to the drainage network and attenuation system within the proposed development, this system will be SuDS compliant and discharge to ground; Invasive Species The following controls for the prevention / treatment of invasive flora species would be implemented throughout the construction phase of the development: • Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place; • The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to, and leaving from, the development site; • All relevant construction personnel would be trained in invasive flora species (main species of concern) identification and control measures;
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- In the unlikely event of an invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of to a suitably licenced facility, in accordance with Regulation 49 of the 2011 Regulations;
- Regulations;
- Cognisance would be taken of the National Roads Authority's Guidelines on "The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads".

Aquatic Ecology

Stormwater from the proposed development would comprise of clean rainwater run-off from roof and paved areas and would be directed to the drainage network and attenuation system within the proposed development.

A nature-based solution has been designed to ensure the proposed development is more ecologically beneficial to the environment by including bioretention areas, swales, green roofs and attenuation tanks with ponds.

Ground Water

The following mitigation measures would be proposed to ensure there is no significant impact upon the groundwater:

- The construction works contractor will adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "Control of Water Pollution from Construction Sites; guidance for consultants and contractors" 2001 and "Control of Water Pollution from Construction Sites – Guide to Good Practice", 2002;
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter any drainage system;
- Silt control features would be inspected on a daily basis and maintained as appropriate;
- Manhole covers and stormwater gullies along the R445 will be protected by silt blankets;
- Stripping of topsoil will be coordinated with the proposed staging for the development;
- Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- Silt fencing would be placed around spoil areas until such time as the excavated soil has been used in landscaping / re-instatement works;
- The R445 road would be inspected and regularly cleaned to prevent sediments being transported along roads;
- The use of pre-cast concrete where possible;
- The delivery and pouring of concrete would be supervised;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;

	• Where re-fuelling of construction plant is required to take place onsite, re-fuelling would take place within a bunded area. Under no circumstances would re-fuelling take place within the vicinity of a treeline/ hedgerow or on exposed soil; • Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be available onsite; • In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor; • Should water be encountered during excavation works, water would be pumped to a constructed silt control feature, such as a settlement pond or detention pond. A filter would be provided at the pump inlet and, where required, dewatering bags or silt fences would be used at the outlet to retain any potential silt entrained in the water. Pumping operations would be supervised at all times; • Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds; • There would be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities would be stored for removal off site for disposal and treatment; • Any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers; 110% of the largest drum volume or 25% of the total volume of containers; • Deliveries of fuels and oils to the site would be supervised; • Fuels / oils would be handled and stored with care to avoid spillage or leakage • Where appropriate, small construction plant equipment would be placed on drip trays; • Any waste fuel / oils would be collected in bunded containers at a designated area and properly disposed of to an authorised waste contractor.
Land, Soil and Geology	Stripping Topsoil Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed phasing of 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 not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil stockpiles will also be located so as not to necessitate double handling. Surface water runoff from areas stripped of topsoil will be directed to temporary on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate. On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.

Excavation of Subsoil Layers

Excavation of existing subsoil layers has been minimised as far as reasonably practicable. Cut type earthwork operations will be required to achieve designed site levels. Cut material is considered likely to be suitable to be reused as non-structural fill elsewhere on site. Confirmation of general suitability will be determined at detailed design stage, and individual loads will undergo sporadic testing to confirm uncontaminated status prior to widespread use on site. Dependent on the results of the detailed site investigation, any subsoil proposed for structural fill will undergo soil improvement work required at the direction of an appointed geologist.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

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. Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

Mitigation of soil volumes could be undertaken by soil stabilisation and reuse of excavated subsoil layers and reuse in proposed pavement and building areas.

Imported Fill

The source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is "clean" (i.e. will not contaminate the environment). Project contract and procurement procedures will be developed to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.

No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area. Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling

Construction Traffic

A construction traffic management plan will be developed and implemented in order to minimise the disturbance caused by large vehicles. This management plan shall include and detail:

- Predetermined haul routes for earthworks plant and vehicles delivering construction materials to site.

