EIAR Addendum Report

Woodtown, Ballycullen, Dublin 16

Stephen Ward

Town Planning & Development Consultants Ltd.

Prepared on behalf of

Lagan Homes Ballycullen Ltd

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1.0 INTRODUCTION

A planning application was made by Lagan Homes Ballycullen Ltd to South Dublin County Council on the 24th of April 2025 for the construction of a Large Scale Residential Development P.A. Ref. LRD25A/0003W. This planning application was accompanied by an Environmental Impact Assessment Report (EIAR).

South Dublin County Council issued a request for additional information on the 16th of June 2025 for P.A. Ref. LRD25A/0003W. Item 5 of this request states-

"The applicant is requested to submit updated EIAR chapters and any relevant plans and particulars, where they are impacted by any of the above additional information amendments."

This EIAR Addendum has been prepared to ensure a complete and comprehensive response to Item 5 of the AI request issued by SDCC. This report is the result of a process that considered any changes to the proposed project as a result of the applicant's response to the AI request with regard to potential environmental impacts that may have not already been assessed as part of the original EIAR or any amendments that may be necessary to mitigation measures previously proposed. This Addendum is prepared to assist the competent authority in its Environmental Impact Assessment.

The following EIAR Chapters have been updated and are appended to this EIAR addendum following a review of the AI response package.

- Chapter 6 Biodiversity
- Chapter 7 Land, Soils and Geology
- Chapter 8 Hydrology, Hydrogeology and Drainage

The Natura Impact Statement (NIS) has also been updated having regard to the new surface water drainage design proposed and is submitted under separate cover.

A full response to the request for additional information issued by South Dublin County Council is provided in the additional information response statement prepared by JFOC Architects under separate cover as agent for the planning application.

2.0 PROJECT DESCRIPTION

2.1 ALTERATIONS TO THE PROPOSED DEVELOPMENT AS A RESULT OF THE ADDITIONAL INFORMATION REQUEST

The additional information requested by South Dublin County Council did not raise any issue with the nature and scale of the development proposed development and according to the report that accompanied the Chief Executive Order, the planning authority found the density, housing mix, building heights and residential accommodation standards were all acceptable.

As a result of additional topographical surveys along the eastern boundary, the 10m setback from watercourses on site has been adjusted and the site layout design been amended with the loss of 2no. houses along the south eastern boundary. The amendments to the surface water drainage network agreed in consultation with South Dublin County Council have resulted in the loss of 6no. houses and the relocation of the creche building in the north west of the site (total reduction of 8no. houses). A summary of all changes to the LRD as proposed is outlined below-

- The red line boundary has been amended to exclude lands in Abbots Grove previously included to provide pedestrian connectivity.
- The number of units proposed has reduced from 502no. to 494no. in total. There has been no change to the number and mix of apartments proposed as detailed by Table 1 below.

Table 1 – Residential Mix (as amended)

Unit Type	**1-bed**		**2-bed**		**3-bed**		**4-bed**		**Total**	
Houses	-	-	19	17	116	114	62	58	197	189
Apartments	108	108	151	151	46	46	-	-	305	305
Total	**108**	**108**	**170**	**168**	**162**	**160**	**62**	**58**	**502**	**494**
	22%	22%	34%	34%	32%	32%	12%	12%	100%	100%

- The marginal reduction in the number of units has not impacted upon the residential density which remains at 48dph.
- The position of the creche building has moved sightly west of its previous position but has not changed in size, design or capacity.
- External staircases to some of the apartment blocks have been amended to address issues identified in the quality audit.
- The dwellings previously identified for the purpose of Part V have been amended following the omission of houses as outlined above. A revised Part V drawing has been prepared by JFOC Architects and is submitted under separate cover (No. PD2001).
- The quantity of public open space to be provide has increased from 17,512sqm to 25,746sq.m (16.5%).

2.2 REVISED DEVELOPMENT DESCRIPTION

A revised description of development updating the description contained within the EIAR is provided below.

The proposed development will consist of 494 no. residential units (108no. 1-bed, 168no. 2-bed, 160 no. 3-bed; 58 no. 4-bed) comprising 189no. 2 storey houses (terraced/semi-detached/detached) (17no. 2-bed, 114no. 3-bed; 58no. 4-bed) and 28no. 3 and 4 storey simplex/duplex apartment blocks providing 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (c.475sq.m), public open space, car parking (surface/undercroft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. Vehicular access to be provided from the existing spur road connection to Stocking Avenue to the west of the site, and via Stocking Wood Drive to the east of the site (with relocation of existing ESB substation and associated works to the existing hammerhead). Additional pedestrian only routes will be provided into Abbot's Grove Park and Stocking Wood Copse with future connections provided for into Stocking Wood Manor, White Pines Park and the future school site to the north of the application site. The proposed development includes all associated site development works (including site reprofiling, retaining structures and downing of ESB overhead lines), landscaping, boundary treatments and services provision.

3.0 ADDITIONAL INFORMATION AND EIAR

The additional information and revised plans to be submitted to South Dublin County Council are listed at Appendix A and have been reviewed with regard to the EIAR. Two key items were identified as affecting the content of the EIAR – the additional information on breeding birds and the revised surface water drainage design.

While not requested by SDCC, it was the decision of the applicant to undertake breeding bird surveys during the summer season to add to the information already available and contained within the chapter relating to biodiversity in the EIAR. The most significant change in terms of the EIAR is the new sustainable urban design strategy which removes petrol interceptors previously proposed and introduces ponds in addition to detention basins.

Reference in this section to Additional Information (AI) refers to the amendments in design, additional survey work and changes to engineering technical matters that are contained within the documents and drawings submitted under separate cover and listed at section.

Chapter in EIAR		**Does Addition information result in a change to the baseline condition?**	**Does the Additional Information alter the content (text) of the EIAR?***		**Does the Additional Information result in a change to the statement of significance compared in the EIAR?**	**Are any changes to the original Mitigation Measures or Additional Mitigation Required as contained within the EIAR?**
			*The description of development contained in section 2 of this report updates all chapters.	What substantive sections of the EIAR are affected?		
1	Introduction	No	There has been no change to the introduction including the regulatory requirements for the EIAR.		No	N/A
2	Legislative Context	No	It is noted that the number of residential dwellings proposed falls slightly under the threshold contained within Schedule 5 Part 2 (10) (b) (i) of the Planning and Development Regulations 2001 as amended. The application site (10.37ha)remains above threshold for the purposes of EIAR under Schedule 5 Part 2 (10) (b) (iv).		No	N/A
3	Introduction to Site and Project	No	The project description has been amended to take account of changes to the design at AI stage. A project description is provided at section 2 of this report and includes a description of changes. An updated site location map and site layout plan is provided at Appendix B of this addendum.		No	No
4	Consideration of Alternatives	No	No change		No	N/A
5	Population and Human Health	No	No change		No	No
6	Biodiversity	No. Breeding bird surveys were undertaken to add to the bird survey information already available.	Yes – revised chapter attached.	6.2 Methodology - Field Based studies 6.4 Receiving Environment- Fauna 6.5 Characteristics of the proposed development 6.6 Potential Impacts 6.8 Mitigation Measures	No	Yes. Previous mitigation measure relating to bats and birds relocated in text. Mitigation measure relating to the protection of Water Quality substitution. Section 6.8 Mitigation Measures **Protection of Habitats** ~~Tree removal should only be done outside of the bird nesting season. It is recommended that prior to the felling of any tree, that it is examined by a bat ecologist in the 48 hours prior to felling to make sure no bat roosts are present. Soft felling of the trees is recommended~~

Chapter in EIAR		Does Addition information result in a change to the baseline condition?	Does the Additional Information alter the content (text) of the EIAR?*		Does the Additional Information result in a change to the statement of significance compared in the EIAR?	Are any changes to the original Mitigation Measures or Additional Mitigation Required as contained within the EIAR?
			*The description of development contained in section 2 of this report updates all chapters.	What substantive sections of the EIAR are affected?		**Mitigation for Birds** • The removal of mature vegetation, including trees, hedgerows and scrub, must only be done outside of the bird nesting season (March-August). **Mitigation for Bats** • All trees within the site should be examined for the presence of bats prior to felling by a bat specialist. • Should bats be noted in any tree that is earmarked for removal, a derogation license from NPWS must be sought. This can be done with the assistance of a bat ecologist. **Protection of Water Quality** • ~~The SUDS proposals outlined for this site must be adhered to in full. Silt and oil interceptors must be incorporated to ensure clean discharge and these must be serviced regularly.~~ • Hydrocarbons from vehicles within the site confines will pass through the SUDS detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. This mitigation measure is considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality, and will ensure the protection of surface water quality and flows in all downstream receiving watercourses.
7	Land, Soils and Geology	No	Yes – revised chapter attached.	7.1.1 Description of development 7.5.2 Description of development 7.5.3 Potential Impacts and Mitigation Measures – Operational Phase		Yes. <u>Section 7.5.3: Text substitution</u> ~~Hydrocarbons from vehicles within the site confines will be captured by petrol and oil interceptors within the proposed surface water drainage network~~

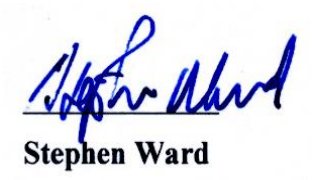
Chapter in EIAR		Does Addition information result in a change to the baseline condition?	Does the Additional Information alter the content (text) of the EIAR?*		Does the Additional Information result in a change to the statement of significance compared in the EIAR?	Are any changes to the original Mitigation Measures or Additional Mitigation Required as contained within the EIAR?
			*The description of development contained in section 2 of this report updates all chapters.	What substantive sections of the EIAR are affected?		
						Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network.
8	Hydrology, Hydrogeology and Drainage	No	Yes – revised chapter attached.	8.1.1 Description of development 8.2.2 Additional survey date 8.5.2 Description of development 8.5.2.7 Effects of Construction Works on the WFD Status of Downstream Waterbodies (Proposed Project) 8.5.3.1 Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces (Proposed Project)	No	Yes. <u>Section 8.5.2.7: Text substitution</u> ~~These will ensure the protection of surface water quality and flows in all downstream receiving watercourses.~~ Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. <u>Section 8.5.3.1 Text substitution</u> ~~Swales/road side drains will be used to collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment'~~ Detention basins, ponds, permeable paving, tree pits and swales will be used to collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment.
9	Climate and Air Quality	No	No change		No	No
10	Noise and Vibration	No	No change		No	No
11	Material Assets – Waste Management	No	No change		No	No.
12	Material Assets –Utilities	No	No change		No	No

Chapter in EIAR		**Does Addition information result in a change to the baseline condition?**	**Does the Additional Information alter the content (text) of the EIAR?***		**Does the Additional Information result in a change to the statement of significance compared in the EIAR?**	**Are any changes to the original Mitigation Measures or Additional Mitigation Required as contained within the EIAR?**
			*The description of development contained in section 2 of this report updates all chapters.	What substantive sections of the EIAR are affected?		
13	Material Assets – Roads and Traffic	No	No change		No	No
14	Cultural Heritage including Archaeology	No	No change		No	No.
15	Landscape Visual Impact	No	No change.		No	No
15	Summary of Impacts	No	No change.		No	No
16	Interaction of Impacts	No.	No change		No	No
17	Mitigation and Monitoring	N/A	Yes	Refer to sections above	No	Yes - Please see above

4.0 CONCLUSION

According to the Record of Executive Business and Chief Executive Order on planning application P.A. Ref. LRD25A/0003W as received, "*It is considered that the information contained within the EIAR allows for adequate assessment of the potential impacts of the proposed development on the receiving environment and complies with the requirements of Article 94 of the Planning and Development Regulations 2001 (as amended)"* (Section 7). Following the changes to the proposed development as a result of the additional information response the EIAR chapters 6, 7 and 8 have been updated.

It is acknowledged that it is the competent authority who will carry out an examination of the EIAR, any supplementary information provided by the developer and any relevant information received through consultations and provide a reasoned conclusion on the significant effects of the project on the environment. It is submitted there have been no changes made to the project which would fundamentally alter the assessment made in the EIAR or its conclusions.



Stephen Ward

APPENDIX A - ADDITIONAL /INFORMATION RESPONSE SCHEDULE OF DOCUMENTS AND DRAWINGS

ADDITIONAL INFORMATION

P.A.REF. LRD25A/0003W

Lagan Homes Balllycullen Ltd

Schedule of Documents and Drawings

The applicant's response to the additional information requested issued by South Dublin County Council on the 16th of June 2025 consists of the attached cover letter and the documents and drawings listed by this schedule. The applicant's response will be made via the Planning Portal.

Document	**Consultant Responsible**
Additional Information Response Statement	JFOC
Accommodation Schedule	
Housing Quality Assessment	
Document Schedule	
EIAR Addendum Report	Stephen Ward Town Planning and Development Consultants Ltd
Updated Natura Impact Statement (NIS)	Noreen McLoughlin – Whitehill Environmental
Breeding Bird Survey	Hugh Delaney
Response to South Dublin County Council LRD Planners Report – Item Nos. , 2, 3, 4 and 5	Waterman Moylan Consulting Engineers
Drawing Register	
Updated Stage 1 Quality Audit	Roadplan
NMP Cover Letter	NMP Landscape Architect
NMP Drawing Index	
Drawing Cover Page	
Solicitors Letter	Eversheds Sutherland

Drawings by JFOC		
Drawing Number	**Drawing Title**	**Scale**
23.120.PD1001	Site Location Map	1:1000
23.120.PD1003	Site Layout Block Plan	1:1000
23.120.PD1004	Site Layout Block Plan 1 of 2	1:500
23.120.PD1005	Site Layout Block Plan 2 of 2	1:500
23.120.PD1006	Site Layout Unit Key	1:1000
23.120.PD2008	Abbots Grove Taking in Charge Overlay	1:500
23.120.PD2001	Part V & Affordable	1:1000
23.120.PD4001	Apartment Type 1a - Plans	1:100
23.120.PD4002	Apartment Type 1b - Plans	1:100
23.120.PD4003	Apartment Type 1c - Plans	1:100
23.120.PD4004	Apartment Type 1d - Plans	1:100
23.120.PD4005	Apartment Type 2a - Plans	1:100
23.120.PD4006	Apartment Type 2b - Plans	1:100
23.120.PD4007	Apartment Type 3a - Plans	1:100
23.120.PD4008	Apartment Type 3b - Plans	1:100
23.120.PD4009	Apartment Type 4a - Plans	1:100
23.120.PD4010	Apartment Type 4b - Plans	1:100
23.120.PD4011	Apartment Block A – Ground Floor Plan	1:200
23.120.PD4012	Apartment Block A – First Floor Plan	1:200
23.120.PD4013	Apartment Block A – Second Floor Plan	1:200
23.120.PD4014	Apartment Block A - Elevations	1:200
23.120.PD4015	Apartment Block A –Section	1:200
23.120.PD4016	Apartment Block B – Ground Floor Plan	1:200
23.120.PD4017	Apartment Block B – First Floor Plan	1:200
23.120.PD4018	Apartment Block B – Second Floor Plan	1:200
23.120.PD4019	Apartment Block B - Elevations	1:200
23.120.PD4020	Apartment Block B – Section	1:200
23.120.PD4021	Apartment Block C– Ground Floor Plan	1:200
23.120.PD4022	Apartment Block C – First Floor Plan	1:200
23.120.PD4023	Apartment Block C – Second Floor Plan	1:200
23.120.PD4024	Apartment Block C - Elevations	1:200
23.120.PD4025	Apartment Block C – Section	1:200
23.120.PD4026	Apartment Block D– Ground Floor Plan	1:200
23.120.PD4027	Apartment Block D – First Floor Plan	1:200
23.120.PD4028	Apartment Block D – Second Floor Plan	1:200
23.120.PD4029	Apartment Block D - Elevations	1:200
23.120.PD4030	Apartment Block D – Section	1:200

Drawing Number	Drawing Title	Scale
23.120.PD4031	Apartment Block E– Ground Floor Plan	1:200
23.120.PD4032	Apartment Block E – First Floor Plan	1:200
23.120.PD4033	Apartment Block E – Second Floor Plan	1:200
23.120.PD4034	Apartment Block E - Elevations	1:200
23.120.PD4035	Apartment Block E – Section	1:200
23.120.PD4036	Apartment Block F– Ground Floor Plan	1:200
23.120.PD4037	Apartment Block F – First Floor Plan	1:200
23.120.PD4038	Apartment Block F – Second Floor Plan	1:200
23.120.PD4039	Apartment Block F - Elevations	1:200
23.120.PD4040	Apartment Block F – Section	1:200
23.120.PD4041	Apartment Block G– Ground Floor Plan	1:200
23.120.PD4042	Apartment Block G – First Floor Plan	1:200
23.120.PD4043	Apartment Block G – Second Floor Plan	1:200
23.120.PD4044	Apartment Block G - Elevations	1:200
23.120.PD4045	Apartment Block G – Section	1:200
23.120.PD4046	Apartment Block H– Ground Floor Plan	1:200
23.120.PD4047	Apartment Block H – First Floor Plan	1:200
23.120.PD4048	Apartment Block H – Second Floor Plan	1:200
23.120.PD4049	Apartment Block H – Third Floor Plan	1:200
23.120.PD4050	Apartment Block H - Elevations	1:200
23.120.PD4051	Apartment Block H – Section	1:200
23.120.PD4052	Apartment Block I– Ground Floor Plan	1:200
23.120.PD4053	Apartment Block I – First Floor Plan	1:200
23.120.PD4054	Apartment Block I – Second Floor Plan	1:200
23.120.PD4055	Apartment Block I – Third Floor Plan	1:200
23.120.PD4056	Apartment Block I - Elevations	1:200
23.120.PD4057	Apartment Block I – Section	1:200
23.120.PD4058	Apartment Block J– Ground Floor Plan	1:200
23.120.PD4059	Apartment Block J – First Floor Plan	1:200
23.120.PD4060	Apartment Block J – Second Floor Plan	1:200
23.120.PD4061	Apartment Block J –Third Floor Plan	1:200
23.120.PD4062	Apartment Block J - Elevations	1:200
23.120.PD4063	Apartment Block J – Section	1:200
23.120.PD4064	Apartment Block K– Ground Floor Plan	1:200
23.120.PD4065	Apartment Block K – First Floor Plan	1:200
23.120.PD4066	Apartment Block K – Second Floor Plan	1:200
23.120.PD4067	Apartment Block K –Third Floor Plan	1:200
23.120.PD4068	Apartment Block K - Elevations	1:200

Drawing Number	Drawing Title	Scale
23.120.PD4069	Apartment Block K – Section	1:200
23.120.PD4070	Apartment Block R – Ground Floor Plan	1:200
23.120.PD4071	Apartment Block R – First Floor Plan	1:200
23.120.PD4072	Apartment Block R – Second Floor Plan	1:200
23.120.PD4073	Apartment Block R –Third Floor Plan	1:200
23.120.PD4074	Apartment Block R - Elevations	1:200
23.120.PD4075	Apartment Block R – Section	1:200
23.120.PD4076	Apartment Block S – Ground Floor Plan	1:200
23.120.PD4077	Apartment Block S – First Floor Plan	1:200
23.120.PD4078	Apartment Block S – Second Floor Plan	1:200
23.120.PD4079	Apartment Block S –Third Floor Plan	1:200
23.120.PD4080	Apartment Block S - Elevations	1:200
23.120.PD4081	Apartment Block S – Section	1:200
23.120.PD4082	Apartment Block X – Ground Floor Plan	1:200
23.120.PD4083	Apartment Block X – First Floor Plan	1:200
23.120.PD4084	Apartment Block X – Second Floor Plan	1:200
23.120.PD4085	Apartment Block X –Third Floor Plan	1:200
23.120.PD4086	Apartment Block X - Elevations	1:200
23.120.PD4087	Apartment Block X – Section	1:200
23.120.PD4088	Apartment Block L – Ground Floor Plan	1:200
23.120.PD4089	Apartment Block L – First Floor Plan	1:200
23.120.PD4090	Apartment Block L – Second Floor Plan	1:200
23.120.PD4091	Apartment Block L –Third Floor Plan	1:200
23.120.PD4092	Apartment Block L - Elevations	1:200
23.120.PD4093	Apartment Block L – Section	1:200
23.120.PD4094	Apartment Block M – Ground Floor Plan	1:200
23.120.PD4095	Apartment Block M – First Floor Plan	1:200
23.120.PD4096	Apartment Block M – Second Floor Plan	1:200
23.120.PD4097	Apartment Block M –Third Floor Plan	1:200
23.120.PD4098	Apartment Block M – Elevations	1:200
23.120.PD4099	Apartment Block M – Section	1:200
23.120.PD4100	Apartment Block N– Ground Floor Plan	1:200
23.120.PD4101	Apartment Block N – First Floor Plan	1:200
23.120.PD4102	Apartment Block N – Second Floor Plan	1:200
23.120.PD4103	Apartment Block N –Third Floor Plan	1:200
23.120.PD4104	Apartment Block N - Elevations	1:200
23.120.PD4105	Apartment Block N – Section	1:200
23.120.PD4106	Apartment Block O– Ground Floor Plan	1:200

Drawing Number	Drawing Title	Scale
23.120.PD4107	Apartment Block O – First Floor Plan	1:200
23.120.PD4108	Apartment Block O – Second Floor Plan	1:200
23.120.PD4109	Apartment Block O –Third Floor Plan	1:200
23.120.PD4110	Apartment Block O - Elevations	1:200
23.120.PD4111	Apartment Block O – Section	1:200
23.120.PD4112	Apartment Block P– Ground Floor Plan	1:200
23.120.PD4113	Apartment Block P – First Floor Plan	1:200
23.120.PD4114	Apartment Block P – Second Floor Plan	1:200
23.120.PD4115	Apartment Block P –Third Floor Plan	1:200
23.120.PD4116	Apartment Block P - Elevations	1:200
23.120.PD4117	Apartment Block P – Section	1:200
23.120.PD4118	Apartment Block Q– Ground Floor Plan	1:200
23.120.PD4119	Apartment Block Q – First Floor Plan	1:200
23.120.PD4120	Apartment Block Q – Second Floor Plan	1:200
23.120.PD4121	Apartment Block Q –Third Floor Plan	1:200
23.120.PD4122	Apartment Block Q - Elevations	1:200
23.120.PD4123	Apartment Block Q – Section	1:200
23.120.PD4124	Apartment Block R– Ground Floor Plan	1:200
23.120.PD4125	Apartment Block R – First Floor Plan	1:200
23.120.PD4126	Apartment Block R – Second Floor Plan	1:200
23.120.PD4127	Apartment Block R –Third Floor Plan	1:200
23.120.PD4128	Apartment Block R - Elevations	1:200
23.120.PD4129	Apartment Block R – Section	1:200
23.120.PD4130	Apartment Block S– Ground Floor Plan	1:200
23.120.PD4131	Apartment Block S – First Floor Plan	1:200
23.120.PD4132	Apartment Block S – Second Floor Plan	1:200
23.120.PD4133	Apartment Block S –Third Floor Plan	1:200
23.120.PD4134	Apartment Block S - Elevations	1:200
23.120.PD4135	Apartment Block S – Section	1:200
23.120.PD4136	Apartment Block T– Ground Floor Plan	1:200
23.120.PD4137	Apartment Block T – First Floor Plan	1:200
23.120.PD4138	Apartment Block T – Second Floor Plan	1:200
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23.120.PD4140	Apartment Block T - Elevations	1:200
23.120.PD4141	Apartment Block T – Section	1:200
23.120.PD4142	Apartment Block U– Ground Floor Plan	1:200
23.120.PD4143	Apartment Block U – First Floor Plan	1:200
23.120.PD4144	Apartment Block U – Second Floor Plan	1:200