12 MAY 2023 RECEIVED FLAT 1006	- Vehicle wheel wash facilities in the vicinity of any site entrances and road sweeping to maintain the road network in the immediate vicinity of the site. - Dust suppression measures (e.g. dampening down). Accidental Spills and Leaks It will be necessary to employ mitigation measures at the construction site in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts. These measures will be outlined in the Construction & Environmental Management Plan (CEMP) and are summarised here as follows: - Over Ground Oil / Diesel Storage – Only approved storage system for oil / diesel within the site will be permitted, (i.e. all oil / diesel storage to be located within a designated area placed furthest away from adjacent watercourses and contained within constructed bunded areas e.g. placed on 150mm concrete slab with the perimeter constructed with 225mm solid blockwork rendered internally); - The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site, however minor, by containment /removal from site; - All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism; - Fixed plant shall be self-bunded; mobile plant must be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge; and, - Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points. Geological Environment There are no likely significant impacts on the geological environment associated with the proposed development of the site. Please refer EIAR chapter 7 for further information regarding groundwater impacts.
Hydrology and Hydrogeology	Excavation Activities The limited depth of excavation activities will minimise the risk of increasing groundwater vulnerability at the site. Appropriate groundwater protection/mitigation measures in relation to fuel storage and construction traffic are detailed in the following sections and will ensure the risk posed is low, temporary, and neutral. Fuel storage/ usage on site and Construction Traffic

Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 25m of drainage ditches, surface waters or open excavations.

All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) shall be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank or 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray must be capable of holding 25% of the aggregate capacity of the drums stored.

Regular monitoring of water levels within drip trays and bunds due to rainfall shall be undertaken to ensure sufficient capacity is maintained at all times.

A bunded hardstanding area for refuelling shall be constructed at the site. Surface water runoff from this concrete surface will discharge to a drain via a full retention petrol interceptor or to the on-site WWTP. Prior to the interceptor, a silt trap will be installed in order to remove the majority of suspended solids.

The provision of wheel wash facilities close to the site entrance shall reduce the deposition of mud, soils and other substances on the surrounding road network.

Oil which accumulates within the petrol interceptor shall be regularly removed by an appropriately licensed contractor. In addition, the petrol interceptor shall be appropriately maintained in accordance with the manufacturer's specification.

Monitoring prior to, during and post construction works of groundwater quality testing shall be undertaken to ensure minimum disturbance of water quality in the underlying groundwater body in compliance with the Construction Environmental Management Plan.

Hazardous waste shall be dealt with in accordance with the Waste Management (Hazardous Waste) Regulations.

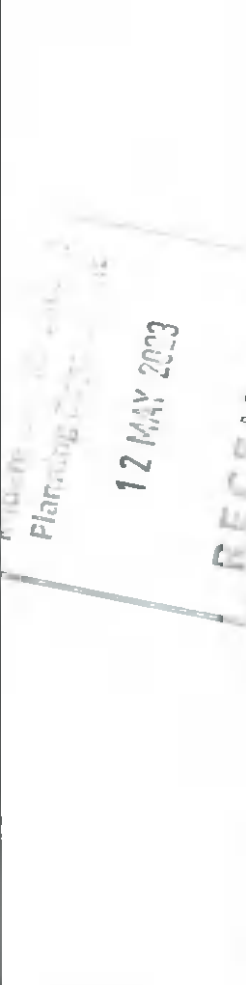
An Emergency Operating Plan (EOP) to deal with the possibility of contamination or fuel spills, e.g., pumping of wells or sumps to collect contaminated groundwater or surface water for treatment shall be developed and incorporated into an overall Construction Environmental Management