Drawing Number	Drawing Title	Scale
23.120.PD4145	Apartment Block U –Third Floor Plan	1:200
23.120.PD4146	Apartment Block U - Elevations	1:200
23.120.PD4147	Apartment Block U – Section	1:200
23.120.PD4148	Apartment Block V– Ground Floor Plan	1:200
23.120.PD4149	Apartment Block V – First Floor Plan	1:200
23.120.PD4150	Apartment Block V – Second Floor Plan	1:200
23.120.PD4151	Apartment Block V –Third Floor Plan	1:200
23.120.PD4152	Apartment Block V - Elevations	1:200
23.120.PD4153	Apartment Block V – Section	1:200
23.120.PD4154	Apartment Block W– Ground Floor Plan	1:200
23.120.PD4155	Apartment Block W – First Floor Plan	1:200
23.120.PD4156	Apartment Block W – Second Floor Plan	1:200
23.120.PD4157	Apartment Block W –Third Floor Plan	1:200
23.120.PD4158	Apartment Block W - Elevations	1:200
23.120.PD4159	Apartment Block W – Section	1:200
23.120.PD4160	Apartment Block X– Ground Floor Plan	1:200
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23.120.PD4162	Apartment Block X – Second Floor Plan	1:200
23.120.PD4163	Apartment Block X –Third Floor Plan	1:200
23.120.PD4164	Apartment Block X - Elevations	1:200
23.120.PD4165	Apartment Block X – Section	1:200
23.120.PD4166	Apartment Block Y– Ground Floor Plan	1:200
23.120.PD4167	Apartment Block Y– First Floor Plan	1:200
23.120.PD4168	Apartment Block Y– Second Floor Plan	1:200
23.120.PD4169	Apartment Block Y–Third Floor Plan	1:200
23.120.PD4170	Apartment Block Y - Elevations	1:200
23.120.PD4171	Apartment Block Y – Section	1:200
23.120.PD4172	Apartment Block Z– Ground Floor Plan	1:200
23.120.PD4173	Apartment Block Z– First Floor Plan	1:200
23.120.PD4174	Apartment Block Z– Second Floor Plan	1:200
23.120.PD4175	Apartment Block Z - Elevations	1:200
23.120.PD4176	Apartment Block Z – Section	1:200
23.120.PD4177	Apartment Block A2– Ground Floor Plan	1:200
23.120.PD4178	Apartment Block A2– First Floor Plan	1:200
23.120.PD4179	Apartment Block A2– Second Floor Plan	1:200
23.120.PD4180	Apartment Block A2- Elevations	1:200
23.120.PD4181	Apartment Block A2– Section	1:200
23.120.PD4182	Apartment Block B2– Ground Floor Plan	1:200

Drawing Number	Drawing Title	Scale
23.120.PD4183	Apartment Block B2 – First Floor Plan	1:200
23.120.PD4184	Apartment Block B2– Second Floor Plan	1:200
23.120.PD4185	Apartment Block B2 - Elevations	1:200
23.120.PD4186	Apartment Block B2 – Section	1:200

Drawings by NMP Landscape Architects		
Drawing Number	**Drawing Title**	**Scale**
LA-100	GENERAL ARRANGEMENT PLAN	1/1000
LA-101	OPEN SPACE PLAN	1/1000
LA-102	BOUNDARY TREATMENT PLAN	1/1000
LA-103	WATER ATTENUATION PLAN	1/1000
LA-104	WATER ATTENUATION DETAIL CALLOUT PLAN	1/1000
LA-600	POND A	AS INDICATED
LA-601	POND B	AS INDICATED
LA-602	POND C	AS INDICATED
LA-603	POND D	AS INDICATED
LA-604	DETENTION BASIN B21	AS INDICATED
LA-605	DETENTION BASIN A & B	AS INDICATED
LA-606	DETENTION BASIN SE A1 & D	AS INDICATED

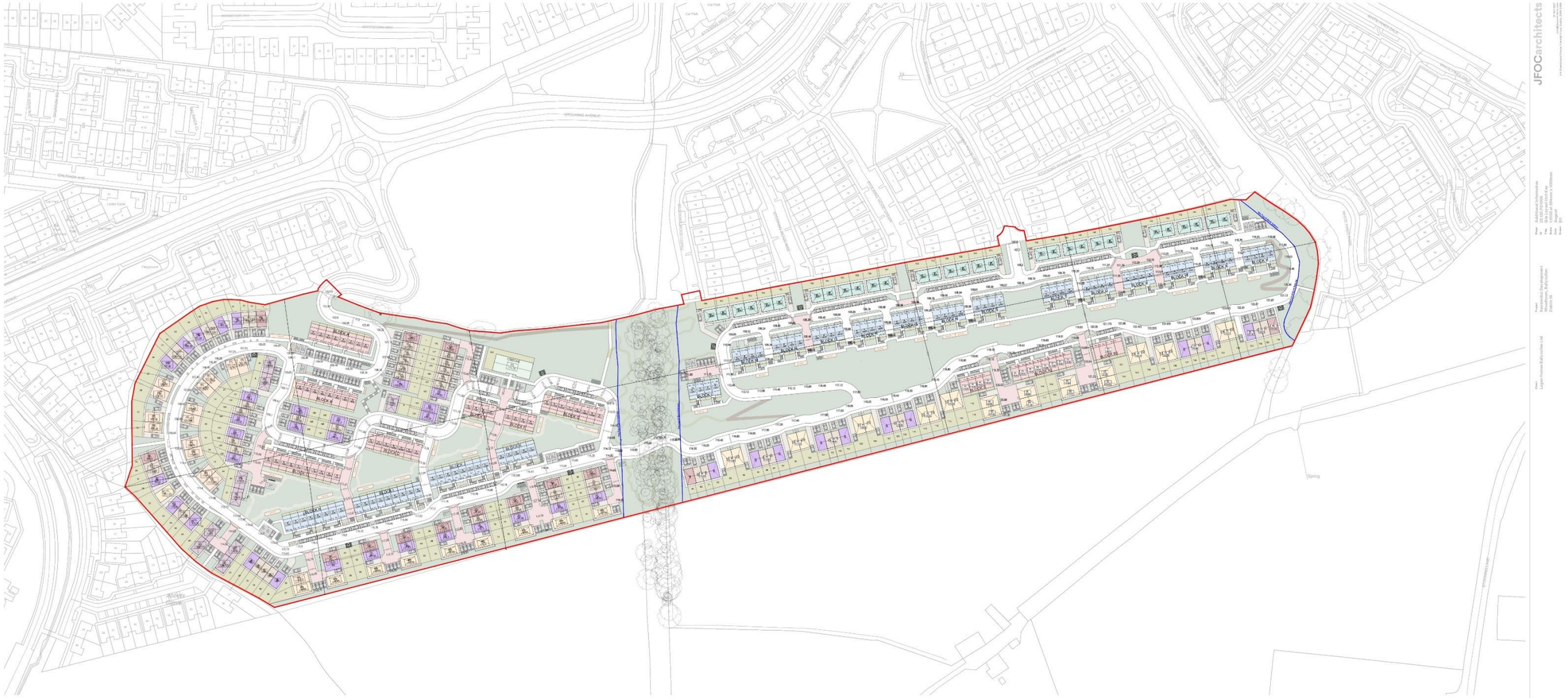
Drawings by Waterman Moylan Consulting Engineers		
Drawing Number	**Drawing Title**	**Scale**
BYCN-WM-ZZ-XX-DR-C-P1010	Site Location Plan	1:2000

BYCN-WM-ZZ-XX-DR-C-P1100	Proposed Road & Levels Layout Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1101	Proposed Road & Levels Layout Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1102	Proposed Road Markings & Signage Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1103	Proposed Road Markings & Signage Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1104	Proposed Sightlines Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1105	Proposed Sightlines Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1150	Swept Path Analysis - Refuse Vehicle Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1151	Swept Path Analysis - Refuse Vehicle Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1152	Swept Path Analysis - Fire Tender Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1153	Swept Path Analysis - Fire Tender Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1154	Swept Path Analysis - Large Car	1:500
BYCN-WM-ZZ-XX-DR-C-P1191	Proposed Road Construction Details Sheet 1 of 2	NTS
BYCN-WM-ZZ-XX-DR-C-P1192	Proposed Road Construction Details Sheet 1 of 2	NTS
BYCN-WM-ZZ-XX-DR-C-P1200	Proposed Drainage Layout Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1201	Proposed Drainage Layout Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1202	Proposed SUDS Layout Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1203	Proposed SUDS Layout Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1204	SUDS Details	NTS
BYCN-WM-ZZ-XX-DR-C-P1205	Surface Water Catchment Areas	1:1000
BYCN-WM-ZZ-XX-DR-C-P1206	Overland Flood Route Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1207	Overland Flood Route Sheet 2 of 2	1:500
BYCN-WM-ZZ-XX-DR-C-P1208	Proposed Attenuation Sections 1 of 3	NTS
BYCN-WM-ZZ-XX-DR-C-P1209	Proposed Attenuation Sections 2 of 3	NTS
BYCN-WM-ZZ-XX-DR-C-P1210	Proposed Attenuation Sections 3 of 3	NTS
BYCN-WM-ZZ-XX-DR-C- P1230	Public Surface Water Drainage Details	NTS
BYCN-WM-ZZ-XX-DR-C-P1231	Private Surface Water Drainage Details	NTS
BYCN-WM-ZZ-XX-DR-C-P1232	Private Foul Drainage Details	NTS
BYCN-WM-ZZ-XX-DR-C- P1233	Hydrobrake & Petrol Interceptor Details	NTS
BYCN-WM-ZZ-XX-DR-C- P1300	Proposed Watermain Layout Sheet 1 of 2	1:500
BYCN-WM-ZZ-XX-DR-C- P1301	Proposed Watermain Layout Sheet 2 of 2	1:500

End

APPENDIX B – SITE LOCATION MAP AND SITE LAYOUT PLAN (ADDITIONAL INFORMATION STAGE) – NOT TO SCALE – ILLUSTRATIVE PURPOSE ONLY


JFOCarchitects
Subject site of application
Reference No. 3454-A
License No. AR0010724
X,Y= 715608.141,725808.0039



SITE INFORMATION

Total Units:	494	
Net Site Area:	10.37 ha	
Proposed Density:	47.6 units / ha	
Public Open Space:	25746m²	(24.8%)
Overall Unit Mix		
Apartments	309	62.7%
Housing	189	38.3%
Bedroom Totals Overall		
1 Bedroom	108	21.9%
2 Bedroom	168	34.0%
3 Bedroom	160	32.4%
4 Bedroom	58	11.7%

Housing Mix		
2 Bedroom House	17	9.0%
3 Bedroom House	114	60.3%
4 Bedroom House	58	30.7%
Housing Typology		
3 Bedroom Semi-Detached	40	21.2%
3 Bedroom End of Terrace	44	23.3%
3 Bedroom Terrace	17	9.0%
4 Bedroom Semi-Detached	48	25.4%
4 Bedroom Detached	10	5.3%
3 Bedroom Terraced	30	15.9%
Apartment Mix		
1 Bedroom Apartment	108	35.4%
2 Bedroom Apartment	151	49.5%
3 Bedroom Apartment	46	15.1%

Car Parking Provision	**549 Total Car Spaces**
House Parking:	
1.5 car spaces per 3 and 4 Bed House	258
1 car space per 2 Bed House	17
Apartment Parking:	
0.8 spaces per Apartment	238
Creche:	16
Visitors:	21

Bicycle Parking Provision	**1,325 Total Bicycle Spaces**
House Bicycle Parking (1 per bedroom, in back gardens)	484
Terrace House Bicycle Parking (1 per bedroom, in storage locker)	134
Apartment Bicycle Parking (1 per bedroom, in storage locker)	548
Visitor Bicycle Parking (1 per 2 apartments, public access)	163
Creche Bicycle Parking	16

Refer to Accommodation Schedule and Housing Quality Assessment for full breakdown of site and unit information

Housing Types Proposed

4	A	Type A1 3 Bed, 2 Storey Semi-Detached 107.6m²	17	D	Type D 3 Bed, 2 Storey Mid Terrace 99m²
10	A1	Type A2 3 Bed, 2 Storey End of Terrace 107.6m²	9	D1	Type D1 4 Bed, 2 Storey Detached 112.6m²
6	B	Type B1 3 Bed, 2 Storey Semi-Detached 107.6m²	20	E2	Type E2 4 Bed, 2 Storey Semi-Detached 130m²
34	B1	Type B2 3 Bed, 2 Storey End of Terrace 107.6m²	33	F	Type F 3 Bed, 2 Storey Semi-Detached 107.6m²
16	C	Type C1 4 Bed, 2 Storey Semi-Detached 130m²	53	G	Type G 3 Bed, 2 Storey Mid Terrace 99.4m²
8	C1	Type C2 4 Bed, 2 Storey Semi-Detached 130m²			
7	C2	Type C3 4 Bed, 2 Storey Semi-Detached 130m²			

Apartment Types Proposed

BLOCK A
6 no. Type 1a 1 Bed, 2 Person 47m²
2 no. Type 1b.1 Bed, 2 Person 47m²
6 no. Type 1c 1 Bed, 2 Person 49.9m²
2 no. Type 2b 2 Bed, 4 Person 84.2m²

BLOCK B, A2
9 no. Type 1a 1 Bed, 2 Person 47m²
2 no. Type 1b.1 Bed, 2 Person 47m²
6 no. Type 1c 1 Bed, 2 Person 49.9m²
2 no. Type 2b 2 Bed, 4 Person 84.2m²

BLOCK C
8 no. Type 1a 1 Bed, 2 Person 47m²
8 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2b 2 Bed, 4 Person 84.2m²

BLOCK D
2 no. Type 1a 1 Bed, 2 Person 47m²
1 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2b.c 2 Bed, 4 Person 84.2m²

BLOCK E
2 no. Type 1a 1 Bed, 2 Person 47m²
2 no. Type 2a 2 Bed, 4 Person 82.9m²
7 no. Type 3b 3 Bed, 4 Person 94.3m²

BLOCK F
2 no. Type 1a 1 Bed, 2 Person 47m²
1 no. Type 1b 1 Bed, 2 Person 47m²
2 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2c 2 Bed, 4 Person 84.2m²

BLOCK G
6 no. Type 1a 1 Bed, 2 Person 47m²
6 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2b 2 Bed, 4 Person 84.2m²

BLOCK H
1 no. Type 1d 1 Bed, 2 Person 47m²
6 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2c 2 Bed, 4 Person 84.2m²
6 no. Type 4a 4 Bed, 4 Person 94.0m²
1 no. Type 4b 2 Bed, 4 Person 94.0m²

BLOCK I
2 no. Type 1d 1 Bed, 2 Person 47m²
2 no. Type 2a 2 Bed, 4 Person 82.9m²
7 no. Type 3b 3 Bed, 4 Person 94.3m²
7 no. Type 4a 4 Bed, 4 Person 94.0m²

BLOCK J
6 no. Type 1a 1 Bed, 2 Person 47m²
6 no. Type 1d 1 Bed, 2 Person 47m²
3 no. Type 1e 1 Bed, 2 Person 47m²
6 no. Type 2a 2 Bed, 4 Person 82.9m²
6 no. Type 2b 2 Bed, 4 Person 84.2m²
3 no. Type 2c 2 Bed, 4 Person 84.2m²

BLOCK K
1 no. Type 1d 1 Bed, 2 Person 47m²
3 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 2b 2 Bed, 4 Person 84.2m²
3 no. Type 4a 4 Bed, 4 Person 94.0m²
1 no. Type 4b 2 Bed, 4 Person 94.0m²

BLOCK L
2 no. Type 1b 1 Bed, 2 Person 47m²
2 no. Type 1d 1 Bed, 2 Person 47m²
7 no. Type 3a 3 Bed, 4 Person 92.3m²
2 no. Type 3b 3 Bed, 4 Person 94.3m²
2 no. Type 4a 4 Bed, 4 Person 94.0m²

BLOCK M, S, T, Y
1 no. Type 1b 1 Bed, 2 Person 47m²
1 no. Type 1d 1 Bed, 2 Person 47m²
2 no. Type 3a 3 Bed, 4 Person 92.3m²
2 no. Type 3b 3 Bed, 4 Person 94.3m²
2 no. Type 4a 4 Bed, 4 Person 94.0m²

BLOCK N, O, P, Q, R, U, V, W, X
2 no. Type 1d 1 Bed, 2 Person 47m²
2 no. Type 3a 3 Bed, 4 Person 92.3m²
2 no. Type 3b 3 Bed, 4 Person 94.3m²
2 no. Type 4a 4 Bed, 4 Person 94.0m²

BLOCK Z, B2
2 no. Type 1a 1 Bed, 2 Person 47m²
2 no. Type 1b 1 Bed, 2 Person 47m²
2 no. Type 2a 2 Bed, 4 Person 82.9m²
2 no. Type 3b 3 Bed, 4 Person 94.3m²

APPENDIX C – EIAR CHAPTER 6 BIODIVERSITY

6.0 Biodiversity

6.1 Introduction

The Aim of the Report

This biodiversity chapter is an Ecological Impact Assessment (EcoIA) which addresses the potential ecological impacts that may occur in the future on the terrestrial and aquatic ecology of a site at Woodtown, Ballycullen, Co. Dublin and its surrounding environs should this proposed development be allowed to proceed. This chapter was updated in July 2025 to incorporate the findings of a breeding bird survey and changes to the proposed development following a Request for Additional Information that was issued by South Dublin County Council.

This EcIA was prepared in accordance with the CIEEM 2018 guidance on EcIA (CIEEM, V. 1.2, updated April 2022), whilst also having regards to the CIEEM EcIA Checklist (2019).

It follows a standard approach based upon the description of the existing baseline conditions within the application site. An evaluation of the likely habitats and species currently present within the application site is also given, along with the identification of the potential ecological impacts arising from the construction and operation of the proposed development. An assessment of the likely significance of the identified impacts on valued ecological receptors (VERs), both within and close to the application site is also made. Where a significant negative impact has been identified, then suitable remedial mitigation measures are provided in order to prevent, reduce or offset the impact.

Legislative and Policy Context

Legislative Context

The Irish Wildlife Act 1976 (and its amendment of 2000) provides protection to most wild birds and animals. Interference with such species can only occur under licence. Under the act it is an offence to "wilfully interfere with or destroy the breeding place or resting place of any protected wild animal". The basic designation for wildlife is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000) NHAs are legally protected from damage. NHAs are not part of the Natura 2000 network and so the Appropriate Assessment process does not apply to them.

The Flora Protection Order 1999 provides statutory protection in Ireland to a number of rare plant species from being wilfully cut, picked, uprooted or damaged. It is also illegal under this order to alter, damage or interfere with their habitats.

The Birds Directive (Council Directive2009/147/EC) recognises that certain species of birds should be subject to special conservation measures concerning their habitats. The Directive requires that Member States take measures to classify the most suitable areas as Special Protection Areas (SPAs) for the conversation of bird species listed in Annex 1 of the Directive. SPAs are selected for bird species (listed in Annex I of the Birds Directive), that are regularly occurring populations of migratory bird species and the SPA areas are of international importance for these migratory birds.

The EU Habitats Directive (92/43/EEC) requires that Member States designate and ensure that particular protection is given to sites (Special Areas of Conservation) which are made up of or support particular habitats and species listed in annexes to this Directive.

The Water Framework Directive (WFD) (2000/60/EC), which came into force in December 2000, establishes a framework for community action in the field of water policy. The overall aim of the WFD is the eventual achievement of good status in all waterbodies. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. The aim of the WFD is to ensure that waters achieve at least good status by 2027 and that status doesn't deteriorate in any waters.

Planning Policies

National

Nationally, the Government's commitment to sustainable development is set out in a number of documents including the National Planning Framework and the National Development Plan.

Regional

Planning at the regional level is now guided by the Regional Spatial and Economic Strategy (RSES). The RSES is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

Local

Planning policy at the local level is provided by the South Dublin County Council Development Plan 2022 –2028. This plan contains a number of objectives and policies relevant to ecology, biodiversity,

green infrastructure and nature conservation. Some of these relevant measures are outlined in Table 6.1.

Reference	Objective / Policy
NCBH2 - Policy	Protect, conserve, and enhance the County's biodiversity and ecological connectivity having regard to national and EU legislation and Strategies.
NCBH2 Objective 1:	To support the implementation of the National Biodiversity Action Plan (2017- 2021) and the All-Ireland Pollinator Plan (2021-2025) and to support the adoption and implementation of the South Dublin County Biodiversity Action Plan (2020-2026) and Pollinator Action Plan (2021-2025) and any superseding plans.
NCBH2 Objective 2	To ensure the protection of designated sites in compliance with relevant EU Directives and applicable national legislation.
NCBH2 Objective 3	To protect and conserve the natural heritage of the County, and to conserve and manage EU and nationally designated sites and non-designated locally important areas which act as 'stepping stones' for the purposes of green infrastructure and Article 10 of the Habitats Directive
NCBH2 Objective 4:	To protect our rivers and in particular to avoid overdevelopment which could have an adverse effect on the biodiversity and ecosystems of the river.
Policy NCBH3	Conserve and protect Natura 2000 sites and achieve and maintain favourable conservation status for habitats and species that are considered to be at risk through the protection of the Natura 2000 network from any plans or projects that are likely to have a significant effect on their coherence or integrity.
Policy NCBH4	Protect the ecological, visual, recreational, environmental and amenity value of the County's proposed Natural Heritage Areas and associated habitats and species.
Policy NCBH5	Protect and promote the conservation of biodiversity outside of designated areas and ensure that species and habitats that are protected under the Wildlife Acts 1976 to 2018, the Birds Directive 1979 and the Habitats Directive 1992, the Flora (Protection) Order 2015, and wildlife corridors are adequately protected.
Policy GI1	Protect, enhance and further develop a multifunctional GI network, using an ecosystem services approach, protecting, enhancing and further developing the identified interconnected network of parks, open spaces, natural features, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, water quality, flood management and adaptation to climate change.

Policy GI2	Strengthen the existing Green Infrastructure (GI) network and ensure all new developments contribute towards GI, in order to protect and enhance biodiversity across the County as part of South Dublin County Council's commitment to the National Biodiversity Action Plan 2021-2025 and the South Dublin County Council Biodiversity Action Plan, 2020-2026, the National Planning Framework (NPF) and the Eastern and Midlands Region Spatial and Economic Strategy (RSES).
Policy GI3	Protect and enhance the natural, historical, amenity and biodiversity value of the County's watercourses. Require the long-term management and protection of these watercourses as significant elements of the County's and Region's Green Infrastructure Network and liaise with relevant Prescribed Bodies where appropriate. Accommodate flood waters as far as possible during extreme flooding events and enhance biodiversity and amenity through the designation of riparian corridors and the application of appropriate restrictions to development within these corridors.
Policy GI4	Require the provision of Sustainable Drainage Systems (SuDS) in the County and maximise the amenity and biodiversity value of these systems.
Policy GI7	Protect, conserve and enhance landscape, natural, cultural and built heritage features, and support the objectives and actions of the County Heritage Plan.