	Plan (CWMP) for the development to include a Waste Management Plan (WMP). The CIRIA document (2001) recommendations for developing a contingency plan for pollution emergencies shall be implemented and include the following: • Containment measures. • Emergency discharge routes. • List of appropriate equipment and clean-up materials. • Maintenance schedule of equipment. • Details of trained staff. • Details of staff responsibilities. • Notification procedures to inform the relevant environmental protection authority. • Audit and review schedule; and, • List of specialist pollution clean-up companies and their telephone numbers. Any vehicles utilised during the operational phase shall be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. The potential impacts are limited by the size of the fuel tank of the largest plant / vehicles used on the site. Precautions shall be taken to avoid spillages. These include: • Use of secondary containment e.g. bunds around oil storage tanks; • Use of drip trays around mobile plant; • Supervising all deliveries and refuelling activities; and, • Designating and using specific impermeable refuelling areas isolated from surface water drains. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral. Waste Arisings Appropriate safe storage of all waste materials shall be implemented during the construction works in accordance with the CEMP for the works. Measures include: • Covering of stockpiles to minimise surface water runoff, • Creation of berms around stockpiles to contain runoff during heavy rainfall events. • Waste segregation and storage in dedicated sealed skips. The implementation of the above-described mitigation measures shall ensure the risk posed by the identified potential impact will be low, temporary and neutral. Contaminated land/ buried waste/ waste soils
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Kildare Council Planning Department 12 MAY 2023 RECEIVED	Special environmental and human health contingency plans and procedures, following best-practice guidance, will be developed for the unexpected discovery of contaminated or illegally deposited waste materials. In the event of encountering contaminated ground or buried waste, an appropriately scoped contaminated land site investigation will be undertaken by a contaminated land consultant comprising soil monitoring, water monitoring, gas and vapour monitoring and groundwater level monitoring. All works will be undertaken in accordance with best practice and EPA Guidance on The Management of Contaminated Land and Groundwater at EPA Licensed Sites, 2013. On completion of the above, a suitably detailed remediation program of works will be undertaken under the direction and supervision of a contaminated land consultant. The outcome of the investigation will dictate the most appropriate remedial solution for the development. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral. Vandalism Adequate security measures shall be installed on the construction site. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials and sufficient warning signage. The implementation of the above-described mitigation measures shall ensure the risk posed by the identified potential impact will be low, temporary and neutral. Contaminated imported fill All imported fill material shall be sourced from approved sources and appropriately certified and fit for purpose. All fill material will be confirmed to be inert prior to importation to the site including confirmation of the chemical testing and a visual assessment. Fill sourced from non-licensed/non-permitted facilities will require prior authorisation under Article 27 legislation. Increased risk of flooding and soil erosion An appropriately designed site drainage system for the construction stage shall be developed across the site to ensure that any surface water runoff from the site is appropriately controlled and treated before discharging to ground or to land drains. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the onsite drainage ditch. This fencing shall be in place as one of the first stages on site and prior to the full site clearance. The silt fencing shall act as a temporary sediment control
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Kildare County Council Planning 12 MAY 2023 RECEIVED	device to protect the watercourse from sediment and potential site water runoff. The fencing shall be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits. Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and drainage ditches. The implementation of the above-described mitigation measures will ensure the risk posed by the identified potential impact will be low, temporary and neutral.
Noise and Vibration	With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) <i>Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2</i>. Whilst construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised. Selection of Quiet Plant This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative. Noise Control at Source If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered: • Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping, and loading of materials within these areas should be restricted to normal working hours. • For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels

Kildare County Council Planning Department 12 MAY 2023 RECEIVED	closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling. • For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum. • For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials. • For compressors, generators, and pumps, these can be surrounded by acoustic lagging or enclosed with in acoustic enclosures providing air ventilation. • Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary. • All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. Screening Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed use standard plywood material to provide adequate sound insulation. The hoarding will be constructed of a material to reduce noise by 20dB along the west, north boundaries where the existing wall is not located and a percentage of the east boundary. Figure 8-16 shows locations of hoarding required. This will ensure guidance limit for construction noise at nearest noise sensitive location is followed and potential impacts relating to noise nuisance and disturbance and vibration impacts are effectively minimised and controlled. In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver. Liaison with the Public A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.
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	Monitoring Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: <i>Acoustics - Description, measurement, and assessment of environmental noise</i>. Project Programme The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation or when other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time. Construction Phase - Vibration The vibration from construction activities will be limited to the values set out in section 8.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.
Air and Climate	Air Quality The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation, and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 9.3. • The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues. • The development of a documented system for managing site practices with regard to dust control • The development of a means by which the performance of the dust management plan can be monitored and assessed. • The specification of effective measures to deal with any complaints received. At all times, the procedures within the plan 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

Kildare County Council Planning Department 12 MAY 2023	resumption of construction operations. The procedures to rectify the problems are set out in appendix 9.3 (Dust Management Plan). Dust nuisance is defined when air quality standards relating to dust deposition and PM₁₀ are exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented. <i>In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a Dust Management Plan (see appendix 9.3). Provided the dust management measures outlined in the plan (see Appendix 9.3) are adhered to, the air quality impacts during the construction phase will not be significant. Regard has also been taken for the import of infill materials from off-site locations and potential dust impacts as a result of this will also be mitigated.</i> Climate • Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. • Minimising delivery vehicles due to poor timing or ordering on site will aid to minimise the embodied carbon footprint of the site. • Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust. • A 3m high solid wooden hoarding with a 3m high dust net shall be erected around the entire construction site perimeter giving a total dust barrier height of 6m. • Use of rubble chutes and receptor skips during construction activities. • During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only. • A road sweeper vehicle shall be on-site at all times to clean soiled public roads in the vicinity of the site. • A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site. • An independent environmental consultant shall be appointed by the contractor to prepare a dust control and monitoring method statement prior to the commencement of site activities. • A weekly inspection of each dust gauge will ensure that the site manager identifies at the earliest instance if dust suppression techniques shall be implemented at the project site areas. • Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper. • The overloading of tipper trucks exiting the site shall not be permitted. • Aggregates will be transported to and from the site in covered trucks.
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12 MAY 2023 RECEIVED McGill Planning	• Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser. • Wetting agents shall be utilised to provide a more effective surface wetting procedure. • Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels. • All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods. • 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. • Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins. • Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system. • A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM₁₀ are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented. • A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated. Table 9.19 also presents a summary of dust control techniques which will be implemented at the site during activities.
Landscape and Visual Impact	There are no mitigation measures required other than a) The landscape mitigation and enhancement measures are incorporated into the Proposed Development's landscape masterplan, are implemented. b) In order to ensure the success of the proposed landscape planting and retained vegetation, implemented during the construction phase, the appointed landscape contractor will be required to undertake and maintain the planting in accordance with the proposed landscape maintenance and management plans. There will be a minimum 18 month defects period on all soft landscape works implemented. Thereafter the landscaping will be

	maintained in perpetuity consecutive 12 months periods. This regular maintenance/inspection of the planting across the Proposed Development helps to ensure the planting becomes established over the initial years and that any failed planting is duly replaced.
Traffic and Transportation	The Contractor must submit a Construction Traffic Management Plan (CTMP) to the Local Authority for approval. Haulage vehicle movements should be fully coordinated to comply with the requirements of the agreed plan: • Construction vehicles must not stop or park along the routes at any time; • Haulage vehicles must not travel in convoys greater than two vehicles at any time; • Site entrance to remain free of parked or stationary vehicles at all times; • All loading of demolition material will occur within the site boundary; • All off-loading of deliveries will take place within the site, remote from the public road and will access via the agreed construction access point. • The Contractor will be required to provide wheel cleaning facilities, and regular cleaning of the main access road. • Temporary car parking facilities for the construction workforce will be provided within the site. These car parking spaces will be located adjacent to the site compound. The surface of this car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads. • Monitoring and control of construction traffic will be ongoing during construction works. Construction traffic will minimise movements during peak hours. • Construction Traffic routes minimising traffic impact on surrounding residential development will be used by construction vehicles. • Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site. • All works on-site will be undertaken during hours of the day in accordance with KCC requirements. • During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads. • The surrounding road network will be signed to define the access and egress routes for the development including dedicated 'haul' routes to / from the development site. • All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel. • A construction Mobility Management Plan will be developed by the appointed contractor to encourage all construction personnel to utilise the vast range of sustainable travel options available when travelling to/from the subject proposed development site. Construction of the proposed scheme will cause temporary short-term traffic impacts on the local road network. Enforcement of a CTMP will ensure that

	construction traffic impacts are minimized through the control of site access / egress routes and site access locations and any necessary temporary lane closure requirements.
Material Assets	The following mitigation measures are proposed for the construction phase of the proposed development with reference to Material Assets - Utilities: • The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation. • Relevant services providers are to be consulted in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services, such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution water mains. • Neighbouring sites are to be advised of construction methodologies in advance of works, in situations which may affect them. • All retained underground services are to be protected. • All decommissioned infrastructure will have to be sent to a licenced waste disposal facility or an accepting landfill for disposal. • A construction methodology will be required by the contractor to be tailored to reduce, where possible, dust noise and air pollution; to minimise interference with the environment and the neighbouring areas. • Any spoil or waste material generated from the construction process is to be temporarily stored at an approved location on site, before being removed to an accepting licensed waste disposal facility. • All infrastructure is to be appropriately tested by an approved method during the construction phase, all in accordance with Irish Water / KCC Requirements. • Connections to the service providers are to be carried out to the approval and / or under the supervision of the Local Authority or relevant utility service provider, prior to commissioning. • All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase. • Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption. • All excavations within the public area are to be back-filled in a controlled manner and surface re-instated to the satisfaction of the Local Authority. • With the advent of new technologies being utilised in new houses resulting in higher electrical loads, e.g. air-to-water heat pumps, electric vehicle re-charging facilities, etc. the ESB infrastructure shall be designed to cater for this uplift in electrical requirements. This entails to installation of three substations to serve the new development.
Waste	A project specific RWMP (Appendix 13.1) has been prepared in line with the requirements of the guidance document issued by the DoEHLG. Adherence to the high-level strategy presented in this RWMP (Appendix 13.1) will ensure