Table 6.1 – Local Policies Relevant to Ecology and Nature Conservation

Heritage and Biodiversity Plans

Ireland's National Biodiversity Plan identifies actions that need to be taken in order to understand and protect biodiversity in Ireland. It states that biodiversity and ecosystems in Ireland should be conserved and restored, to deliver benefits that are essential to all sectors of society and that Ireland should contribute to the efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally.

The South Dublin County Council Heritage Plan 2010-2015 and the Biodiversity Plan for South County Dublin (draft) 2022-2026 also identify a number of objectives and policies in order to protect the natural heritage and biodiversity of the South County Dublin area.

6.2 Methodology

Statement of Competency

The site survey and report was carried out by Noreen McLoughlin. Noreen is the owner and main ecologist at Whitehill Environmental. Noreen holds a BA (Hons) in Natural Science (Mod) Zoology and an MSc in freshwater ecology (TCD, Dublin). She has been a full member of the CIEEM (Chartered Institute of Ecology and Environmental Management) for over 19 years. Noreen has over 21 years' experience as a professional ecologist in Ireland. Noreen has recently completed an Advanced Diploma in Environmental and Planning Law from the King's Inns, Dublin (2024).

Study Area

The study area encompasses all the land within the area defined in the plan submitted for planning consent, i.e., the proposed application site. In addition, important ecological habitats and receptors within the zone of influence of the proposed development were also studied.

Desk Based Studies

The desk study involved the examination of aerial photographs, current and historical maps and plans and drawings of the site. In addition, information was collated on designated nature sites within a 10-15 km radius of the proposed site and on protected and rare species within the 1km square of the site.

The following websites were used to access information and data:

- National Parks and Wildlife Service – www.npws.ie
- National Biodiversity Data Centre – www.biodiversitycentre.ie
- Ordinance Survey Ireland – www.osi.ie
- Google Maps & Street View – maps.google.ie
- Bing Maps – www.bingmaps.com
- My Plan – www.myplan.ie
- Environmental Protection Ireland – www.epa.ie
- South Dublin County Council – www.sdcc.ie

Field Based Studies

Habitats

The application site at Ballycullen has been visited by Whitehill Environmental on three occasions as part of three separate planning application processes.

An initial visit to the site of the proposed application at Ballycullen was undertaken on October 26th 2017 when field notes, species lists and photographs were taken. Subsequent visits to the site were undertaken in May 2021 and October 2024 to update this work and to ascertain if any changes in the habitats on the site had arisen in the intervening time. The site was surveyed in accordance with the Heritage Council's *Habitat Survey Guidelines* (Smith et al., 2010) and the Institute of Environmental Assessment's *Guidelines for Baselines Ecological Assessment* (IEA, 1995). Habitats within the application site were classified in accordance with Level 3 of *A Guide to Habitats in Ireland* (Fossit, 2000). These habitats are denoted in the text along with their habitat code, e.g., the habitat code for improved agricultural grassland is GA1. A species list was compiled and target notes were made. Mammal and bird activity was also noted. The species nomenclature for vascular plants conforms with *The New Flora of the British Isles'* (Stace, 2010).

Bats

An initial bat survey of the site was also carried out by Brian Keely of Wildlife Surveys Ireland in October 2017. Updated surveys were carried out in September 2020 and October 2024. The methodology described here pertains to the survey undertaken in October 2024, as that is the most recent and up to date survey.

Trees were examined for evidence of bat usage and for their potential as bat roosts in August (26th and 27th) and in November (12th) 2024. The trees were considered in terms of the following categories:

Description 1 Trees - With multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts;

Description 2 Trees - With definite bat potential but supporting features (PRFs) suitable for use by individual bats;

Description 3 Trees - Have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats.

Bat Activity Survey - Equipment

- Exide Lamps, Head torch
- Two Song Meter Mini Bat remote detectors with Kaleidoscope Pro sound analysis
- One thermal imager
- Two handheld Echometer Touch 2 Pro bat detectors

In 2024, the survey was undertaken by 2 surveyors on 26th August 2024 up to sunrise of 27th August 2024. Each surveyor monitored trees to each side of the woodland band both prior to and after sunset for over 1.5 hours and prior to sunrise for 1.5 hours. The bat activity survey results were combined with visual observations of the trees and the desktop survey that included data from surveys in 2017 and 2020 on the same site.

Badgers

The survey for the presence of badgers and other ground mammals within the site was undertaken on November 12th 2024. The area in question was checked for the presence of badgers within the site and the entire area of scrub and tree cover and the open field were checked for any fresh signs of badgers. Each tree base, area of scrub and the field area were examined in sequence working in an approximately counter-clockwise direction from the entrance. Typical signs sought in this assessment were badger setts, badger paw prints and tracks, scratch marks on walls or concrete, badger latrines and dung pits, badger snuffle holes and digging and badger hairs.

Breeding Birds

Two breeding bird surveys were carried out by Hugh Delaney, ornithologist on 20th June 2025 and 8th July 2025. The breeding bird surveys were conducted early in the day to optimize the species range recorded with this time coinciding with the maximal number of birds in song. Breeding indications specifically looked for on-site include birds singing or alarm calling, visible nest locations, nest building, birds provisioning food to young or a nest site, recently fledged young etc. All species noted on-site (including foraging over site) were recorded, with all breeding indications recorded.

Field Work Constraints

There were no survey constraints associated with the assessment of vegetation or habitats within the application site. All surveys were carried out at an optimal time.

No significant constraints were associated with the timing of the bat, badger or breeding bird surveys.

6.3 Assessment Methodology

Evaluation of Ecological Features

The methodologies used to determine the value of ecological resources, to characterise the impacts of the proposed scheme, and to assess the significance of impacts and any residual effects are described below. This approach is in accordance with the following guidelines and methodologies:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018, updated 2022)
- *Guidelines on The Information To Be Contained In Environmental Impact* (EPA, 2002)
- *Draft Guidelines on Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2017)
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* (NRA, 2009).

CIEEM suggest that to ensure a consistency of approach, ecological features are valued in accordance with their geographical frame of reference, as defined below:

- International
- National (Ireland)
- Regional (East)
- County (South Dublin)
- District (Ballycullen)
- Local/Townland (Woodtown)

The above categories are then applied to the ecological features identified. Ecological features can be defined as:

- Designated sites (i.e., SACs, SPAs, NHAs, pNHAs, National Nature Reserves) or non-statutory locally designated sites and features.
- Non-designated sites and habitats and features of recognised biodiversity value, such as rivers and streams. The features being evaluated can be considered in the context of the site and locality and thus a more accurate assessment of the impacts in the locality can be made.

Assessment of Impacts

The assessment of potential ecological impacts has been carried out using guidelines published by the EPA and the CIEEM. They can be summarised as:

- The identification of the range of potential impacts which can reasonably be expected to occur should the proposed developments receive planning consent;
- The consideration of the systems and processes in place to avoid, reduce and mitigate the possible effects of these impacts;
- The identification of opportunities for ecological enhancement within the site.

Impacts are defined as being positive, negative or neutral. A significant impact is defined as an impact upon the integrity of a defined ecosystem and/or the conservation status of a habitat or species within a given area. Where a potential negative impact has been identified, mitigation measures have been formulated using best practices techniques and guidance to prevent, reduce or offset the impact.

6.4 Receiving Environment

This section provides an overview of the existing ecological conditions within the site and the surrounding environment.

Site Location & General Description

The site in question is approximately 10.35 hectares acres in area. It is located in Ballycullen, approximately 1.2km south of Knocklyon and 1.6km south-east of Firhouse. Access to the site will be via Stocking Avenue and Abbott Grove to the north of the site. Site location maps can be seen in Figures 6.1 and 6.2. The site is zoned as a residential area by South Dublin County Council (Zoning: Res-N), i.e., to provide for new residential communities in accordance with approved area plans.

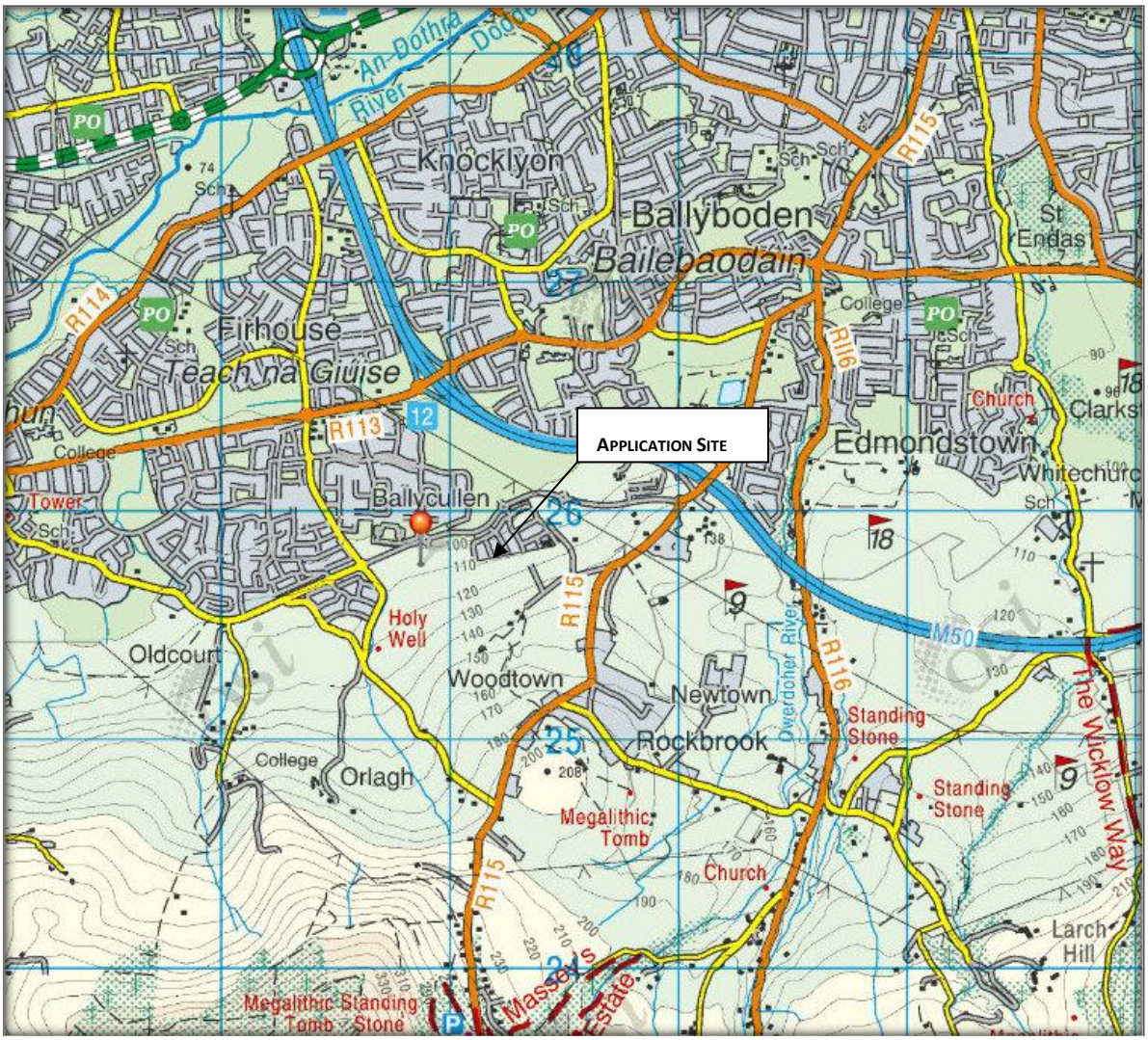


Figure 6.1 – Site Location Map

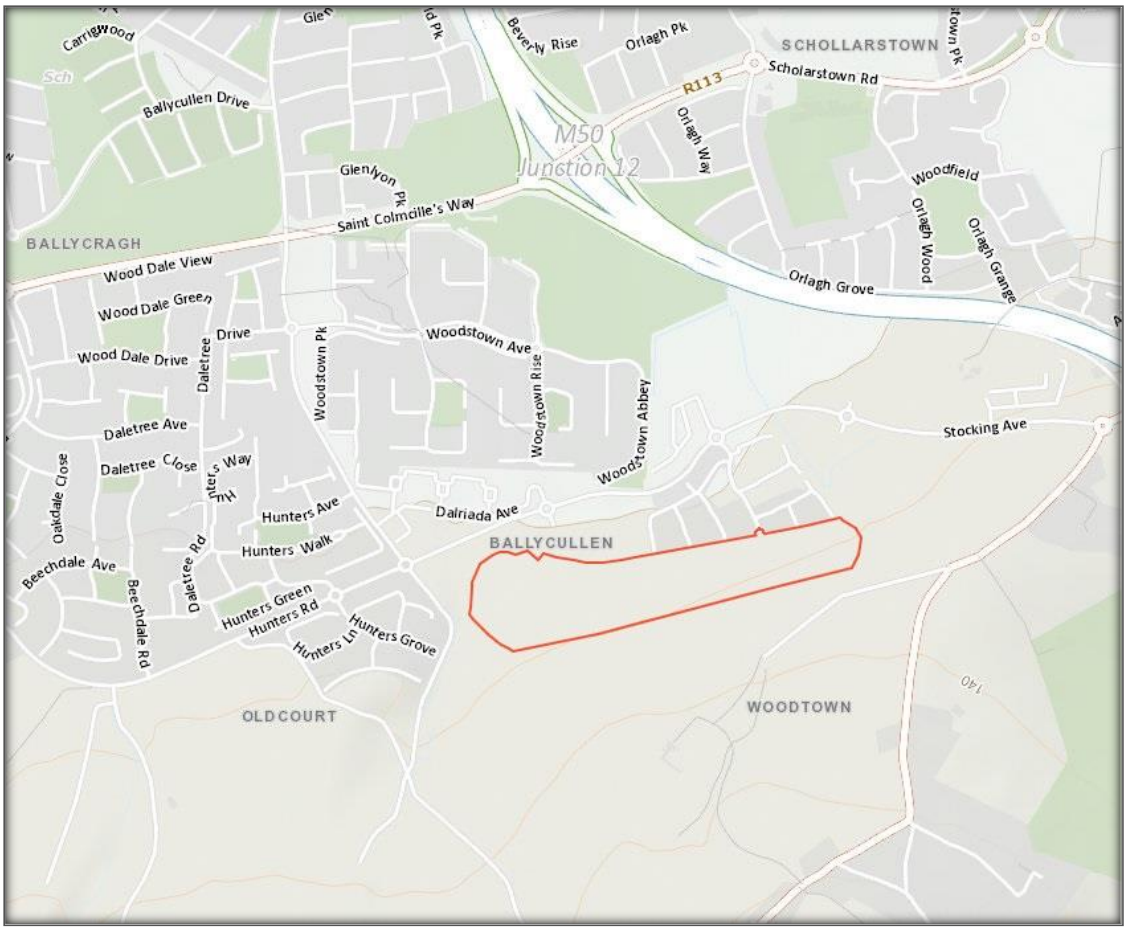


Figure 6.2 – Site Location Map. Application Site is Outlined in Red

Habitats and Land-Use Surrounding the Site

The main land uses surrounding the site include the residential and amenity areas to the north, west and east of the site, whilst agriculture is the main land use to the south of the site. The habitats associated with these areas include buildings and artificial surfaces, amenity grasslands and gardens and improved agricultural grasslands. An overview of the local habitats surrounding the application site can be seen in the aerial photograph in Figure 6.3.

Figure 6.3 – Aerial Photograph Showing Habitats Surrounding the Application Site © Google

Designated Sites

Natura 2000 Sites

The proposed application site is not within or immediately adjacent to any site that has been designated as a Special Area of Conservation (SAC) or a Special Protection Area (SPA) under the EU Habitats or EU Birds Directive.

There are thirteen Natura 2000 sites within 15km of this proposed development. These sites are summarised in Table 5.2. The location of the application site in relation to these designated areas is shown in Figure 6.4 and a full synopsis of these sites can be read online on the website of the National Parks and Wildlife Service (www.npws.ie).

Site Name/Code	Distance	Qualifying Interests	Connectivity
Glenasmole Valley SAC 001209	3km south-west	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Petrifying springs with tufa formation (Cratoneurion)	*This SAC is in the upper reaches of the Dodder sub-catchment. It is not hydrologically connected to the application site, therefore significant effects upon this site can be ruled out.*
Wicklow Mountains SAC 002122	3.9km south-east	• Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) • Natural dystrophic lakes and ponds • Northern Atlantic wet heaths with *Erica tetralix* • European dry heaths • Alpine and Boreal heaths • Calaminarian grasslands of the Violetalia calaminariae • Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) • Blanket bogs (* if active bog) • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani • Calcareous rocky slopes with chasmophytic vegetation	*There is no hydrological connectivity between the application site and this SAC, therefore significant effects upon this site can be ruled out.*

		• Siliceous rocky slopes with chasmophytic vegetation • Old sessile oak woods with Ilex and Blechnum in the British Isles • *Lutra lutra* (Otter)	
Wicklow Mountains SPA 004040	4.1km south	• Merlin (*Falco columbarius*) • Peregrine (*Falco peregrinus*)	*There is no hydrological connectivity between the application site and this SPA, therefore significant effects upon this site can be ruled out.*
South Dublin Bay SAC 000210	8.9km north-east Circa 16km downstream	• Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Salicornia and other annuals colonising mud and sand • Embryonic shifting dunes	*The application site is adjacent to a stream which is a tributary of the River Dodder, which eventually flows into Dublin Bay. This SAC is approximately 16km downstream of the of the application site. Significant effects arising from run-off into this stream during construction and operation are uncertain and will be considered further*
Knocksink Wood SAC 000725	9.3km south-east	• Petrifying springs with tufa formation (Cratoneurion) • Old sessile oak woods with Ilex and Blechnum in the British Isles • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	*There is no hydrological connectivity between the application site and this SAC, therefore significant effects upon this site can be ruled out.*

South Dublin Bay and River Tolka Estuary SPA 004024	10km north-east Circa 16km downstream	• Light-bellied Brent Goose (*Branta bernicla hrota)* • Oystercatcher (*Haematopus ostralegus*) • Ringed Plover (*Charadrius hiaticula*) • Grey Plover (*Pluvialis squatarola)* • Knot *(Calidris canutus)* • Sanderling *(Calidris alba)* • Dunlin *(Calidris alpina)* • Bar-tailed Godwit *(Limosa lapponica)* • Redshank *(Tringa totanus)* • Black-headed Gull *(Chroicocephalus ridibundus)* • Roseate Tern *(Sterna dougallii)* • Common Tern *(Sterna hirundo)* • Arctic Tern *(Sterna paradisaea)* • Wetland and Waterbirds	*The application site is adjacent to a stream which is a tributary of the River Dodder, which eventually flows into Dublin Bay. This SPA is approximately 16km downstream of the of the application site. Significant effects arising from run-off into this stream during construction and operation are uncertain and will be considered further*
Ballyman Glen SAC 000713	12.3km south	• Petrifying springs with tufa formation • Alkaline fens	*There is no hydrological connectivity between the application site and this SAC, therefore significant effects upon this site can be ruled out.*
North Dublin Bay SAC 000206	13.6km north-east Circa 16km downstream	• Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Salicornia and other annuals colonising mud and sand	*The application site is adjacent to a stream which is a tributary of the River Dodder, which eventually flows into Dublin Bay. This SAC is approximately 16km downstream of the of the application site.*

		• Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Mediterranean salt meadows (Juncetalia maritimi) • Embryonic shifting dunes • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) • Fixed coastal dunes with herbaceous vegetation (grey dunes) • Humid dune slacks • *Petalophyllum ralfsii* (Petalwort)	*Significant effects arising from run-off into this stream during construction and operation are uncertain and will be considered further*
North Bull Island SPA 004006	13.6km north-east Circa 16km downstream	• Light-bellied Brent Goose (*Branta bernicla hrota)* • Shelduck (*Tadorna tadorna*) • Teal (*Anas crecca*) • Pintail (*Anas acuta*) • Shoveler (*Anas clypeata*) • Oystercatcher (*Haematopus ostralegus)* • Golden Plover (*Pluvialis apricaria*) • Grey Plover (*Pluvialis squatarola*) • Knot (*Calidris canutus*) • Sanderling (*Calidris alba*) • Dunlin (*Calidris alpina*) • Black-tailed Godwit (*Limosa limosa)* • Bar-tailed Godwit (*Limosa lapponica)*	*The application site is adjacent to a stream which is a tributary of the River Dodder, which eventually flows into Dublin Bay. This SPA is approximately 16km downstream of the of the application site. Significant effects arising from run-off into this stream during construction and operation are uncertain and will be considered further*

		• Curlew (*Numenius arquata*) • Redshank (*Tringa totanus*) • Turnstone (*Arenaria interpres*) • Black-headed Gull (*Chroicocephalus ridibundus*) • Wetland and Waterbirds	
North-West Irish Sea SPA 004236	13.8km north-east Circa 16km downstream	• Common Scoter (Melanitta nigra) • Red-throated Diver (*Gavia stellata)* • Great Northern Diver (*Gavia immer)* • Fulmar (*Fulmarus glacialis*) • Manx Shearwater (*Puffinus puffinus)* • Shag (*Phalacrocorax aristotelis*) • Cormorant (*Phalacrocorax carbo*) • Little Gull (*Larus minutus*) • Kittiwake (*Rissa tridactyla*) • Black-headed Gull (*Chroicocephalus ridibundus*) • Common Gull (*Larus canus*) • Lesser Black-backed Gull (*Larus fuscus*) • Herring Gull (*Larus argentatus*) • Great Black-backed Gull (*Larus marinus)* • Little Tern (*Sterna albifrons*) • Roseate Tern (*Sterna dougallii*) • Common Tern (*Sterna hirundo*) • Arctic Tern (*Sterna paradisaea*) • Puffin (*Fratercula arctica*)	*The application site is adjacent to a stream which is a tributary of the River Dodder, which eventually flows into Dublin Bay. This SPA is approximately 16km downstream of the of the application site. Significant effects arising from run-off into this stream during construction and operation are uncertain and will be considered further*

		• Razorbill (*Alca torda*) • Guillemot (*Uria aalge*)	
Poulaphouca Reservoir SPA 004063	14.7km south-west	• Greylag goose *Anser answer* • Lesser black-backed gull *Larus fuscus*	*There is no hydrological connectivity between the application site and this SPA, therefore significant effects upon this site can be ruled out.*
Dalkey Island SPA 004172	14.6km east	• Roseate Tern (*Sterna dougallii)* • Common Tern *(Sterna hirundo)* • Arctic Tern *(Sterna paradisaea)*	*No direct hydrological connectivity, therefore potential significant effects can be ruled out.*
Rockabill to Dalkey Island * SAC 003000	14.9km east	• Reefs • Phocoena phocoena *(Harbour Porpoise)*	*No direct hydrological connectivity, therefore potential significant effects can be ruled out.*

Table 6.2 – Natura 2000 within 15km of the Application Site

The generic conservation objectives of the SACs are:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The generic conservation objectives of the SPAs are:

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a habitat is achieved when:

- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future;
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- The population dynamics data on the species concerned indicate that it is maintaining itself on a long -term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future;
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

An Appropriate Assessment as required under Article 6(3) of the EU Habitats Directive has been prepared in relation to this proposed application in Ballycullen. It was determined that due to hydrological connectivity, that potential impacts upon European sites could not be ruled out with certainty. Therefore, a Stage 2 Appropriate Assessment (Natura Impact Statement) for this proposed development site has been carried out.