12 MAY 2023 RECEIVED	effective waste management and minimisation, reuse, recycling, recovery, and disposal of waste material generated during the construction phase of the proposed development. Punch Consulting Engineers have estimated that the approximate volume of removed topsoil is 8,500 m³. This will need to be disposed of off site. The approximate volume of subsoil to be excavated is 10,600 m³ and this will be re-used onsite. Contractor(s) will endeavor to ensure material taken offsite is reused or recovered off-site or disposed of at authorised facility. In addition, the following mitigation measures will be implemented: • Building materials will be chosen with an aim to 'design out waste'. • On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling, and recovery – it is anticipated that the following waste types, at a minimum, will be segregated: - Concrete rubble (including ceramics, tiles, and bricks). - Plasterboard. - Metals. - Glass; and - Timber. • Left over materials (e.g., timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible. • All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. • Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required). • A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works. • All construction staff will be provided with training regarding the waste management procedures. • All waste leaving site will be reused, recycled, or recovered where possible to avoid material designated for disposal. • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities; and • All waste leaving the site will be recorded and copies of relevant documentation maintained. These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the <i>Waste Management Act 1996</i>, as amended, associated Regulations, the <i>Litter Pollution Act 1997</i> and the <i>EMR Waste Management Plan (2015 - 2021)</i>. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources.
Cultural Heritage	Prior to any construction at the site a programme of archaeological testing should be undertaken. This will allow for any sub surface archaeological

	remains at the site to be identified. These works will be under licence to the National Monuments Service (NMS) at the Department of Housing, Local Government and Heritage (DHLGH). Should any archaeological features be identified the NMS should be immediately notified and a strategy for the resolution of the remains should be formulated. This may include preservation in situ or preservation by record or excavation.
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16.3 Operational Phase

Population and Human Health	The proposed development has been designed to avoid negative impacts on population and human health through the provision of various physical and social infrastructure as part of the development as are outlined in Chapter 3 of this EIAR. Chapter 9 Climate and Air Quality notes the proposal includes operational phase mitigation by design measures to minimise the impact on air quality and climate. These include efficient glazing, thermal insulation, and the inclusion of electric car charging points. Chapter 11 Traffic and Transportation has been prepared for the proposed development with the aim of encouraging sustainable travel practices for all journeys. Increased sustainable travel practices will also reduce the negative impact of traffic emissions on the air quality. No additional mitigation measures are considered necessary.
Biodiversity	Artificial Lighting during operational phase Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012). The lighting design by MANDE Consulting Engineers Ltd. will include the following mitigation measures: • Lighting will be directed to where it is required only, rear shields shall be used; • Lighting of hedgerows / treelines will be avoided where possible. The PL shall be positioned to avoid unnecessary light over spill around the retained hedgerows; • Buildings, roads and site entrance lighting will be angled away from hedgerows and treelines; • The PL shall be limited to roadways to retain darkness above; • All lanterns calculated at 0° tilt • Lighting will be 6m height as per KCC guidelines; • Where possible and practicable to do so, timers or motion sensors will be used; • White LED (temperature is 3000K) or amber coloured LED outdoor lighting would be used where possible, which is considered to be low impact in comparison to other lighting types;