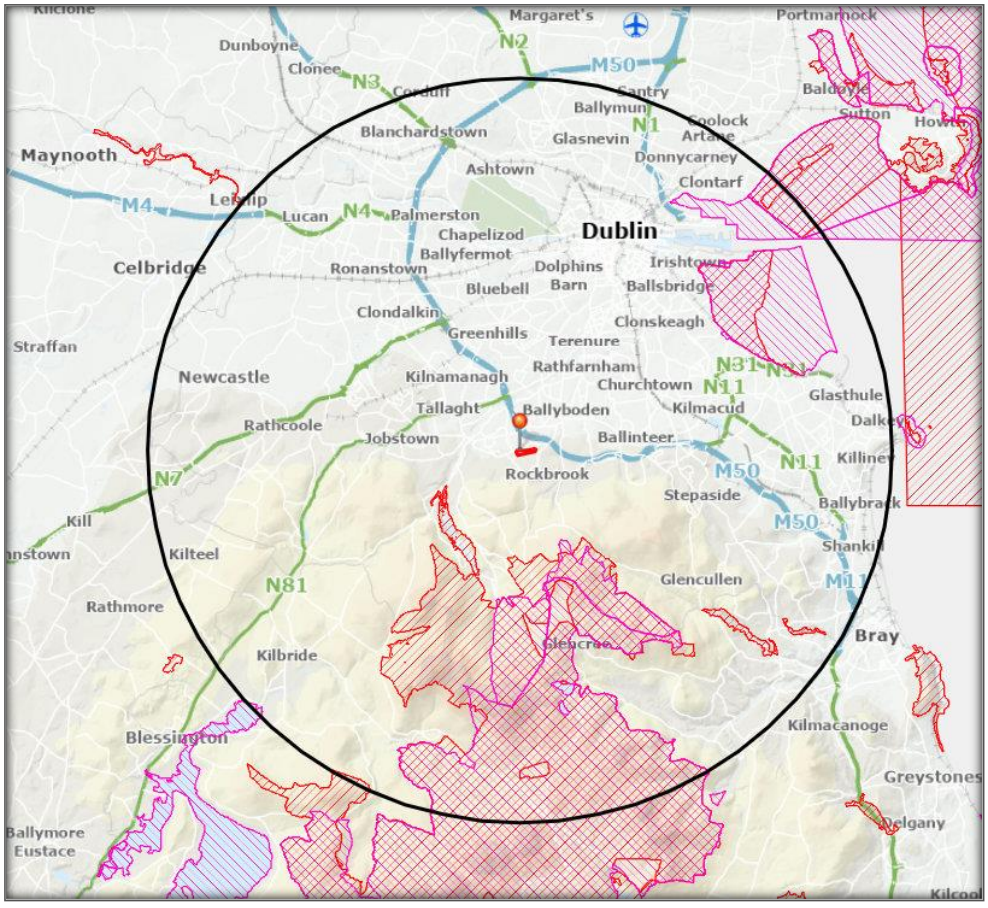


Figure 6.4 – Designated Sites within 15km of the Application Site (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.

Nationally Important Sites

The application site is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a proposed Natural Heritage Area. It is within 10km of twelve sites that have been designated as proposed Natural Heritage Areas. These are summarised in Table 6.3 and a map showing their location relative to the application site is shown in Figure 6.5.

Site Name	Distance from Proposed Development
Dodder Valley pNHA 000991	1.8km north-west
Glenasmole Valley pNHA 001209	3km south-west
Lugmore Glen pNHA 001212	5.2km east
Fitzsimons Woods 001753	5.2km east
Grand Canal pNHA 002104	7.1km north
Slade of Saggart and Crooksling Glen pNHA 000211	7.9km east
Ballybetagh Bog pNHA 001202	8.8km south-east
South Dublin Bay pNHA 000210	8.9km north-east
Liffey Valley pNHA 000128	9.4km north
Dingle Glen pNHA 001207	9.4km south-east
Knocksink Woods pNHA 000725	9.5km south-east
Glencree Valley pNHA 001755	9.7km south

Table 6.3 – Nationally Important Sites within 10km of the Proposed Development

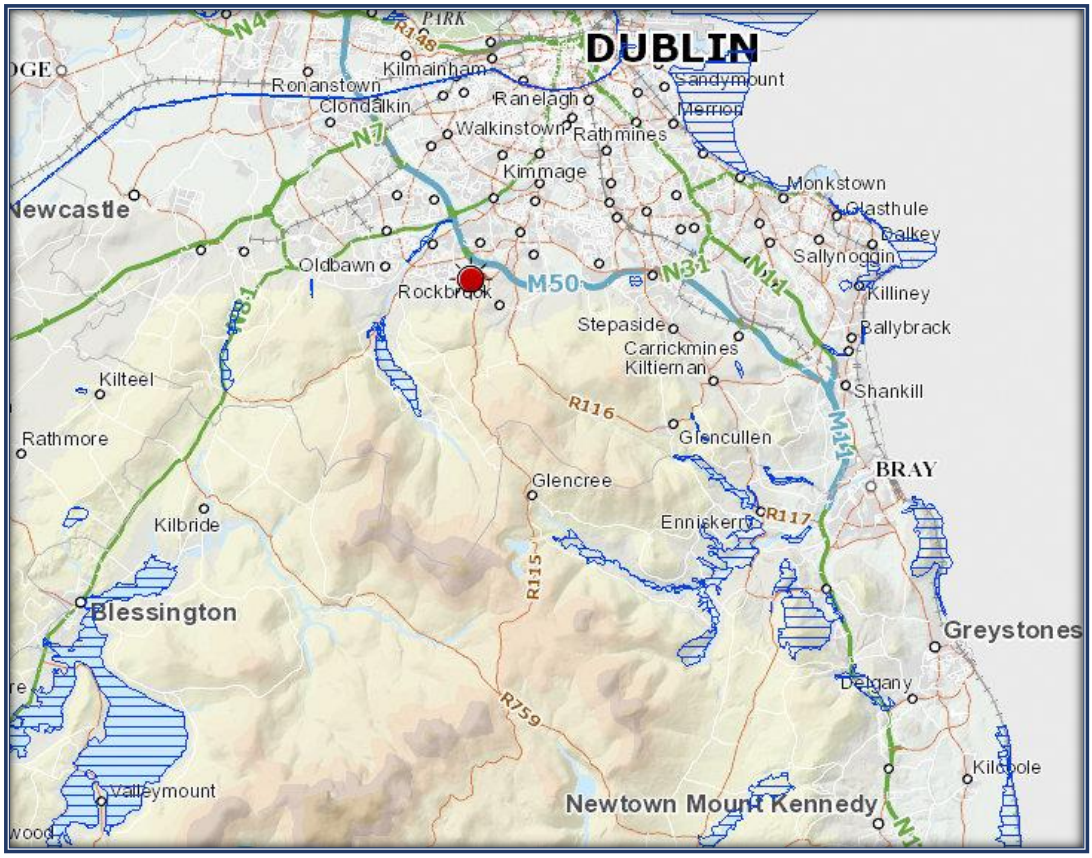


Figure 6.5 – The Proposed Application Site at Ballycullen in Relation to proposed Natural Heritage Areas within 10km (Blue Cross Hatching)

Geology

An examination of the information relating to the geology of the site on the Geological Survey of Ireland Spatial Resources application revealed that the bedrock of the site consists of Ordovician Metasediments. The soils on site are deep well drained mineral soils and they have been categorised as acid brown earths and brown podzolics, derived from mainly acidic parent materials. The sub-soil has been described as granite till. The nature of the geology of the site has determined the habitats within the site, particular any semi-natural grassland habitats that are present.

Flora

Habitats within the Study Area

No part of the site lies within any area that is designated for nature conservation purposes. All proposed development works within the application site will take place on areas of low - high biodiversity value on a local level. The natural habitats within the study area are limited and mainly consist of improved agricultural grassland habitats (GA1), hedgerows (WL1), treelines (WL2) and

woodland. These habitats are described in greater detail below whilst a habitat map is illustrated in Figure 6.9. A full list of the plant species recorded from the study area is shown in Appendix I and photos of the site can be seen in Appendix II.

From 2017 until 2024, it was concluded that there was no significant or notable change in the habitats within the application site.

Improved Agricultural Grassland (GA1)

This is the dominant habitat within the application site and it is currently used for grass production and grazing. There are two distinct areas of this habitat on the site. In the west of the site (west of the woodland dissecting the site) this habitat is quite improved, with very low biodiversity. It is dominated by rye grass (*Lolium* sp). On the eastern site of the woodland dissecting the site, the habitat here is more variable. This field is being grazed by horses. Whilst it can still be described in the improved agricultural grassland category it is less intensively managed and biodiversity is slightly higher. Species recorded are typical of this habitat and included Cock's foot grass *Dactylorisa* as well as creeping buttercup *Ranunculus repens*, meadow buttercup RANUNCULUS ACRIS, clovers TRIFOLIUM sp., common chickweed *Stellaria media* and ragwort SENECIO JACOBAEA.

Along the un-mown and under-grazed verges of this habitat that are adjacent to the hedgerows and treelines, species such as nettles URTICA DIOCIA, germander speedwell *Veronica chamaedrys*, cleavers *Galium aparine* and brambles RUBUS FRUCTICOSUS are all common.

Evaluation: This improved agricultural grassland habitat is of low biodiversity value overall and is of no ecological value.

Treelines (WL2) and Hedgerows (WL1)

Fossit defines the treeline (WL2) as a narrow row or single line of trees that is greater that 5m in height that typically occurs along field or property boundaries. A hedgerow is generally considered to be less than 5m in height and 4m wide. Prior to the development of the lands adjacent to the application site, treelines and hedgerows would have formed an important natural feature of the site. However, many have been removed to facilitate developments adjacent to the applicant site since the capturing of the most recent aerial images available. The hedgerow / treeline forming the western and northern boundaries of the site were removed during the development of the residential estate and replaced by a wooden fence. The hedgerows and treelines previously removed are shown in Figure 6.6.

Figure 6.6 – Aerial Photograph Showing Areas where Treelines / Hedgerows have been Removed (Dashed Yellow Line)

The only remaining treeline habitat currently within the application site is a small section occurring along the eastern site boundary. The dominant species within this treeline is sessile oak *Quercus petraea*, whilst beech *Fagus sylvatica* and sycamore *Acer pseudoplantatus* are also common.

Evaluation: The majority of the original treeline and hedgerow habitats within the site have been lost to facilitate developments adjacent to the site. The remaining treeline along the eastern perimeter is dominated by native oaks and this could be considered of high local importance.

Scrub (WS1)

Fossit describes scrub as an area that is dominated by at least 50% cover of shrubs, stunted trees or brambles, with a canopy height of less than 5m. There is a small area of scrub within the application site along the western boundary of the site. It has colonised an area of previous hedgerow growth. The dominant species in the habitat is bramble, with the occasional hawthorn CRATAEGUS MONOGYNA and ash *Fraxinus excelsior*. Along the northern site boundaries where the back gardens of the residential dwellings on Stocking Wood back on to the site, there are some small pockets of scrub, containing willow, bramble and buddlia.

Evaluation: Biodiversity within the scrub habitat is low, although it does provide some suitable nesting sites and foraging opportunities for small birds and mammals.

Oak-Birch-Holly Woodland WN1

This is the most notable ecological feature within the application site and it bisects the site from north to south. Fossit describes this habitat as "native, semi-natural broadleaved woodland that occurs on acid or base-poor soils that may be either dry or humid but not waterlogged". Sessile oak *Quercus petraea* is the dominant tree in this habitat. Non-native beech *Fagus sylvatica* and sycamore *Acer pseudoplantatus* are also common, but they are not the dominant feature. The understory of this habitat is dominated by holly *Ilex aquifolium*. Hawthorn CRATAEGUS MONOGYNA and blackthorn *Prunus spinosa* are occasional. Honeysuckle *Lonicera periclymenum* was frequently observed growing around the tree trunks and in the shrubby species of the understory. Other tree / shrub species recorded included downy birch *Betula pubescens*, dog rose *Rosa canina* and gorse *Ulex europaeus*.

The herbaceous ground flora of this habitat was limited, possibly due to trampling and grazing by cattle and sheep. Species recorded include wood avens *Geum urbanum*, vetches *Vicia sp*, germander speedwell *Veronica chamaedrys* and self heal PRUNELLA VULGARIS.

Evaluation: Although this habitat has a limited ground flora and non-native tree species are common (beech), this habitat is a valuable ecological feature in the site and it is considered to be of medium/high biodiversity value on a local level, both in its own right and as it provides an important ecological corridor for birds, bats and other mammals. There is a small, woodland south of the farm (Woodtown House) that is south of the site and so the woodland within the application site would provide an important corridor to this other woodland habitat. The feature is also historical and it is evident on historical OSI maps, which can be seen in Figures 6.7 and 6.8.

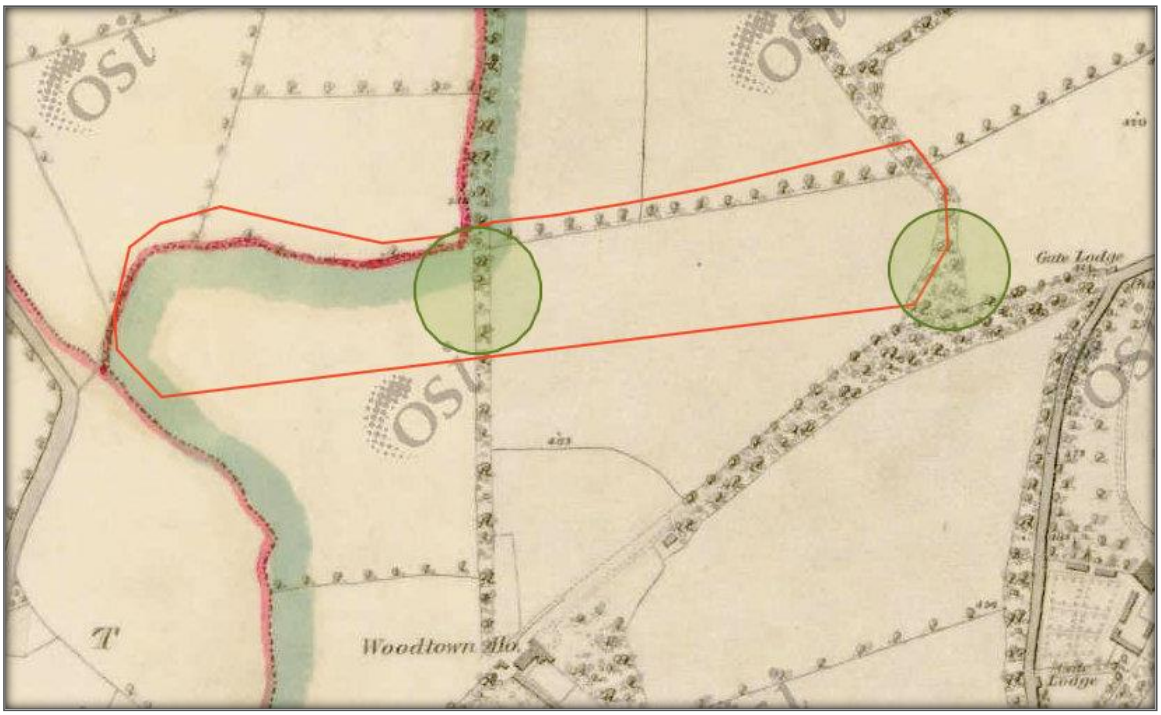


Figure 6.7 – OSI Cassini 6inch Map (1829-1841). WN1 Habitats Highlighted

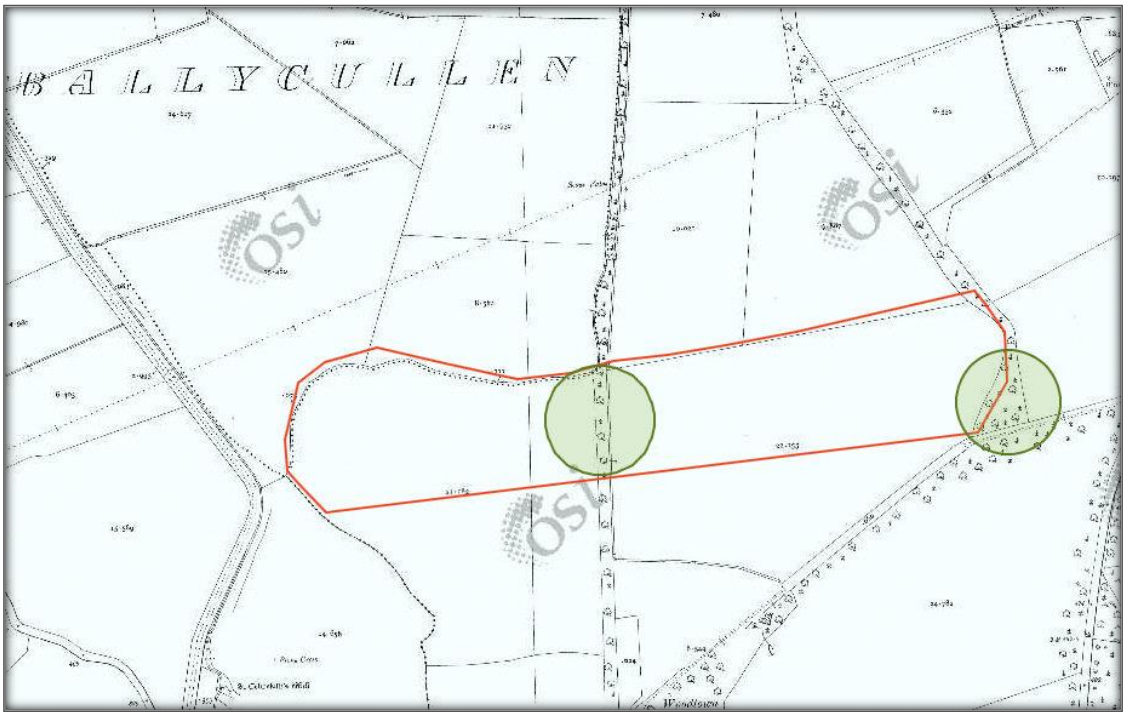


Figure 6.8 – OSI 12inch Map (1897-1913). WN1 Habitats Highlighted

Depositing/Lowland Rivers FW2

This habitat category refers to watercourses where fine sediments are deposited on the river bed. There are two small streams within the application site – one on the eastern side of the woodland within the site and there is also one on the eastern site boundary. These streams are both narrow and shallow and both have an accumulation of sediment and leaf detritus. A discussion on the water quality in these streams is presented in the Water Quality section.

Evaluation: All watercourses can be considered to be of high ecological value and locally / regionally important.

Rare and Protected Plant Species

An examination of the website of the National Parks and Wildlife, the National Biodiversity Data Centre and the Online Atlas of Vascular Plants for Ireland revealed that there are no modern records for any plant species protected under the Flora Protection Order from within the 10km square (O1125 and O1225) of the proposed application sites.

Invasive Species

No non-native invasive species that are listed in Schedule Three of the Birds and Habitats Regulations (2011) were recorded from within the study area. Particular attention was paid to the potential presence of Japanese knotweed *Fallopia japonica*, which is very common throughout the Greater Dublin Area.

Arboricultural Assessment

A Tree Survey report has been prepared to accompany this application (Arbor-Care Ltd, 2024). Within the site area, the individual trees were assessed, described and plotted. This report classified these trees into four different tree condition categories. These categories and the numbers of trees within the application site falling into these categories are listed below.

- Category A: Trees of high value and quality
- Category B: Trees of moderate value and quality
- Category C: Trees of low quality and value
- Category U: Trees of very low value which should be removed

A TOTAL OF 134 TREES ON THE SITE WERE ASSESSED AS PART OF THIS SURVEY. A SUMMARY OF THE TREE CONDITION CATEGORIES OF THESE TREES IS PRESENTED BELOW.

- Category A: ~1 tree
- Category B: ~69 trees
- Category C: ~50 trees
- Category U: ~12 trees

It should be understood that whilst a tree may be of low value arboriculturally, its value in an ecological and biodiversity context can by high, as trees of poor condition can provide high value to nesting birds, roosting bats as well as a wide range of invertebrates. They also form important ecological networks and ecological commuting corridors between areas of high biodiversity value.

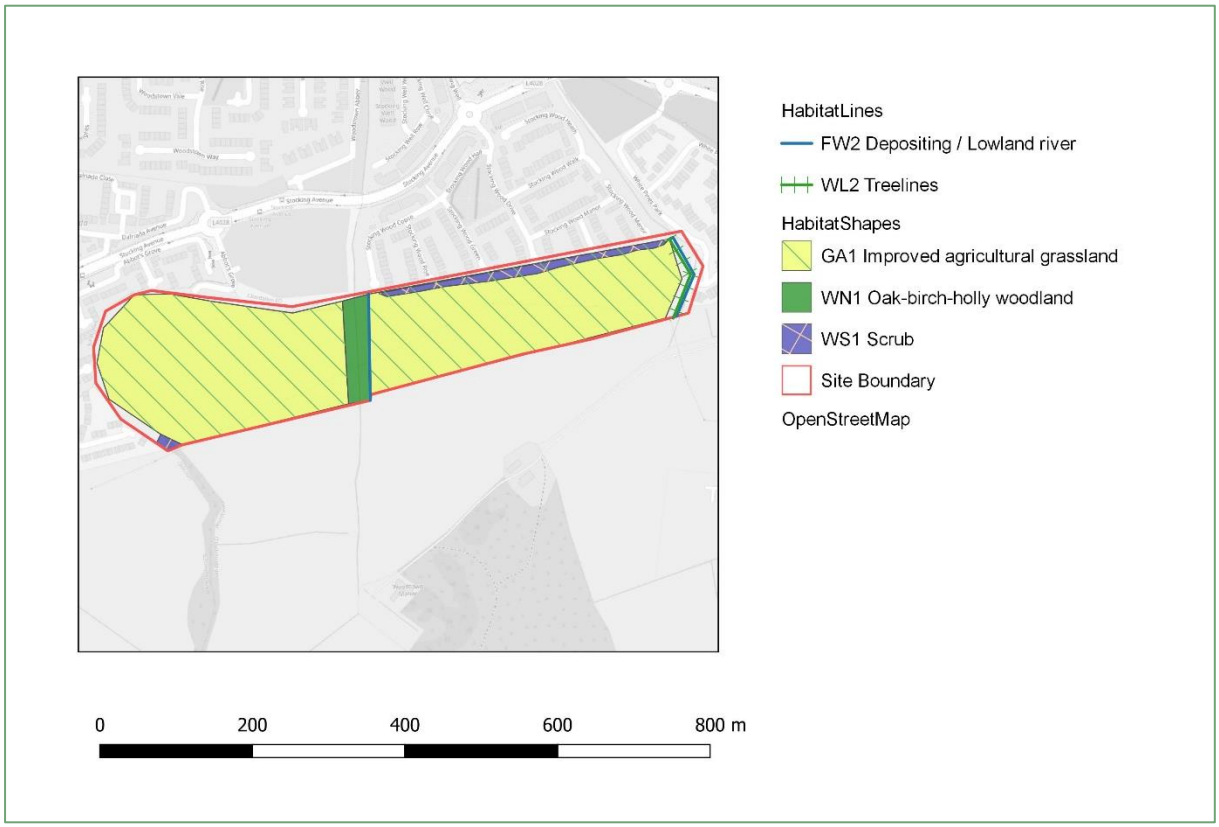


Figure 6.9 – Map Showing the Main Habitats within the Site

Fauna

Protected Mammals

Records from the National Biodiversity Data Centre reveal the presence of the following protected mammals from within the 10km square (O22) of this proposed application site:

- Badger *Meles meles*
- European Hedgehog *Erinaceus europaeus*
- Otter *Lutra lutra*
- Red deer *Cervus elaphus*
- Irish Hare *Lepus timidus subsp. Hibernicus*
- Irish stoat *Mustela 51rmine subsp. hibernica*
- Red squirrel *Sciurus vulgaris*
- Daubenton's bat *Myotis daubentonii*
- Natterer's bat *Myotis nattereri*
- Whiskered bat *Myotis mystacinus*
- Nathusius's Pipistrelle *Pipistrellus nathusii*
- Pygmy shrew *Sorex minutes*
- Pipistrelle *Pipistrellus pipistrellus sensu lato*
- Lesser Noctule *Nyctalus leisleri*
- Soprano *Pipistrelle Pipistrellus pygmaeus*
- Brown long-eared bat *Plecotus auritus*

All these species are protected under the Irish Wildlife Acts. In addition, the otter *Lutra lutra* is protected under Annex II of the European Habitats Directive.