	• All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used; • Light spill into the surrounding fields to the east and north is to be minimal, this would include the Curragh Buffer zone; • Each light fitting shall be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile, 35 lux on/18 lux off
Land, Soil and Geology	Considering the proposed surface water drainage discharges to groundwater, mitigation of surface water quality is provided by: • SUDS measures located throughout the site, including bioretention areas serving roads and roofs, pervious pavements for all car parking areas providing filtration for hydrocarbons, green roofs for some roofs and ponds serving local areas near to open spaces • Petrol interceptors upstream of all connections to the infiltration tanks Please refer EIAR chapter 7 for further information regarding groundwater impacts.
Hydrology and Hydrogeology	Surface water runoff from footpaths, roads, walkways, carparks and general hardstanding An appropriately designed drainage system has been designed for the subject site. The system was designed in accordance with the CIRIA SUDS Manual and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. It is proposed to use a sustainable urban drainage systems (SuDS) approach to stormwater management throughout the site, the overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. The lowest invert of the proposed attenuation tanks is 90.0 mOD. Based on the highest groundwater levels recorded across the site (i.e. 88.83 mOD within PBH02), this equates to an unsaturated zone of 1.2 metres between groundwater and the invert of the lowest proposed drainage tank. In addition, all infiltration systems have been designed and located taking account of the infiltration rates recorded across the site both within the shallow and deeper subsoils. Contaminated imported material All imported fill shall be confirmed as inert and suitable for reuse on site by an appropriately qualified engineer/consultant. General Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures as specified the Engineering Assessment Report and in accordance with CIRIA SuDS Manual C753 which will be incorporated into the overall management strategy for the Proposed Development. This will ensure no

	impacts on water quality and quantity (flow regime) for the Operational Phase of the Proposed Development. There is no other requirement for mitigation measures for the Operational Phase of the Proposed Development.
Noise and Vibration	Additional Traffic on Adjacent Roads During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary. Mechanical Services Plant Considering that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required. Inward Noise Impact Internal LAeq T criteria will be met at most residential units using standard thermal glazing. However, certain facades will require enhanced glazing to meet ProPG and BS 8233:2014 criteria. The facades in question are shown in Figure 8-19. At these façades, it is proposed to install glazing with a minimum RW value of 33 dB in living rooms and dining rooms, and 38 dB on bedrooms. Standard glazing will suffice in kitchens, bathrooms, hallways, and stairwells. Table 8-13 shows recommended glazing specifications, along with ventilation requirements. No mitigation measures are required in respect of noise in external amenity areas or for the creche.
Air and Climate	No additional mitigation measures are required as the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.
Landscape and Visual Impact	There are no mitigation measures recommended for landscape and visual effects.
Traffic and Transportation	With the objective of mitigating the potential impact of the proposed residential development above during its operational stage, and with the objective of promoting sustainable travel for all residents, workers, and visitors to the development; the following initiatives have been identified and subsequently form an integral part of the subject development proposals. • Management – A Mobility Management Plan is to be rolled out with the aim of guiding the delivery and management of a range of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the proposed development site. The MMP will be developed in partnership with KCC to specifically consider the opportunities of shaping all journeys and promoting sustainable transport habits throughout the scheme. • Management – The availability of parking spaces is a key determinant of mode choice and car usage. With the objective of minimising travel by car and encouraging the use of sustainable modes instead, it is proposed to limit car parking provision wherever possible. This approach will help to reduce car

	dependency, reduce traffic congestion and pollution, improve the quality of the environment, and help tackle climate change in addition to encouraging sustainable travel while acknowledging the current availability of public transport in the area. • Facilities – It is proposed to increase the number of high-quality cycle parking provided in the development to encourage the use of cycling as a sustainable mode of transport. • Active Travel Infrastructure (by applicant) • Junction Infrastructure (by applicant) • Infrastructure (by others)
Material Assets	To reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals. The proposed surface water SUDs measures and infiltration tanks will mitigate the impacts from surface water flows on existing groundwater and reduce discharge to be similar to greenfield equivalent rates.
Waste	All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the <i>Kildare County Council Development Plan 2023 - 2029</i>. In addition, the following mitigation measures will be implemented: • On-site segregation of all waste materials into appropriate categories including (but not limited to): - Organic/catering waste (including garden waste from landscaping activities). - Dry Mixed Recyclables. - Mixed Non-Recyclable Waste. - Glass. -Waste electrical and electronic equipment (WEEE) including computers, printers, and other ICT equipment. - Batteries (non-hazardous and hazardous) - Fluorescent bulb tubes and other mercury containing waste (if arising). - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and • All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials. • All waste collected from the development will be reused, recycled, or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available. • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities; and

	These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the <i>Waste Management Act 1996</i> , as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved.
Cultural Heritage	It is expected that all archaeological issues will be resolved in advance of construction. As a result there is no mitigation required at operational phase.