During the site walkover, all possible mammal evidence was recorded. There were many tracks crossing the grass and over the streams and it was possible that these were caused by foxes or dogs. Grey squirrels were very active in the woodlands within and around the site.

No signs of otters were observed on the site at any stage and there are no suitable riparian habitats within the site to support otters.

The 2024 badger survey noted no badger signs within the site. There were no paw prints, tracks, digging, dung pits or latrines, badger setts or any clear evidence of badger activity. There were certainly no badger setts within the site and there was no evidence of badgers or badger setts within the immediate adjoining hedgerows. There were no clear signs of badger foraging within the site. It is possible that some signs were obscured by the level of deer activity within the site. There were several tracks leading from the site to the south but only deer signs were confirmed for these tracks. Other tracks were attributable to fox activity and rabbits. There is suitable badger habitat to the south of the site. The main mammal evidence was sika deer, and deer were seen during the bat and badger surveys. Rabbit burrows were noted within the site and in neighbouring lands. There are also rodent signs within the site including grey squirrel and brown rat. There is also a small herd of horses within the eastern field. These would also destroy badger paw prints or other foraging signs. It is certain that badgers are not breeding within the site and that there are no setts in evidence. There is the possibility that badgers enter the site to feed and that the activity of deer and horses have covered these signs.

Bats – 2024 Survey

Despite moderate bat activity in the dusk survey of 2024, no roosting behaviour was observed throughout the night. The strong winds and rain of the storm during the morning survey may have deterred bat activity although more than one bat was still observed commuting across the site indicating not all bats had been deterred by the unfavourable weather conditions at dawn.

Activity was seen to increase by 70.3% in the 2024 survey compared to the 2020 survey, however less bat species diversity was recorded with only 3 species recorded in 2024 and 2017 as opposed to 4 in 2020. No bat species were found roosting in the site.

Bat species found feeding and commuting:

- Common pipistrelle – *Pipistrellus pipistrellus*
- Soprano pipistrelle – *Pipistrellus pygmaeus*
- Leisler's bat – *Nyctalus leisleri*
- Natterer's bat - *Myotis nattereri* (2020 only)

The survey of trees for Bat Roost Potential noted that the trees with the highest potential were in the tree line in the centre of the site along the river. A number of trees in this woodland showed suitability for bat roosting, particularly the trees most central to the site. The trees above all qualify for Description 1. Other trees within this wooded area have no roost potential while some are Description 2 or 3.

The bat activity survey determined that bat activity was consistent particularly along either side of the woodland. Common pipistrelle activity began at 20:55 hours, followed by soprano pipistrelle activity across on the other side of the trees. On the eastern side of the treeline, both soprano and common pipistrelle activity continued feeding along the treeline. Leisler's activity commenced a few minutes later on the same side and continued until 21:41.

Activity was quieter in the western field although consistent feeding was recorded throughout the night. Predominantly common and soprano pipistrelle activity was recorded (intermittently) throughout the night in the western field, with one pass of a Leisler's bat which was social calling across the site continuing to the west. Soprano pipistrelle and Leisler's bat activity continued until 21:41.

In the morning only one Leisler's bat pass was recorded by surveyors although the Song Meter Mini recorded four passes by a common pipistrelle over this period. No evidence of bat roosting was found onsite despite low-moderate foraging and commuting activity throughout the night. Bat activity was recorded for three bat species throughout the night across the span of this site.

This shows a decrease in bat diversity onsite since the 2020 survey which found an additional bat species, Natterer's bat feeding on the site. This may be temporal in nature and longer-term evaluations may increase the species list.

The full results from the bat survey are presented in the accompanying bat report.

Figure 6.10 – Bat Activity on the Site 2020 (from Bat Assessment, Brian Keely)

Birds

A range of common passerine birds were seen / heard within proposed development site between 2017 - 2024, these species included:

- Great tit *Parus major*
- Robin *Erithacus rubecula*
- Chaffinch *Fringilla coelebs*
- Blue tit Cyanistes caeruleus
- Magpie *Pica pica*
- Jackdaw *Corvus monedula*
- Starling *Sturnus vulgaris*
- Blackbird *Turdus merula*
- Goldfinch
- Sparrow

Two breeding bird surveys were carried out by Hugh Delaney, Ornithologist. The results of these surveys are presented below in Table 6.4 with a map of the areas of interest included in Figure 6.11. The conservation status of the birds is also included, based on the Birds of Conservation Concern in Ireland 2020 – 2026. These classifications help indicate the conservation status of each species (Red = highest concern, Amber = moderate concern, Green = least concern).

Species	Peak Count	Breeding Evidence	Notes	BOCCI Status
Buzzard *Buteo buteo*	2	Confirmed	Nest likely south of site; adult observed provisioning young.	Green
Herring Gull *Larus argentatus*	11	None	Overflying birds only; no foraging or nesting on-site.	Red
Woodpigeon *Columba palumbus*	28	None	Foraging on-site; no breeding evidence.	Green
Swift *Apus apus*	2	None	Foraging over site; no breeding behaviour noted.	Amber

Species	Peak Count	Breeding Evidence	Notes	BOCCI Status
Swallow *Hirundo rustica*	15	None	Foraging observed; no nesting activity.	Amber
House Martin *Delichon urbicum*	8	None	Foraging observed; no nesting activity.	Amber
Pied Wagtail *Motacilla alba yarrellii*	1	Probable	Intermittent foraging observed.	Green
Dunnock *Prunella modularis*	4	Confirmed	Adults feeding young in Area 1 (See Figure 6.11)	Amber
Robin *Erithacus rubecula*	8	Confirmed	Multiple juveniles observed being provisioned by adults.	Green
Song Thrush *Turdus philomelos*	1	Confirmed	Juvenile observed; adult in song at same location.	Red
Blackbird *Turdus merula*	5	Confirmed	Fledged juveniles observed; adults in song.	Green
Chiffchaff *Phylloscopus collybita*	1	Possible	Singing male; no further breeding activity noted.	Green
Wren *Troglodytes troglodytes*	6	Confirmed	Pair feeding young at north boundary; additional singing males.	Green
Blue Tit *Cyanistes caeruleus*	4	Confirmed	Adults feeding fledglings; nesting location not confirmed.	Green
Great Tit *Parus major*	3	Confirmed	Adults provisioning young; likely nesting nearby.	Green
Long-tailed Tit *Aegithalos caudatus*	4	Possible	Foraging group; no breeding behaviour noted.	Green
Magpie *Pica pica*	5	None	Foraging observed; no breeding evidence.	Green
Jackdaw *Corvus monedula*	15	None	Overflying birds only.	Green
Starling *Sturnus vulgaris*	50	Possible	Large post-breeding flocks; no confirmed nesting.	Red

Species	Peak Count	Breeding Evidence	Notes	BOCCI Status
Chaffinch *Fringilla coelebs*	2	Possible	Singing males; no confirmed breeding.	Green
Goldfinch *Carduelis carduelis*	22	Possible	Juveniles and small flocks observed; nesting not confirmed.	Green

Table 6.4 – Birds Recorded within the Site

Figure 6.11 – Map Showing Areas Studied for Breeding Bird Survey

Amphibians, Reptiles and Insects

Although no amphibians or reptiles were observed on the day of the survey, it is possible that the common frog occurs within the site. Few aerial invertebrates were observed on the day of the surveys as temperatures were cool. In suitable seasonal and climatic conditions, it is likely that a range of the most common invertebrates would occur.

Aquatic Environment

Water Features and Quality

The application site lies within the Eastern River Basin District, the Liffey and Dublin Bay Hydrometric Area/Catchment, the Dodder Sub-Catchment and Sub-Basin. There is a small stream flowing along the eastern perimeter of the woodland that bisects the site. There is also a stream flowing along the eastern perimeter. Both these flow in a northerly direction. These streams are not mapped by the EPA but it is likely that they are tributaries of the Orlagh Stream, which is a tributary of the Dodder. The confluence of the Orlagh Stream and the River Dodder is 2km north of the application site.

The EPA have classified the ecological status of the Orlagh Stream and its tributaries as moderate. The River Dodder has also been classed as moderate for its entire length. As part of the field work for this application site, an examination of the invertebrates of the stream in the middle of the site was undertaken using a hand held sweep net and a two minute kick sample. The stream bed was dominated by silt. The dominant taxon observed in the sample was the amphipod *Gammarus*, which is relatively tolerant of organic pollution. As this species was dominant, an EPA Q rating of 3 was applied, indicating that this stream is also of moderate ecological status. Under the requirements of

the Water Framework Directive, this is unsatisfactory and all water bodies are obliged to achieve good status under this Directive.

Ecological Evaluation

Summary of the Value of the Application Site

The application site is not within nor is it adjacent to any site that has been designated for nature conservation purposes. The site at Ballycullen is within 15km of thirteen sites designated under the Natura 2000 network. The closest of these is Glenasmole Valley SAC and this is 3km south-west of the application site. The site is also approximately 16km upstream of the European sites associated with Dublin Bay. The site is also within 10km of twelve sites designated as Natural Heritage Areas (NHAs and pNHAs). It is hydrologically connected to the pNHAs associated with Dublin Bay.

Within the application site itself, the dominant habitat is improved agricultural grassland, which is of little biodiversity value. The woodland habitats within and adjacent to the eastern site perimeter are the most important ecological features within the site and these could be considered to be of medium - high local importance. They are also historical landscape features. The native species within the habitat add to its importance, as does its value to wildlife such as birds, bats and mammals.

The watercourses within the site are also important features as they are tributaries of the River Dodder. The ecological water quality in these streams and the surrounding areas is moderate and this is unsatisfactory. An overview of water quality in the entire catchment revels this problem to be large scale and the highest reaches of these streams are also unsatisfactory. Upland forestry is the likely cause for this unsatisfactory status.

6.5 Characteristics of the Proposed Development

Lagan Homes Ballycullen Limited intend to make a planning application for planning permission for a Large Scale Residential Development (LRD) in the townland of Woodtown, Ballycullen, Dublin 16. The lands are located to the east of Abbots Grove Park, south-east of Abbots Grove Avenue, south of Stocking Avenue and Stocking Wood estate, and west of White Pines Park.

The proposed development will consist of 494 no. residential units (108no. 1-bed, 168no. 2-bed, 160 no. 3-bed; 58 no. 4-bed) comprising 189no. 2 storey houses (terraced/semi-detached/detached) (17no. 2-bed, 114no. 3-bed; 58no. 4-bed) and 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (c.475sq.m), public open space, car parking (surface/undercroft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. Vehicular access to be provided from the

existing spur road connection to Stocking Avenue to the west of the site, and via Stocking Wood Drive to the east of the site (with relocation of existing ESB substation and associated works to the existing hammerhead). Additional pedestrian only routes will be provided into Abbot's Grove Park and Stocking Wood Copse with future connections provided for into Stocking Wood Manor, White Pines Park and the future school site to the north of the application site. The proposed development includes all associated site development works (including site reprofiling, retaining structures and downing of ESB overhead lines), landscaping, boundary treatments and services provision.

An extract from the planning drawings can be seen in Figure 6.11.

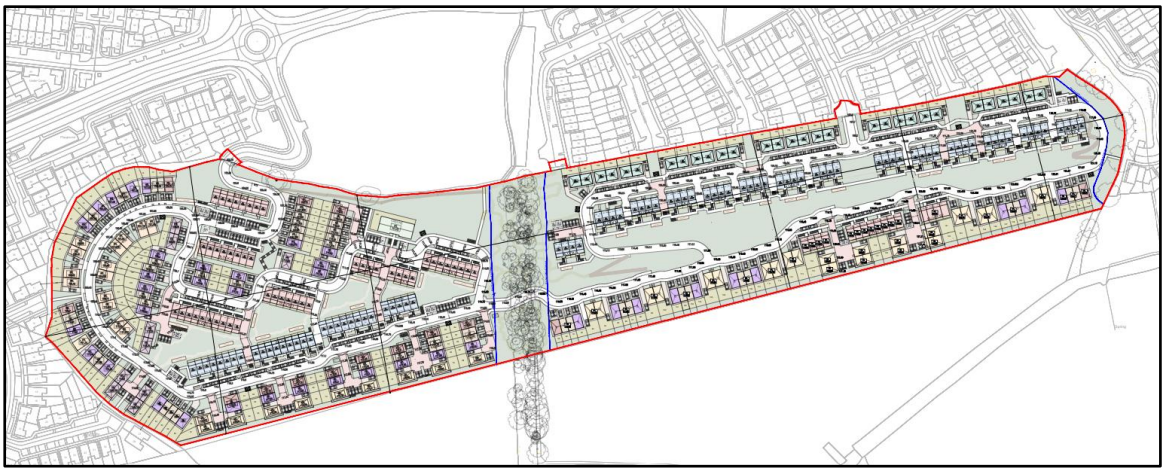


Figure 6.11 – Extract from Planning Drawing (as prepared by JFOC Architects)

Foul Water

An engineering report for the proposed development has been prepared by Waterman Moylan Consulting Engineers Ltd. This outlines the proposed foul water drainage situation. There is an existing 225mm diameter foul sewer constructed in the spur road adjacent to Abbot Grove development on the west side of the site. This 225mm sewer connects to an existing 450mm diameter sewer north of Stocking Avenue.

It is proposed to provide a gravity system which will discharge to the existing foul water infrastructure north of the subject site at 2 No. locations. A Pre-Connection Enquiry form was submitted to Uisce Éireann on 26/01/2024 for 400 units which outlined the proposals for the drainage of wastewater from the development. Uisce Éireann responded with the Confirmation of Feasibility (COF) on 12/02/2024, with reference no. CDS24000704. A revised Pre-Connection Enquiry form was submitted to Uisce Éireann on 06/12/2024 for 505 No. houses and 1 No. creche and a COF with reference number

CDS24010539 was received from Uisce Éireann on 05/03/2025 which further confirmed that the foul connection is feasible without infrastructure upgrades.

Proposed Surface Water Drainage

Details on the proposed surface water drainage have also been presented in the report prepared by Waterman Moylan Consulting Engineers Ltd. The proposed surface water drainage network will comply with the GDSDS Regional Drainage Policies Volume 2, for New Developments. The following documents have also been considered in preparing the surface water drainage strategy for the development:

- South Dublin County Council 2022-2028 Development Plan
- Sustainable Drainage Explanatory Design and Evaluation Guide 2022
- CIRIA SuDS Manual (C753)

Sustainable Urban Drainage Systems (SUDS) have been developed and are in use to alleviate the detrimental effects of traditional urban stormwater drainage practices that typically consist of piping run-off of rainfall from developments to the nearest receiving watercourse. Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as SUDS. They are typically made up of one or more structures, built to manage surface water run-off. The use of SUDS to control runoff also provides the additional benefit of reducing pollutants in the surface water by settling out suspended solids, and in some cases providing biological treatment.

A stormwater management or treatment train approach assures that run-off quantity and quality are improved. The following objectives of the treatment train provide an integrated and balanced approach to help mitigate the changes in stormwater run-off flows that occur as land is urbanised and to help mitigate the impacts of stormwater quality on receiving systems:

1) Source control: conveyance and infiltration of run-off; and

2) Site Control: reduction in volume and rate of surface run-off, with some additional treatment provided.

It is proposed that the surface water runoff for the development will be intercepted, collected, slowed, and attenuated through the use nature-based rainwater management and sustainable urban drainage systems (SuDS). The SuDS for this subject site are summarised below:

- Permeable paving below parking spaces
- Rain gardens and bio-retention tree pits within strategically located landscaped areas
- Above-ground detention basins located in open green space areas
- Green roof systems on duplex/apartment blocks
- Roadside swales and a filter drain
- Hydrobrakes fitted downstream of the attenuation area basins

The proposed SUDS interventions have been implemented to ensure runoff is treated to the standards outlined in the Greater Dublin Strategic Drainage Study and to add value to the biodiversity potential of the development.

Following the Request for Additional Information, the proposed Surface Water Drainage Strategy was re-evaluated to consider the concerns of South Dublin County Council with regards to the design of the proposed SUDS measures.

The drainage design has been updated, limiting the depth of detention basins to 1m and introducing ponds which are up to 2m in depth with a 500mm permanent water level. The detention basins have been designed with a 1 in 4 slope on at least one side so that they can be maintained, in line with the SDCC Guidelines. The ponds will be provided with a railing and walkway to protect the steep embankments where required.

Where the attenuation volumes allow, the discharge from the detention basins will be through a mesh basket on the bank of the detention basins. Furthermore, the discharge location from all ponds will be on the bank. Where possible, the incoming pipe will be on the opposite side of the detention basin to the outflow, allowing maximum opportunity for surface water run-off to be treated and absorbed or allow for evapotranspiration to take place prior to being discharged from the SUDS Component.

Petrol interceptors are not proposed as part of the proposed SUDS design. All surface water from the proposed roads will pass through at least one forms of SUDS prior to being discharged to the stream or public sewer.

6.6 Potential Impacts

Introduction

The information gathered as part of the desk and field studies for this proposed application has been used to complete the biodiversity chapter of this EIA.

The identification of potential impacts and the assessment of their significance typically requires the identification of the type and magnitude of the impacts. For example, will the impacts be short term or long term, direct, indirect or cumulative and will they occur during construction or operation. This section will establish whether ecological impacts of the proposed development in Ballycullen are likely to occur and whether or not they are significant. These potential impacts will be examined with respect to the ecological receptors identified in the previous section.

The emphasis in EcIA is on "significant" effects, rather than all ecological effects (CIEEM, 2018). For the purpose of EcIA, a "significant effect" is an effect that either supports or undermines biodiversity conservation objectives for important ecological features for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national / local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local.

A significant effect is an effect that if sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting the project. In broad terms, significant effects encompass impacts on structures and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). (CIEEM, 2018).

Impacts upon Designated Sites

Natura 2000 Sites

The NIS that has been completed for this proposed development identified five Natura 2000 sites that lie within the Zone of Influence of the application site, i.e., South Dublin Bay / River Tolka Estuary SPA,

the South Dublin Bay SAC, the North-West Irish Sea SPA, North Bull Island SPA and North Dublin Bay SAC. These sites are approximately 16km downstream of the application site. Given this hydrological separation distance, significant effects upon these sites are unlikely but cannot be ruled out with certainty.

In accordance with the tenets of the precautionary principle and in the absence of mitigation, an accidental pollution event which might occur during the construction or operation or the proposed development, either alone or in-combination with other developments, could potentially affect the water quality in the watercourses within the site. These streams lead to the River Dodder, which eventually flows into Dublin Bay. Therefore, in light of this uncertainty, coupled with the fact that mitigation measures are required to protect the water quality of the watercourses in the site, a Natura Impact Statement was prepared for the development.

It was concluded in the Natura Impact Statement that following an analysis and evaluation of the predicted impacts from the proposed development and with the implementation of the mitigation measures proposed in the NIS and this biodiversity chapter, that the proposed development will not have any negative effect on the integrity of the South Dublin Bay / River Tolka Estuary SPA, the South Dublin Bay SAC, the North-West Irish Sea SPA, North Bull Island SPA and North Dublin Bay SAC, either alone or in combination with other plans or projects.

Natural Heritage Areas

The application site is not within or adjacent to any site designated as a Natural Heritage Area. The closest pNHA to the site is the Dodder Valley and this is 1.8km north-west of the site. There is no upstream – downstream hydrological connectivity between the application site and this pNHA and impacts upon this pNHA are not likely to occur. The only pNHAs with direct source – pathway – receptor linkages to the application site are the pNHAs of Dublin Bay, i.e., South/North Dublin Bay pNHA. These sites are over 16km downstream of the application site and the boundary of these pNHAs are largely similar to the boundaries of the European sites of Dublin Bay. Impacts upon these pNHAs arising from run-off during the construction and operation of the site are unlikely given the downstream distance, however mitigation will be included to ensure that run-off from the site during construction and operation does not impact upon any downstream designated receptors.

Impacts within the Application Site

Development Phase

Should the developments at Ballycullen be allowed to proceed then the following impacts will / may occur during the site preparation and construction of the proposed development.

- Habitat loss and fragmentation – In identifying these impacts, the arborist's report accompanying this application was referred to (The Tree File, Consulting Arborists).

  The majority of the site will be cleared to facilitate the development, resulting in the permanent loss of the grassland habitats. These habitats are of no ecological value; therefore, their loss will be neutral. This will however reduce the open space of the landscape, reducing the areas that currently allow for the free and unimpeded movement of mammals.

  The Arboricultural Impact Assessment (2024) has stated that 10 trees will be removed to facilitate the proposed development, including two ash trees, one elm and seven oaks. These trees consist of 0 no. category A trees, 7 no. category B, 1 no. category C trees and 2 no. category U trees

  This fragmentation will have a permanent slight negative impact upon the biodiversity of the local area. Local populations of birds will also be affected as the availability of local nesting and feeding sites will be reduced, and if these trees are removed during bird nesting season then loss of eggs and injury or death of fledglings could arise. A number of bird species were confirmed as breeding on the site, including buzzard, dunnock, robin, song thrush, blackbird, wren, blue tit and great tit, and it is likely that other passerine species will also breed on the site. Therefore, any loss or fragmentation of these habitats could result in a long-term reduction in breeding opportunities and foraging resources for local bird populations.

  In addition, small terrestrial mammals might be affected from habitat loss and fragmentation as they would use the woodland to commute and feed in safety. Bats that use the trees as roosting or hibernating sites might also be affected and the safe commuting corridor within the site would be fragmented.

- Disturbance to local wildlife – During the development phase, there will be an increase in human activity and noise on the site. This will be disruptive to local populations of birds and mammals. Bats will also be impacted upon due to:

  - Roost loss - Tree felling and tree surgery may lead to roost loss albeit that no roosts were evident in the bat assessment. If bats are present at the time of felling, this could lead to

injury or death to a species protected under the Wildlife Act and Habitats Directive and would therefore constitute a breach of the Irish and EU legislation;

- Disturbance from Lighting – The lighting scheme associated with the proposed development may affect light-intolerant bat species during foraging and if directed at emergence points would affect all bat species, even those that will feed in illuminated areas. Species such as Leisler's bat and common pipistrelle are less affected than almost all other Irish bat species and this would not be a significant impact while Natterer's bat, whiskered bats and brown long-eared bats would be more affected. At worst, it would be a permanent moderately negative impact.

- Reduced feeding - Reduced vegetation including the removal of grazing stock and of any of the trees within the site will lead to reduced insect abundance. This will be a permanent slight negative impact.

- Decrease in Water Quality – The preparation and development of the site will will involve the excavation of soil and the pouring of concrete for foundations and other hard surfaces. A bridge (Open bed box culvert type) will also need to be constructed over the stream that is mid-site. These works have the potential to generate run-off into this stream. If appropriate mitigation measures are not taken during the construction of the proposed development, then there is the possibility that water quality in this stream may be negatively impacted upon. Possible direct impacts include the pollution of the waters during construction with silt, oil, cement, hydraulic fluid etc. This would directly affect the habitat of species by reducing water quality. These substances would also have a toxic effect on the ecology of the water in general, directly affecting certain species and their food supplies. In addition, an increase in the siltation levels of the watercourses in the site could result in the smothering of fish eggs, an increase in the mortality rate in fishes of all ages, a reduction in the amount of food available for fish and the creation of impediments to the movement of fish. Pollution of the water with hydrocarbons, cement and concrete during the construction phase of this proposed development could also have a significant negative effect on the fish and aquatic invertebrate populations. The potential for pollution run-off, in the absence of mitigation measures, will constitute a short-term negative effect.

Operational Phase

The majority of impacts will occur during the development phase of this development. However, certain impacts on local habitats / wildlife may occur during the operation of the development.

- Disturbance to local wildlife – Once operational, the development at Ballycullen will facilitate many new buildings, all of which are associated with human activity. This will deter wildlife from the site, particularly mammals. There will also be a number of ongoing impacts upon the bats occurring within the site. These include:
  - The interruption of commuting routes
  - The loss of foraging areas within or adjacent to lighting
  - Reduced competitiveness
- Landscaping – Inappropriate landscaping of the application site may inadvertently result in the introduction of non-native and invasive plant species. However, appropriate landscaping could also provide new beneficial habitats for wildlife if it is done with suitable trees and shrubs that provide nesting and foraging opportunities for birds. The management of the verges for wildlife would also be beneficial for local pollinators. A comprehensive landscaping plan has been prepared for the site, and this considers the green infrastructure that exists on the site. Supplemental planting and the creation of additional habitats on the site have been included, such as a new woodland area along the southern site boundary that will be planted with trees that are native.
- Decrease in Water Quality – During the operation of the site, pollution to the stream on site may occur due to run-off of silt and oil from hard surfaces.

6.7 Potential Cumulative Impacts

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first; through persistent additions or losses of the same materials or resource, and second,- through the compounding effects as a result of the coming together of two or more effects (Bowers-Marriott, 1997).

In the larger context of the Dublin City area, there are a number of other proposed developments, some of which are proposed for previously undeveloped, green field sites. These developments

combined will reduce the open spaces and habitat availability of the Dublin City area as a whole, thereby cumulatively impacting on local bird and mammal populations. However, the creation of new areas of biodiversity within the application site and the retention and protection of treelines, will provide local ecological corridors and networks that will reduce the overall cumulative impact of this development in the Dublin City area.

6.8 Mitigation Measures

The primary method of mitigation for any development should be avoidance of that impact. Consideration was therefore given to avoiding any direct or indirect impacts on the sensitive ecological receptors within the site.

In order to avoid protect the existing ecological features on site and surrounding area, the following mitigation measures are recommended:

Construction Phase

Protection of Habitats

- Site preparation and construction must be confined to the development site only and it must adhere to all the mitigation measures contained in this chapter. Work areas should be kept to the minimum area required to carry out the proposed works and the area should be clearly marked out in advance of the proposed works. On foot of this ecological study and the iterative process involved in the preparation of this report, the applicant is aware of the ecological sensitivity of the location. Upon appointment of the construction contractor, this team will also be made aware of the valued ecological receptors within the site. All measures will be undertaken from initial site works until the completion of all construction works on site.
- It is recommended that the measures outlined in this Biodiversity Chapter of the EIAR and the NIS along with any other reports containing environmental mitigation measures, are incorporated into a Construction and Environmental Management Plan.
- In accordance with the policies and objectives of the South County Dublin Development Plan, the existing green infrastructure of the site, i.e., the woodlands and hedgerows, should be incorporated into the development in so far as possible. The proposed development has been designed to retain the central portion of woodland in the site, with the exception of the removal of a portion of this habitat to facilitate the road and a pathway (10 trees will be removed). The woodland to the east of the site will also be retained. A detailed landscape plan has been prepared for the proposed development site. The successful implementation of this landscape plan will mitigate somewhat against the loss of any other woodland habitats in the site.
- In order to prevent damage to treelines / woodlands in the site that are to be retained, then protective barrier fencing should be erected prior to the commencement of site clearance works. This fencing should be erected 10m out from the feature that needs protecting and this most include the Root Protection Zone. Any natural verges or hedgerows within the site that are to be retained should also be fenced off prior to the commencement of works. There must be no dumping or storage of construction waste or machinery in these areas during construction. The understorey and ground flora of the woodland should also be protected during all stages of site works.
- Any additional measures contained in the arborists report for the protection of trees must also be followed.
- Any natural verges along woodland features or hedgerows should be retained and managed appropriately or enhanced with additional suitable planting for the benefit of wildlife. They should

not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators.

- Any drainage system under the road shall provide a diameter of 30 cm to allow badgers to pass under the road to avoid traffic

Mitigation for Bats

- The bat survey prepared for this proposed development contains a number of recommendations to minimise potential construction impacts upon the bat species recorded from the site. These mitigation measures include:
  - All trees within the site should be examined for the presence of bats prior to felling by a bat specialist.
  - Should bats be noted in any tree that is earmarked for removal, a derogation license from NPWS must be sought. This can be done with the assistance of a bat ecologist.

Mitigation for Birds

- The removal of mature vegetation, including trees, hedgerows and scrub, must only be done outside of the bird nesting season (March-August).

Protection of Water Quality

- Efficient construction practices and sequences should be employed on site, and this will minimise soil erosion and potential pollution of local watercourses with soil and sediment. Unnecessary clearance of vegetation should be avoided and only areas necessary for building works should be cleared. Existing grassed verges and vegetated areas around the perimeters of the site and along the watercourses should be retained where possible. Supplemental planting and careful management of these areas will increase the biodiversity value of the site in the future. The retention of these areas will also help retain storm water run-off from the site during construction and operation. Works within the site should be avoided during periods of heavy rainfall.

- It is vital that there is no deterioration in water quality in the streams that occur within the application site. This will protect both habitats and species that are sensitive to pollution. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the construction process should be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses. Guidelines in the following best practice documents should be adhered to:

- Construction Industry Research and Information Association (CIRIA) (2005) *Environmental Good Practice on Site (C692)*
- Construction Industry Research and Information Association (2001) *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532)*
- Construction Industry Research and Information Association (2000) *Environmental Handbook for Building and Civil Engineering Projects (C512)*
- Environmental Protection Agency (2015) *List of Waste and Determining if Waste is Hazardous or Non-Hazardous*
- Environment Agency *et al*. (2015) Guidance on the Classification and Assessment of Waste, Technical Guidance WM3
- Environmental Protection Agency (2013) *Guidance (and Templates) on the Management of Contaminated Land and Groundwater at EPA Licensed Site*
- Environment Agency (2004) *Model Procedures for the Management of Land Contamination (CLR11).*

- All relevant guidelines within the document *Inland Fisheries Ireland Requirements for the Protection of Fisheries Habitats during Construction and Development Works and River Sites* (www.fisheriesireland.ie) and the updated guidelines *entitled Guidelines on Protection of Fisheries During Construction Works in And Adjacent to Waters (2016)* should also be adhered to and they include.
- The construction team must implement the following specific mitigation measures and these measures should be incorporated into a Construction and Environment Management Plan. This CEMP must include measures to prevent the release of hydrocarbons, aggregates, polluting chemicals, sediment and silt and contaminated waters into water course on site.
  - Surface waters from the construction site should be managed using a system of temporary on-site attenuation features, and these should be fitted with silt barrier devices such as silt fences or silt busters.
  - Silt fences and berms should be installed prior to the commencement of construction on site. These should be set back at a minimum of 10m from the streams on site. As the streams within the application site are associated with existing treelines and woodland habitats, the silt fences could be incorporated into the protective fencing that is required for the woodland habitats. The silt fences should be sturdy and constructed of a suitable geotextile membrane to ensure that water can pass through, but that silt will be retained. An interceptor trench

will be required in front of this interceptor fence. The silt fence must be capable of preventing particles of 425μm from passing though.

- The silt fences should be monitored daily to ensure that they remain functional throughout the construction of the proposed development. Maintenance of the fences should be carried out regularly. Fences should be inspected thoroughly after periods of heavy rainfall.
- Discharge water generated during laying of concrete should be removed off site for treatment and disposal.

- The following pollution control measures must also be employed on site:
  - A dedicated re-fuelling location must be established on site, and this must be situated away from any watercourse on site.
  - Spill kits stations must be provided at the fuelling location for the duration of the works.
  - Staff must be provided with training on spill control and the use of spill kits.
  - All fuel storage containers must be appropriately bunded, roofed and protected from vehicle movements. These bunds will provide added protection in the event of a flood event on site.
  - All chemicals must be stored as per manufacturer's instructions. A dedicated chemical bund will be provided on site.
  - Storage of fuel, and servicing and refuelling of equipment or machinery must be at least 20m from ground clearance or rock-breaking activities.
  - The dedicated refuelling area must be underlain by concrete hard standing. All fuel and oil tank should be inspected on a regular basis for signs of spillages, leaks and damage during use. A record of these inspections must be kept, and any improvements needed be carried out immediately.
  - The risk of fuel spillages on a construction site is at its greatest when refuelling plant. Therefore, only designated trained and competent operatives should be authorised to refuel plant on site. Plant and equipment should be brought to a designated refuelling area rather than refuelling at numerous locations about the site.
  - Chemicals used on site must be returned to the site compound and secured in a lockable and sealed container overnight in proximity to the fuel storage area.
  - Drip trays must be utilised on site for all pumps situated within 20m away from ground clearance areas.
  - Procedures and contingency plans must be established on site to address cleaning up small spillages as well as dealing with an emergency incident. A stock of absorbent materials such as sand, spill granules, absorbent pads and booms must be kept on site, on plant working near the river and at the refuelling area.

- Daily plant inspections must be completed by all plant operators on site to ensure that all plant is maintained in good working order. Where leaks are noted on these inspection sheets, the plant must be removed from operations for repairs.
- All personnel should observe standard precautions for handling of materials as outlined in the Safety Data Sheets (SDS) for each material, including the use of PPE. Where conditions warrant, emergency spill containment supplies should be available for immediate use.

- Best practice concrete / aggregate management measures must be employed on site. These will include:
  - A designated concrete wash out area should be set up on site; typically, this will involve washing the chutes, pumps into a designated IBC before removing the waste water off site for disposal. These procedures should be covered during a Site Safety & Environmental Induction session.
  - Best practice in bulk-liquid concrete management should be employed on site addressing pouring and handling, secure shuttering, adequate curing times etc.
  - Stockpile areas for sands and gravel must be kept to a minimum size, well away from the drains and watercourses (minimum 50m).
  - Where concrete shuttering is used, measures must be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils.
  - Activities which result in the creation of cement dust must be controlled by dampening down the areas.
  - Raw and uncured waste concrete must be disposed of by removal from the site;
  - Stockpile areas for sands and gravel will be kept to a minimum size, well away from the watercourse on site.

- There should be no disturbances of the habitats along the watercourses within the application site. All vegetation within the 10m buffer zone of the stream must be protected, outside of the point where the box culvert bridge is to be installed. Vegetation within these buffer zone should be retained and enhanced using suitable species and in accordance with any landscaping plan that has been produced for the site.

- A separate surface water pipe will cross the central woodland area. This will be situated in a tunnel that is bored under the stream.

Operational Phase

Mitigation for Bats

- Six 2F or 2FN Schwegler bat boxes have been proposed for the site as well as a Schwegler 1WI into the wall of one of the new buildings. The box will be built into the wall and will be almost invisible from ground level once painted in the same style as the building. This must be unlit and should be at least 2.5 metres above ground height and preferably 3 metres or higher. The remaining bat boxes shall be installed on trees with easy access. An ideal substrate for the attachment of bat boxes has a clear bark, straight bough, and overall ease of access for bats exiting and returning to boxes. Three boxes shall be attached to each of two trees unless there are better opportunities created by modifying this arrangement according to the bat specialist. These bat boxes should be erected under the supervision of a bat ecologist.
- Lighting must be controlled to avoid light pollution of green areas and should be targeted to areas of human activity and for priority security areas. The following measures are proposed to reduce the impacts of lighting:
    - Motion-activated sensor lighting is preferable to reduce light pollution.
    - None of the remaining mature trees or trees proposed for planting shall be illuminated.
    - Dark corridors for movement of bats along the grounds of the site.
    - Lighting should be directed downwards away from the treetops.
    - All luminaires shall lack UV elements when manufactured and shall be LED.
    - A warm white spectrum (ideally <2700 Kelvin) shall be adopted to reduce blue light component.
    - Luminaires shall feature peak wavelengths higher than 550 nm.
    - Tree crowns shall remain unilluminated.
    - Planting shall provide areas of darkness suitable for bats to feed and commute through the site.
    - Lighting shall be kept to a minimum around the trees (see below). No light shall fall directly on the trees from street lighting or private houses.
    - Additional Guidelines from Bat Conservation Ireland and Bat Conservation Trust have been provided above for considering how to avoid light pollution of the hedgerow to allow for feeding, commuting, and roosting.

Protection of Water Quality

- The Engineering Report has outlined the full proposals for SUDS on the site. Hydrocarbons from vehicles within the site confines will pass through the SUDS detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. This mitigation measure is considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality, and will ensure the protection of surface water quality and flows in all downstream receiving watercourses.

Biodiversity Enhancement

- The landscaping of the site offers the potential for biodiversity enhancements within the site. Future landscaping of the site should adhere to the following recommendations:
    - The proposed green roof system provides an opportunity for the creation of suitable habitats for pollinators. Therefore, the species mix should focus on a nectar rich plants that bloom between spring and late summer.
    - The natural verges along the treelines and hedgerows that are to be retained should be retained and managed appropriately for the benefit of wildlife. They should not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators.
    - Native trees and shrubs should preferably be used in the landscaping, followed by ornamental species that are of benefit to pollinators.
    - A proportion of the grassland / parkland habitats within the site should be managed through methods that mimic traditional grassland management (low level mowing regimes). This will benefit local pollinators. Locally sourced wildflower seed would also be beneficial;
    - Where possible the importation of topsoil from outside the area should be avoided;
    - Allow some areas to go ‘wild’ where bramble and scrub, etc. can develop;
    - Garden plants that have the potential to become invasive must be avoided;
    - Water features, e.g., attenuation ponds, could be incorporated into the development as additional wildlife features.

6.9 Do Nothing Scenario

If the lands at Ballycullen were not developed, there would be no change to the natural landscape and ecology other than that caused by natural variation and trends or other anthropogenic impacts.

6.10 Worst Case Scenario

The worst-case scenario would see the development of the site without any mitigation to reduce and lessen ecological impacts. The worst-case scenario for the construction and operation of the residential development at Ballycullen could include loss of all treelines or woodland habitats within the application site, the mortality of birds and bats due to tree removal and habitat loss, a large-scale failure of hydrological mitigation measures and the chronic release of hydrocarbon into the surrounding surface waters. There are mitigation measures incorporated into the design and operation of the project to address this.

6.11 Monitoring and ReInstatement

Monitoring is generally required where there may be significant residual impacts despite the implementation of the mitigation measures. The following monitoring measures are recommended:

- Any trees and bat boxes should be monitored once the development is operational.

6.12 Difficulties in Compiling Information

All surveys were carried out at an appropriate time of the year and there were no difficulties present in the compiling of information for this report.

6.13 Residual Impacts and Conclusions

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated for. The mitigation measures proposed for the proposed development include specific avoidance and construction control measures to ensure that the proposed development in Ballycullen does not impact upon any species or habitats of conservation importance or designated sites. It is essential that these measures are complied with, in order to ensure that the proposed development complies with National conservation legislation. Provided all such measures are implemented in full and remain effective throughout the life-time of the proposed development, no significant negative residual impacts on the local ecology or on any designated nature conservation sites, are expected from the proposed works.

The creation of new habitats on the site where possible will be a positive benefit to local ecology and with proper management of the site and its green areas, then local areas of biodiversity will be allowed to develop.

References

Bailey, M. & Rochford, J. (2006) Otter survey of Ireland 2004 / 2005. Irish Wildlife Manuals No. 23. National Parks & Wildlife Service. DoEHLG.

Bowers Marriott, B. (1997) Practical Guide to Environmental Impact Assessment: A Practical Guide. Published by McGraw-Hill Professional, 1997, 320 pp.

CIEEM (2018**)** Guidelines for Ecological Impact Assessment in the UK and Ireland. CIEEM, 2018

Cummins, S; Fisher, J; Gaj McKeever, R; McNaghten, L & Crowe, O. (2010) Assessment of the Distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on six SAC river systems in Ireland. NPWS & Birdwatch Ireland.

Department of the Environment, Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities.

Dwyer, (2000) *Protecting Nature in Ireland, The NGO Special Areas of Conservation Shadow List.* Published by the Irish Peatland Conservation Council, Dublin.

EPA (2001) Parameters of Water Quality - Interpretation and Standards. Environmental Protection Agency, Ireland.

EPA (2002*) Guidelines on the Information to be contained in Environmental Impact Statements*. Environmental Protection Agency, Ireland.

EPA (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*. EPA, Wexford, Ireland.

EPA (2012) Guidance on the setting of trigger values for storm water discharges to off site surface waters at EPA licensed IPPC and waste facilities. EPA, Wexford.

Fossit, J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Hayden, T. & Harrington, R. (2000) *Exploring Irish Mammals.* Dúchas the Heritage Service, Town House Dublin.

Institute of Environmental Assessment (1995) *Guidelines for Baseline Ecological Assessment*. Institute of Environmental Assessment, Great Britain.

IUCN (2003) *Red List of Threatened Species*. International Council for Conservation of Nature and Natural Resources.

Kurz, I. and Costello, M.J. (1999) An Outline Of The Biology, Distribution And Conservation Of Lampreys In Ireland. F. Marnell (ed.), Irish Wildlife Manuals, No. 5.

Ó Néill L. (2008) Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning. PhD thesis. Trinity College, Dublin.

Natura Environmental Consultants (2005) Draft Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland. The Heritage Council, Kilkenny.

NPWS (2008) Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC

NRA (2004) *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority, Dublin.

Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. (2010.) *Best Practice Guidance for Habitat Survey and Mapping*. Heritage Council.

Whilde, A. (1993) Threatened *Mammals, Birds, Amphibians and Fish in Ireland.* Irish Red Data Book 2: Vertebrates. HMSO, Belfast.

Appendix Species List

Common Name	Scientific Name
Ash	*Fraxinus excelsior*
Autumn hawkbit	*Scorzoneroides autumnalis*
Beech	*Fagus sylvatica*
Blackthorn	*Prunus spinosa*
Bramble	*Rubus fruticosus agg.*
Broadleaved Dock	*Rumex obtusifolius*
Butterfly bush	*Buddleia davidii*
Cat's ear	*Hypochaeris radicata*
Cleavers	*Galium aparine*
Cock's-foot	*Dactylis glomerata*
Common chickweed	*Stellaria media*
Common field speedwell	*Veronica persica*
Common ragwort	*Senecio jacobaea*
Creeping buttercup	*Ranunculus repens*
Creeping thistle	*Cirsium arvense*
Dandelion	*Taraxacum officinale*
Dog rose	*Rosa canina*
Dog violet	*Viola riviniana*
Foxglove	*Digitalis purpurea*
Germander speedwell	*Veronica chamaedrys*
Gorse	*Ulex europaeus*
Greater stitchwort	*Rabelera holostea*
Hairy bittercress	*Cardamine hirsuta*
Hawthorn	*Crategus monogyna*

Herb Robert	Geranium robertianum
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera periclymenum*
Ivy	*Hedera helix*
Leyland's Cypress	*Cupressus × leylandii*
Lesser celandine	*Ficaria vern*
Male fern	*Dryopteris filix-mas*
Meadow foxtail	*Alopecurus pratensis*
Meadow grasses	*Poa* sp.
Mouse ear	*Cerastium fontanum*
Nettle	*Urtica dioica*
Nipplewort	*Lapsana communis*
Primrose	*Primula vulgaris*
Red clover	*Trifolium pratense*
Ribwort plantain	*Pantago lanceolate*
Self-heal	*Prunella vulgaris*
Sessile oak	*Quercus petraea*
Silverweed	*Potentilla anserina*
Spear thistle	*Cirsium vulgare*
Spurge	*Euphorbia*
Sycamore	*Acer pseudoplatanus*
Tufted vetch	*Vicia cracca*
White clover	*Trifolium repens*
Willow	*Salix sp.*
Willowherb	*Ebilobium sp*
Wood avens	*Geum urbanum*

Wood sedge	*Carex sylvatica*
Yorkshire fog	*Holcus lanatus*

APPENDIX II – Photographs

Grassland Habitats within the Site. Housing Developments Adjacent to the Site (north) can be Seen in the Background

A View of the Woodland at the Eastern Perimeter of the Site

The Woodland in the Centre of the Site

View of the Woodland in the Centre of the Site

APPENDIX D – EIAR CHAPTER 7 LAND, SOILS AND GEOLOGY

LAND, SOILS AND GEOLOGY

7.1 INTRODUCTION

7.1.1 Background and Objectives

Dr. Robert Meehan was retained on behalf of Stephen Ward Planning and Development Consultants Limited in September 2024, to undertake an assessment of the potential likely and significant effects of the proposed Large Scale Residential Development (LRD) by Lagan Homes Ballycullen Limited (Proposed Project) on a site south of Stocking Avenue, in the townland of Woodtown, Ballycullen, Dublin 16 (*Irish Transverse Mercator Grid Reference 712000 725740*), where it is proposed to construct a residential development comprising a number of accommodation unit types, on the Land, Soils and Geology aspects of the receiving environment.

The Proposed LRD Project is described in full in Chapter 3 of this EIAR.

Where the 'proposed LRD Site' is referred to it refers to the entire site boundary encompassing the proposed

- 4 no. Type A1 dwelling houses (three-bedroomed, semi-detached),
- 10 no. Type A2 dwelling houses (three-bedroomed, end of terrace),
- 6 no. Type B1 dwelling houses (three-bedroomed, semi-detached),
- 34 no. Type B2 dwelling houses (three-bedroomed, end of terrace),
- 15 no. Type C1 dwelling houses (four-bedroomed, semi-detached),
- 8 no. Type C2 dwelling houses (four-bedroomed, semi-detached),
- 1 no. Type C3 dwelling house (four-bedroomed, detached),
- 17 no. Type D dwelling houses (two-bedroomed, mid-terrace),
- 9 no. Type E1 dwelling houses (four-bedroomed, detached),
- 25 no. Type E2 dwelling houses (four-bedroomed, semi-detached),
- 30 no. Type F dwelling houses (three-bedroomed, semi-detached),
- 30 no. Type G dwelling houses (3-bedroomed, mid-terrace)
- 108 no. of either Type 1a, 1b, 1c or 1d Apartments (all one-bedroomed),
- 151 no. of either Type 2a, 2b, 3a, 3b Apartments (all two-bedroomed),
- 46no. 4a or 4b Apartments (all 3-bedroomed)
- creche

and all ancillary site works.

This report provides a baseline assessment of the environmental setting of the Proposed Project, as described in Chapter 3, in terms of Land, Soils and Geology and discusses the potential likely and significant effects that the construction and operation of the Proposed Project will have. Where required, appropriate mitigation measures to avoid any identified significant effects to Land, Soils and Geology (i.e. natural resources) are recommended and the residual effects of the Proposed Project post-mitigation are assessed.

The Proposed Project study area with regard Land, Soils and Geology is defined by the EIAR Site Boundary. The full extent of the area which is the subject of the investigations is identified in **Figure 7.1** below as a red outline, which is a site covering 10.35 hectares. Through the desk study and investigations undertaken and having regard to other environmental and design considerations a suitable design of the Proposed Project was subsequently identified for the site, which includes the absence of basement storeys and associated inherent construction mitigation measures. This has also in turn informed the extent and level of detail of this report on land, soils and geology (again for the site outlined in red below). Because the regional geology has a bearing on the site geology, in this case, the study area is larger than the application site; thus, much of the baseline data presented in this chapter extends beyond the application site itself.

7.1.2 Statement of Authority

EurGeol. Dr. Robert Meehan, PGeo. is a specialist geological, hydrological, hydrogeological and environmental sole trader who delivers a range of water and environmental management consultancy services to the private and public sectors across the Republic of Ireland. Robert began working a as a self-employed Consultant Geologist in 2003, with his office located in Navan, County Meath.

Robert's core areas of expertise and experience includes soils, subsoils, geology, hydrogeology and hydrology. Robert routinely completes impact assessments for land, soils and geology, hydrology and hydrogeology for a large variety of project types including housing developments, large-scale infrastructure projects and quarry enterprises.

Robert Meehan (B.A., Ph. D, PGeo., EurGeol.) is an Environmental Geologist / Hydrogeologist with over 30 years' environmental consultancy experience in Ireland. Robert initially worked for Geological Survey Ireland (GSI, 1993 – 1998) on the initiation of Groundwater Protection Schemes across the country, and then worked for Teagasc between 1998 and 2006 completing the first countrywide mapping of subsoil (and related soils) coverage, which is that still used today in all Environmental Impact Assessments across the country. Since beginning life as a consultant while with Teagasc in 2003, Robert has completed numerous hydrological and hydrogeological impact assessments of various types of development in Ireland. He has also worked for GSI on their National Groundwater Protection Scheme, as well as Irish Geological Heritage Audits of all counties across Ireland. Robert acts as a consultant to the EPA on on-site waste water treatment systems, and was a co-author of the current Code of Practice (Domestic Waste Water Treatment Systems, 2021). Robert has been a lead trainer on the (formerly FAS, now Water Services Training Group) course on 'Site Assessment for On-Site Waste Water Treatment Systems' since in's inception in 1998. Robert has managed the geological and hydrogeological aspects of EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in geological and hydrogeological site investigations, site suitability assessments for on-site waste water, geological heritage mapping and appraisal, wetland hydrology and hydrogeology, water resource assessments, surface water drainage and SUDs design, and surface water/groundwater interactions.

7.1.3 Relevant Legislation

The EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

- the Planning and Development Acts;
- the Planning and Development Regulations, 2001 (as amended);
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment;
- S.I. No. 296 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, and;
- The Heritage Act 1995, as amended.

7.1.4 Relevant Guidance

The Land, Soils and Geology chapter of this EIAR was prepared in accordance with, where relevant, the guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Commission 2017).

7.2 ASSESSMENT METHODOLOGY

7.2.1 Desk Study

A desk study of the Site was completed in advance of undertaking the walkover survey, mapping and site investigations. This involved collecting all relevant geological data for the Site and receiving environment. This included consultation with the following data sources:

- the Environmental Protection Agency's online environmental database (www.epa.ie);
- Geological Survey Ireland's (GSI's) Groundwater and Geology Databases (www.gsi.ie/geology or www.gsi.ie/groundwater);
- Geological Survey Ireland's Geological Heritage site mapping (www.gsi.ie/geoheritage);
- GSI's Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow). Geological Survey Ireland (GSI, 1994);
- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Geological Survey Ireland (2003) – Kilcullen Groundwater Body Initial Characterization Reports;
- General Soil Map of Ireland (Teagasc, 1980, 2nd edition, viewable on www.epa.ie); and,
- Aerial Photography, 1:5,000 and 6 inch sheet base mapping.

7.2.2 Baseline Monitoring and Site Investigations

Walkover surveys, including geological mapping and investigations of the Site, were undertaken by Robert Meehan (refer to Section 1.2 above for qualifications and experience) on 6th and 7th November 2024.

Intrusive Site Investigations had previously been conducted across the site area by Ground Investigations Ireland, The Grange, 12th Lock Road, Lucan, County Dublin, on 21st September 2006, and by Waterman Moylan Ltd., Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4, on 16th February 2024.

The objectives of the intrusive site investigations included mapping the distribution and depth of mineral subsoils at the proposed LRD Site along with assessing the mineral subsoil / bedrock conditions at key Proposed Project locations. These data were used to inform the final layout design.

Site investigations to address the Land, Soil and Geology section of the EIAR included the following:

- Walkover surveys and geological mapping of the Site area were undertaken to assess ground conditions;
- A total of 26 no. deep trial pits excavated inside the proposed LRD Site boundary, and 2 no. excavated just outside of it at the southeast, to determine the thickness and geomorphology of mineral subsoils overlying the Site;
- Measurement of flow in streams flanking the site and that running through the site (see following Chapter 8 Hydrology, Hydrogeology, Drainage); and
- Mineral subsoils were logged according to the British Standard BS: 5930 Subsoil Classification scheme.

As there is an absence of peat of any depth across all portions of the site (see following Sections), and as the soil and subsoil is all mineral, the requirement for a Peat Stability Risk Assessment Report and Peat Management Plan does not arise.

7.2.3 Impact Assessment Methodology

The desk study investigations commissioned were to characterise the detailed three-dimensional soils, subsoils and bedrock geology of the proposed LRD Site, as well as resultant interpreted hydrogeology (see Chapter 8). As well as this, an assessment as to whether there would be any impact on any SACs, SPAs, NHAs or pNHAs around the site, was an inherent part of this study. It should be noted that a Natura Impact Statement (NIS) also accompanies this Planning Application, and also espouses this paradigm. The resulting report provided the resultant description of the geological character of the lands, and details the nature, extent and complexity of the geological material from the surface downwards through the mineral subsoil to the bedrock. As part of this desk study mapping and modelling exercise, field investigations were undertaken and involved a detailed walk over of the site and its surrounding environs, and mapping of salient features.

Overall therefore, the results of the desk study, visual assessment of the site, groundwater and surface water level analysis (see Chapter 8) and trial pit analysis have been collated to conclude that the lands could be used for the construction of the proposed LRD development, as well as the associated drainage scheme, and assert that there will be no detrimental impact on the soils and subsoils geology, or hydrogeology and drainage on the site (Chapter 8) or at any nearby SACs, SPAs, NHAs or pNHAs, from the construction of same.

The rating of potential environmental impacts on the soils and geology environment is based on Table 1 following which takes account of the quality, significance, duration and type of impact characteristic identified.

The appraisal methodology is completed in accordance with the Environmental Protection Agency (EPA) document '*Guidance on the Information to be contained in Environmental Impact Statements*' (EPA, 2002), the Institute of Geologists of Ireland (IGI) publication '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapter of Environmental Impact Statements*' (2013) and the EPA document entitled '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*' (2022) classification of environmental impacts. In addition, the document entitled '*Guidelines on Procedures for Assessment and Hydrogeology for National Road Schemes*' by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

In EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the environmental impacts of the proposed activities on that cited attribute. These impact ratings presented in below are in accordance with impact assessment criteria provided in the EPA (2022) publication.

The duration of each impact is considered to be either temporary, short-term, medium term, long-term, or a permanent impact. Temporary impacts are considered to be those which are construction related and last less than one year. Short term impacts were seen as impacts lasting one to seven years; medium-term impacts lasting seven to fifteen years; long-term impacts lasting fifteen to sixty years; and permanent impacts lasting over sixty

years. The proposed LRD project is planned to be developed in two distinct phases. Phase 1 is programmed to be fully constructed by mid-2028 and Phase 2 by 2030. Therefore, it is anticipated that the total construction period for the development will be approximately 5 years, meaning an overall short term impact in the EIA (EPA, 2022) assessment methodology.

Impact characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Slight	An impact which causes noticeable changes in the character
Impact	Moderate	An impact that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Profound	An impact which obliterates sensitive characteristics
Duration	Short term	Impact lasting one to seven years
	Medium-term	Impact lasting seven to fifteen years
	Long-term	Impact lasting fifteen to sixty years
	Permanent	Impact lasting over sixty years
	Temporary	Impact lasting for one year or less
	Cumulative	The addition of many small impacts to create one larger, more significant impact
Type	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	Indeterminate	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is not permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents
	'Worst Case'	The impact arising from a development in the case where the mitigation measures may substantially fail

Table 7.1 Glossary of potential impacts following EPA (2022) Guidance document.

The NRA criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and area presented in Table 2 below.

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Table 7.2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA, 2009).

The guideline criteria (EPA, 2022) for the assessment of likely significant effects require that likely effects are described with respect to their extent, magnitude, type (i.e. negative, positive or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable).

Impact Characteristic	Degree/ Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Unlikely	A low likelihood of occurrence of the impact.
	Likely	A medium likelihood of occurrence of the impact

Table 7.3 Additional Impact Characteristics

The descriptors used in this environmental impact assessment report are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 of this EIAR. In addition, the two impact characteristics proximity and probability are described for each impact and these are defined in Table 3 above.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of effects are related to examples of potential likely significant effects on the geology and morphology of the existing environment, as listed in Table 4.

Impact Characteristics	**Potential Hydrological Impacts**	
Quality	**Significance**	**Potential Hydrological Impacts**
Negative only	Profound	Widespread permanent impact on: • The extent or morphology of a cSAC. • Regionally important aquifers. • Extents of floodplains. Mitigation measures unlikely to remove impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: • The extent or morphology of a cSAC / ecologically important area. • A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). • Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not fully remove impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: • The extent or morphology of a cSAC / NHA / ecologically important area. • A minor hydrogeological feature. • Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.

Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

Table 7.4 Impact Descriptors relating to the Receiving Environment

7.2.4 Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of the Land, Soils and Geology Chapter of this EIAR. The site investigations and follow up monitoring carried out were thorough and exhaustive.

7.3 EXISTING ENVIRONMENT

7.3.1 Site Description and Topography

The Site is located in the northern foothills of the Dublin – Wicklow Mountains, in the townland of Woodtown, approximately 1.5 kilometres southeast of the centre of the town of Firhouse and immediately south of Ballycullen, in south central County Dublin (see **Figure 7.1**). The site lies at ground surface elevations between approximately 106 and 126 mAOD, and is bounded by the Ballycullen Road at the west and the Regional R115 road approximately 150 m to the southwest. The existing Abbott's Grove and Stocking Wood housing developments are immediately adjacent at the northwest and northeast of the site, respectively (see **Figure 7.1**). The site itself is made up of two long, west-southwest to east-northeast oriented fields, and the entrance to the proposed LRD site is proposed from the existing spur road to the east of Abbott's Grove, at the northwest, and via Stocking Wood development into the (current) eastern field.

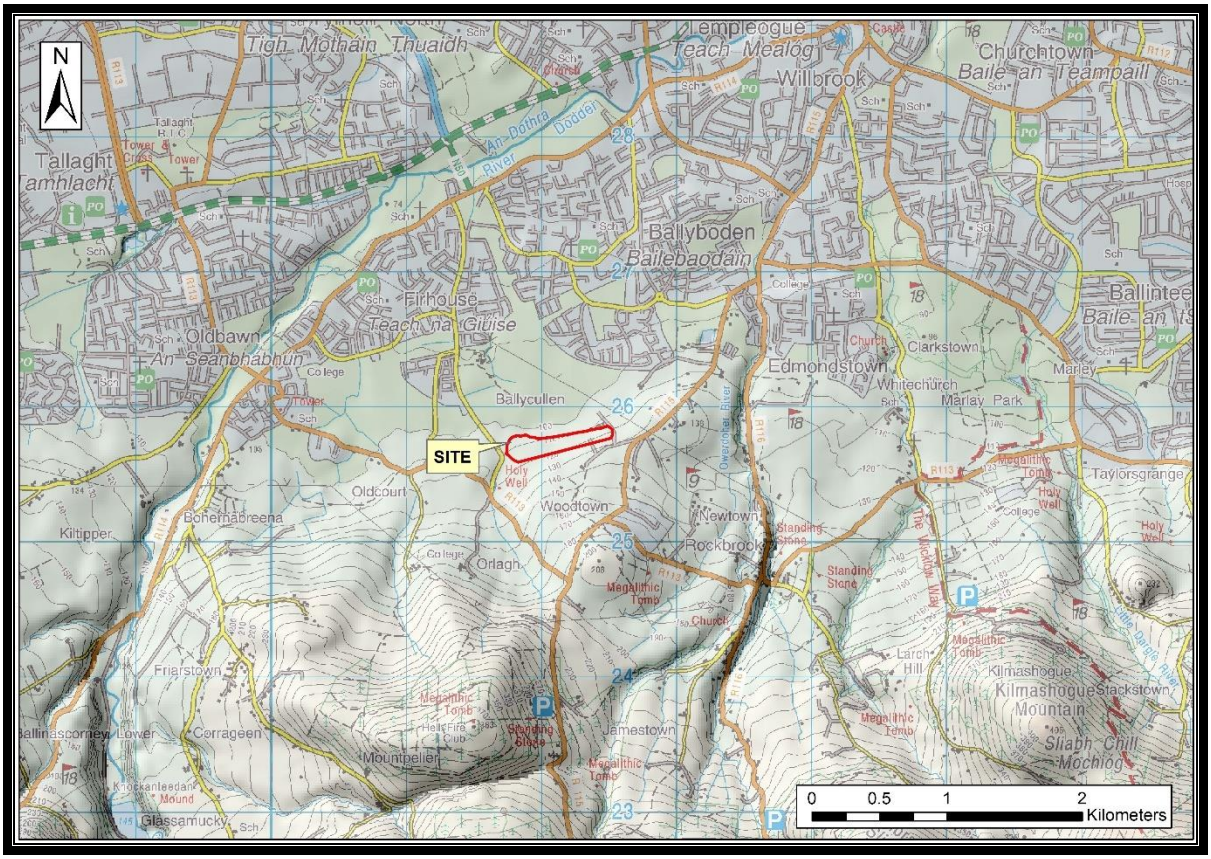


Figure 7.1 Geological Study Area, Application Site Area and Surrounding Features. Grid squares are 1 km distance (O.S. Licence EN 057925).

The Ordnance Survey Ireland 1:50,000 Discovery Series Map shows a multi-contoured topography in and around the site (**Figure 7.1**) and though no streams or other watercourses are shown as flowing through or adjacent to the site on this map, it is noted that a number of small, unnamed, potentially ephemeral streams seem to flow northwards through the centre of the site, as well as along it's eastern boundary, on the six inch to one mile map sheets of the locality, from the 1840's.

The proposed LRD Site itself is situated on the northern lower backslope of a high, unnamed, dome-shaped ridge feature at Woodtown, which itself is a spur-ridge off the northeastern side of Mountpelier Hill. The dome-shaped ridge on which the site is located rises to 208 m elevation AOD approximately 850 m southeast of the site, with Mountpelier Hill rising to 383 mAOD 2 kilometres south-southwest of the site (**Figure 7.1**).

The overall form / geometry of the site itself is of a ridge or 'bank' type feature along the lower backslopes of much higher, bedrock-cored ridges, undulating with gentle to moderate slopes. Currently (January 2025) the site itself is comprised completely of agricultural pasture, with a narrow band of broadleaf forestry running north to south through the central portion of the site and bounding the two component fields, and a mature hedgerow / treeline along the eastern boundary. Both of these belts of trees and shrubs are incised by shallow stream channels. Pockets of scrub vegetation also occur at the northeastern extreme of the site, and the site is bounded by fences and walls elsewhere. To the north, west and east, the land in the housing estates has a concrete, tarmacadam or hardstand cover, and to the south and in a narrow area at the north centre of the site, pasture

also occurs. There are currently no buildings across any locality within the site confines. The northwestern edge of the site comprises a relatively high, cliffed slope at the edge of Abbott's Grove, generally 4 m – 5m high.

Plate 7.1 View of the western field on the site, from the west

Plate 7.2 View of the eastern field on the site, also from the west

Plate 7.3 The cliffed edge of the northwestern end of the site at the edge of Abbot's Grove (at the proposed road entrance)

7.3.2 Land and Land Use

As would be expected given the above description, based on the Corine 2018 land cover mapping, the proposed LRD Site comprises agricultural pastures. A narrow strip of broadleaf forestry also runs through the central portion of the site, from north to south.

7.3.3 Soils Geology (Topsoil)

According to the An Foras Taluintais General Soils Map of Ireland (Gardiner and Radford, 1980) the region containing the subject site has a relatively homogeneous and uniform soils geology.

The site locality itself is shown as being characterised by soils of Soil Association 38. This association includes soils which are dominated by grey brown podzolic soils (75% of the land area of this category). These are deep, well drained, alkaline mineral soils. Within this association, the limestone-dominated subsoil is moderately permeable, and leaching of clay to the 'B' horizon has taken place.

The remainder of the area of this soils association is mapped as being underlain gley soils (25% of the area). Gleys are poorly drained mineral soils, which are generally of clay loam texture and are imperfectly to poorly drained, owing to the fact that they are in either low portions of the landscape or are hosted within pcokets of subsoil with low permeability. These soils are usually no more than 0.7m deep.

The site is also specifically mapped as being underlain by deep, well drained mineral soils derived mainly from acidic parent materials (Teagasc/EPA, 2006a).

The majority of the soils within this subject proposed LRD Site are therefore expected to be well drained mineral soils. From this, any subsoil on the site is likely to be of moderate permeability, with a moderate to low likelihood of surface water runoff and/or impeded vertical drainage (particularly given the slope gradients on the site also, see **Plates 1 and 2**). This supports the assertion above that surface water will flow through any topsoil and permeable subsoil to the bedrock and water table beneath the site, throughout the year.

A walkover survey of the site and examination of the cuttings in the banks of the stream channels on and at the edge of the site noted that deep, well drained, acidic topsoil is present throughout the site area.

7.3.4 Subsoils Geology (Quaternary Geology)

The Quaternary period extended from 1.6 million years ago to the present day. During this period great Ice Ages took hold in Ireland, the last of these extending from 73,000 years before present (BP) until 10,000 years BP.

General information concerning the Subsoil (Quaternary) Geology is contained in the GSI publication "Geology of Kildare-Wicklow" (1994). There were several phases of ice flow affecting south County Dublin. Within these phases, ice flowed from a number of different centres. The ice from the northwest would have been the last ice to cross over the site as the existing glacial landforms indicate that ice flow direction during the Last Glacial Maximum was approximately southeasterly across south County Dublin. Following this there was a period of deglaciation, when waterlain glaciofluvial sediments were deposited. Since deglaciation ended, a period of post-glacial geological processes has continued until the present day, where natural landscape processes in Ireland are dominated by the action of water.

Glacial deposits in this area around Woodtown are often relatively shallow, with tracts of much older bedrock poking through the glacially-derived subsoils. Thus, on the higher ground south and southwest of the proposed LRD Site itself, bedrock is mapped as being at or within 1 metre of the surface across some wide belts of land.

Where glacial debris is found on top of the bedrock, it generally consists of tills (boulder clays), which were deposited at the base of the moving ice. All of the subject site is mapped as having deep till as the subsoil, above bedrock at a deeper level, in a such a fashion (**Figure 7.2**).

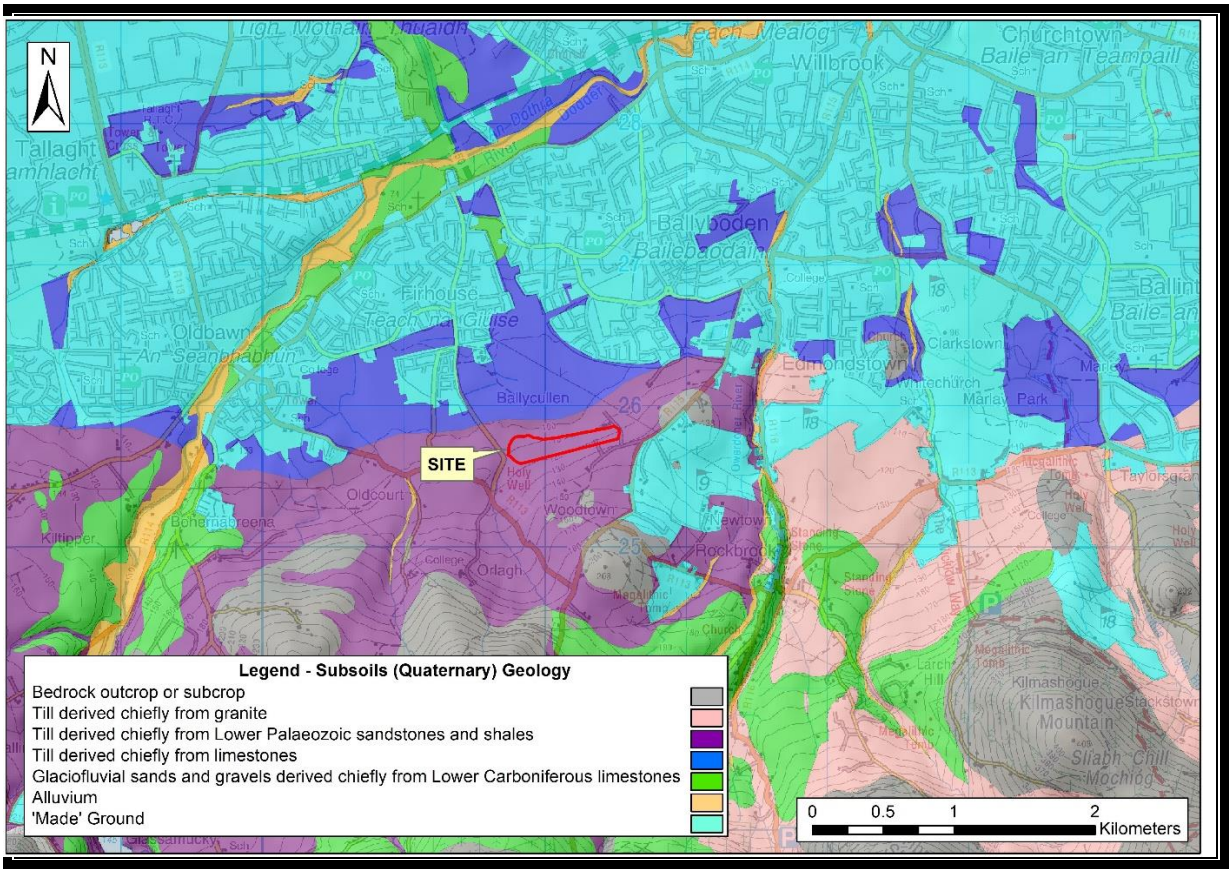


Figure 7.2 Subsoils geology of the site and its environs (O.S. Licence EN 057925).

The powerful glacial activity has therefore moulded and sculpted the macro-scale landscape character in this area. Ice moved across southern Dublin, flowing southeastwards towards Wicklow and the Irish Sea, while sculpting and planing the underlying bedrock. During the advancement of the glaciers, the weight and pressure of the ice broke the bedrock upon which the glaciers moved and ground it down to particle sizes ranging from boulders to clay. This material was bulldozed off and smeared by the advancing ice on the pre-existing bedrock. This material is therefore unsorted, cohesive and consolidated reflecting its crushing, smearing depositional process at the base of the ice. In many areas this bedrock was scraped clean of overburden, whereas in others thousands of tonnes of sandstone or limestone rock material was crushed, bulldozed and redeposited as till (boulder clay). Thick till debris overlying the bedrock is common in the lowlands of central Dublin, but generally shallows moving up the mountains, such as around Woodtown (**Figure 7.2**).

Plate 7.4 Gently undulating till ridge at the western end of the site, viewed from it's western edge.

The proposed LRD Site therefore lies in a transitional area between relatively deep glacial sediments to the north around Firhouse – Ballyboden, where a till plain is in evidence, and sandstone or granite bedrock outcrop to the south, around Mountpelier Hill, the southern portion of Woodtown Townland, and Kilmashogue Mountain.

According to the GSI Quaternary sediments (subsoil) map (Geological Survey Ireland, 2025, **Figure 7.2**), the tills at the proposed LRD Site are comprised of till derived chiefly from Lower Palaeozoic sandstone and shales (TLPSsS). This subsoil will generally have a SAND to CLAY texture, as the sandstone, when crushed mechanically by glacial ice, breaks down to a SAND texture, with CLAY also being derived from shale bands in the bedrock around the area. Consequently, the permeability of this material is generally moderate. On and around the proposed LRD Site itself much of the land surface has had significant depths of subsoil deposited across it, and bedrock is below the surface.

During deglaciation, when the ice covering Ireland melted, huge amounts of meltwater were released. At this time the wide valleys hosting the River Dodder at the west of the site (around Bohernebreena), and the Owerdoher River to the east of the site (around Rockbrook) were wide, deglacial rivers. In these wide valley settings glaciofluvial sands and gravels were deposited by the deglacial meltwaters. In the base of these modern valleys, where the Rivers Dodder and Owerdoher now flow, alluvium has been deposited over the millennia by the present day rivers across the lower, flatter floodplain strips flanking the watercourses. Much of the land

around the proposed LRD Site itself, having been sealed by concrete and/or hardstand in recent years, is mapped on the subsoil map as 'Made' ground (see **Figure 7.2**).

On a regional basis, in general it would be interpreted that depths of subsoil in the area of the Site are of relatively deep depth in the majority (>3m, South Dublin County Council Groundwater Protection Scheme Map), and are projected to be at least 5 m deep in places, where significant piles of till subsoil debris has been interpreted as being left by previous glacial activity along the western edge of the proposed LRD Site.

The walkover survey of the site noted that subsoil is present across the entirety of the site area, with no bedrock seen to outcrop at surface. This is particularly the case along the stream conduits incising into the till subsoil, which run through the site from south to north, and have cut channels up to 2.3 m deep in places.

Plate 7.5 Till subsoil exposed along the banks of the stream channel along the eastern boundary of the site; note the complete absence of bedrock outcrop along the stream channel sides and in the stream base.

7.3.4.1 Site Investigations (Drilling and Trial Pitting)

In order to determine the full geological profile (soil, subsoil and bedrock) at the proposed LRD Site, extensive ground investigations were carried out in September 2006 and February 2024 to determine the geological and hydrogeological setting of the proposed LRD Site.

A total of 26 no. deep trial pits excavated inside the proposed LRD Site boundary, and 2 no. excavated just outside of it at the southeast, to determine the thickness and geomorphology of mineral subsoils overlying the Site. Of these, 20 no. trial pits were dug in 2006, with a further 8 no. in 2024.

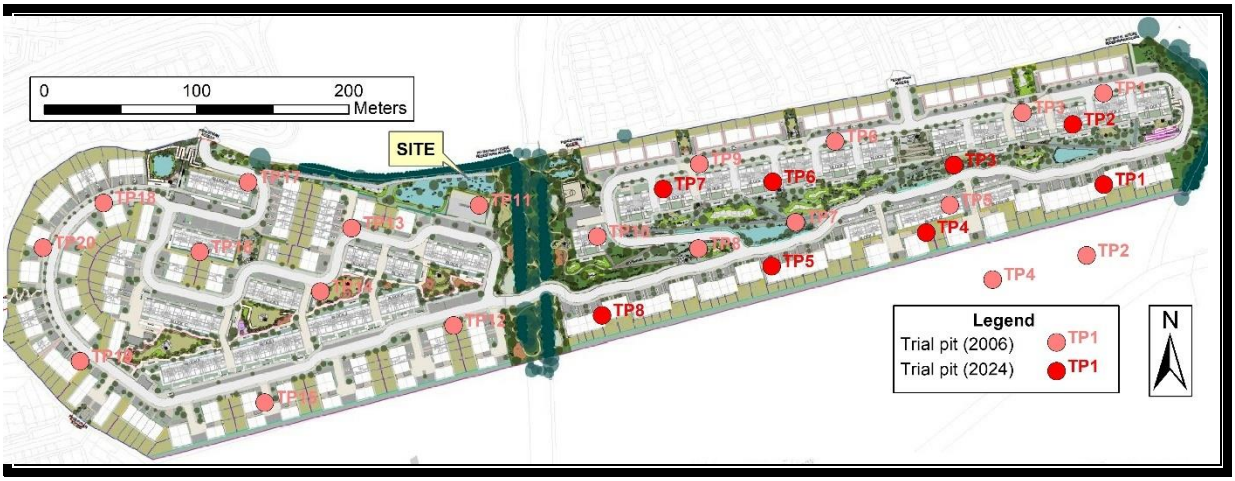


Figure 7.3 Location of trial pits excavated across the proposed LRD Site area.

Trial pit logs are attached as Appendix 7-1, and the locations of the investigation points are shown on **Figures 7.3** and **7.4**. Refer to **Table 7.5** for a summary of the investigation trial pitting.

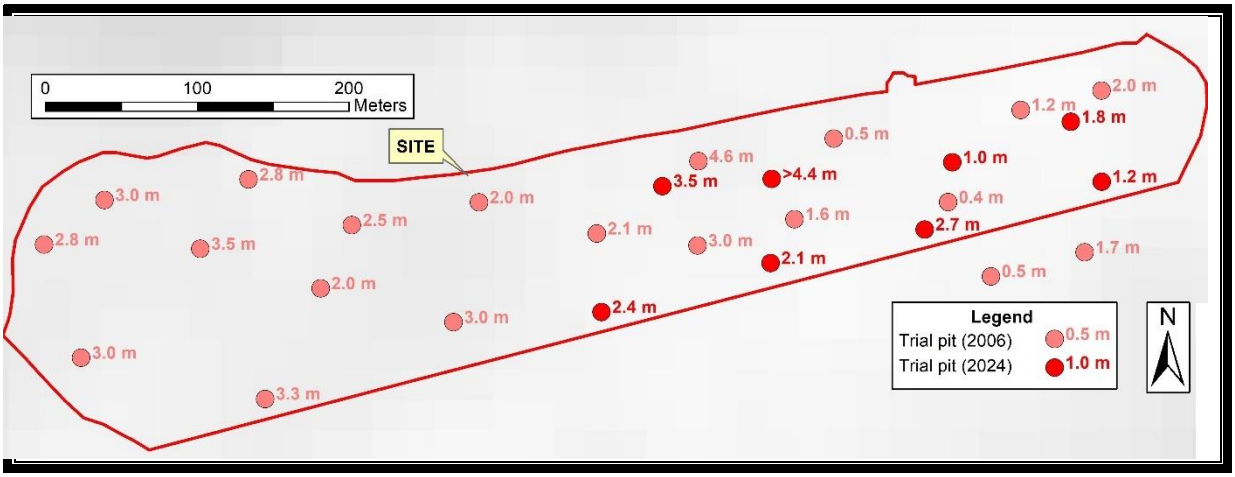


Figure 7.4 Point depths to bedrock at trial pit localities excavated across the proposed LRD Site area.

Bedrock was confirmed in 27 of the 28 trial pits excavated on the site.

The depths to bedrock across the proposed LRD Site as a whole were found to be relatively deep, being a minimum of 0.4 m deep but a maximum of >4.4 m deep. The individual depths to bedrock at the trial pit point localities are shown in **Figure 7.4**.

Across the majority of the site, the till subsoil was found to be directly underlain by bedrock described as either schist or shale in the Site Investigation reports. In one trial pit (TP20, 2006) interbedded layers of SAND and GRAVEL were encountered at depth, between 1.3 m and 4.0 m below ground (and just above bedrock).

The till deposits are typically comprised of slightly sandy gravelly CLAY, with some cobbles and boulders (**Table 7.5**).

The confirmed depth of glacial tills in grassland areas on the proposed LRD Site are therefore between 0.4 m (TP5, 2006) and > 4.4 m deep (TP6, 2024). In contouring the depths to bedrock, the subsoil depths deepen generally westwards across the proposed LRD Site, and there does seem to be a bedrock 'high'

where bedrock is generally close to the surface in the east central portion of the site (**Figure 7.5**). This bedrock deepens rapidly to deep depth of over 4 m in the east central portion of the site (**Figure 7.5**).

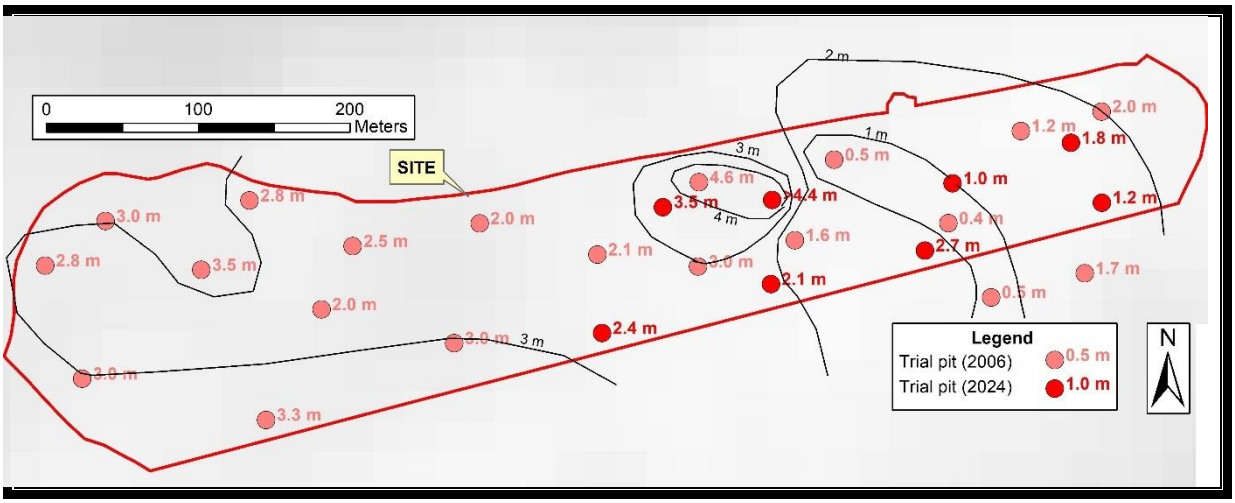


Figure 7.5 Interpreted depth to bedrock contour map across the proposed LRD Site area.

Location	Date excavated	Depth of trial pit (m)	Depth to bedrock (m)	Glacial till thickness (m)	Glacial till description
TP1	21st September 2006	2.20	2.00	2.00	slightly sandy silty gravelly CLAY
TP2	21st September 2006	2.00	1.70	1.70	slightly sandy silty gravelly CLAY
TP3	21st September 2006	1.90	1.20	1.20	slightly sandy gravelly CLAY
TP4	21st September 2006	1.50	0.50	0.50	slightly sandy gravelly CLAY/SILT
TP5	21st September 2006	0.90	0.40	0.40	sandy gravelly SILT
TP6	21st September 2006	1.40	0.50	0.50	sandy CLAY
TP7	21st September 2006	2.00	1.60	1.60	sandy gravelly CLAY
TP8	21st September 2006	3.90	3.00	3.00	slightly sandy silty gravelly CLAY
TP9	21st September 2006	4.90	4.60	4.60	slightly sandy silty gravelly CLAY
TP10	21st September 2006	3.30	2.10	2.10	slightly sandy gravelly CLAY
TP11	21st September 2006	3.70	2.00	2.00	sandy gravelly CLAY
TP12	21st September 2006	3.40	3.00	3.00	slightly sandy gravelly CLAY
TP13	21st September 2006	3.80	2.50	2.50	sandy gravelly CLAY
TP14	21st September 2006	3.00	2.00	2.00	slightly sandy gravelly CLAY
TP15	21st September 2006	3.80	3.30	3.30	sandy gravelly CLAY
TP16	21st September 2006	3.80	3.50	3.50	slightly sandy gravelly CLAY
TP17	21st September 2006	3.50	2.80	2.80	sandy gravelly CLAY
TP18	21st September 2006	3.50	3.00	3.00	sandy gravelly CLAY
TP19	21st September 2006	3.50	3.00	3.00	slightly sandy slightly gravelly CLAY
TP20	21st September 2006	4.00	2.80	1.30	sandy gravelly CLAY over SAND/GRAVEL
TP1 ('24)	16th February 2024	3.60	1.20	1.20	No description given
TP2 ('24)	16th February 2024	2.00	1.80	1.80	No description given
TP3 ('24)	16th February 2024	1.10	1.00	1.00	No description given
TP4 ('24)	16th February 2024	3.10	2.70	2.70	No description given
TP5 ('24)	16th February 2024	2.60	2.10	2.10	No description given
TP6 ('24)	16th February 2024	4.40	>4.40	>4.40	No description given
TP7 ('24)	16th February 2024	3.80	3.50	3.50	No description given
TP8 ('24)	16th February 2024	2.80	2.40	2.40	No description given

Table 7.5 Summary depth to bedrock and subsoil data from trial pitting across the proposed LRD Site

As the proposed LRD Site is entirely underlain by mineral subsoil, no peat probing to determine peat thickness or morphology / composition was required to be carried out across the site.

All depths to bedrock have been considered in the proposed finished floor levels, and associated cut and fill element for site preparation, across the site, and the deepest areas of cut, in the east central, north central and southwestern portions of the site (4.846 m bgl, 3.148 m bgl and 2.198 m bgl) have all

been sited in the localities with the deepest soil and subsoil above bedrock (see **Figure 7.6** following, and detail in both accompanying sheets of Cut and Fill Analysis by Waterman Moylan). Thus, it is envisaged that minimal elements of excavation to and into the bedrock substrate will be completed during construction works on the site.

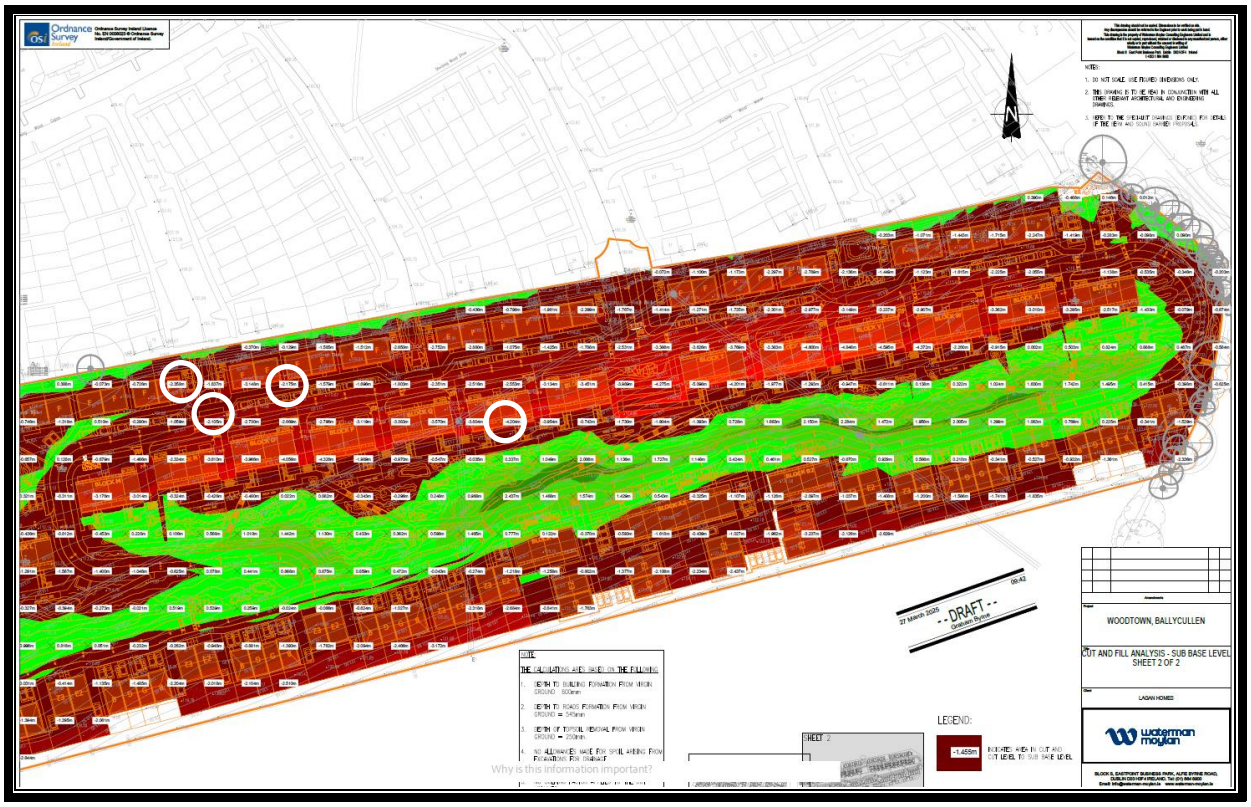


Figure 7.6 Cut and fill areas across the eastern portion of the site, with the deepest cut localities (white circles) corresponding to the deepest depth to bedrock across the proposed LRD Site area.

7.3.5 Bedrock Geology

The bedrock geology underlying the proposed LRD Site is discussed in the GSI publication "Geology of Kildare-Wicklow" (1994), as well as on Geological Survey Ireland's web viewer (www.gsi.ie). The 1:100,000 scale bedrock geology map of the area (Sheet 16) indicates that the subject site is underlain entirely by rocks of the Butter Mountain Formation (OABUTT). These were deposited during the Ordovician Period (485 to 444 million years ago). The bedrock geology of the area around the proposed LRD Site is shown in **Figure 7.7**.

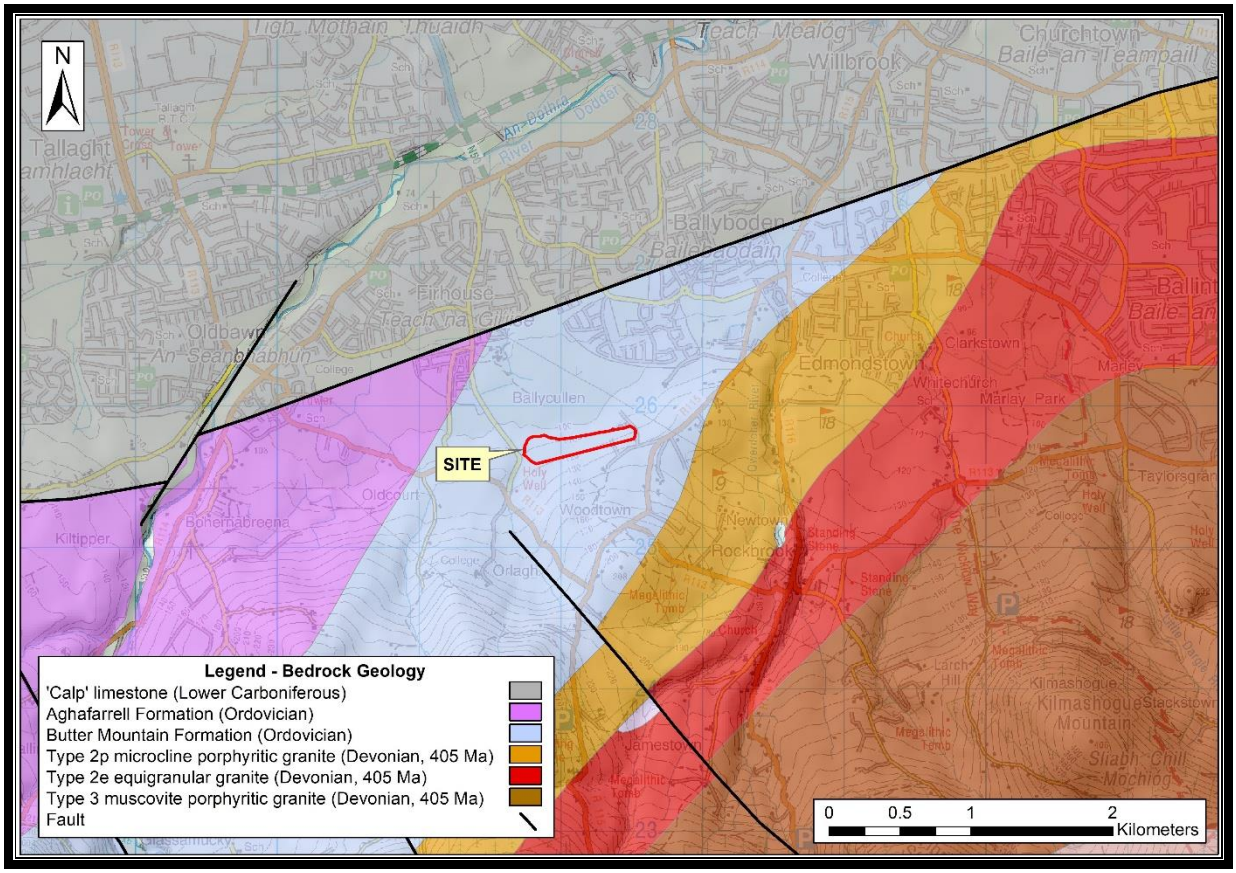


Figure 7.7 Bedrock geology of the proposed LRD Site and its environs (after www.gsi.ie)

The Butter Mountain Formation is a metamorphic rock and comprises fine-grained metasediments, which are in the majority dark blue to grey slates, which become schistose towards the granite of the Dublin – Wicklow Mountains, with thin, interbedded quartzites seen in the rock unit in places (McConnell and Philcox, 1994). The quartzite beds may be up to 200 mm thick, and usually interbedded with purplish, tourmaline-bearing pelites (McConnell and Philcox, 1994). In summary on the GSI Rock Unit Group map the Butter Mountain Formation is synthesised as an 'Ordovician Metasedment' of grey and grey-green, dark slate – schists, quartzites and coticules, and the formation is also classified overall in a hydrostratigraphic sense as 'Ordovician Metasediments'.

To the southeast of the site, various types of granite bedrock underlie the higher ground on Kilmashogue Mountain (**Figure 7.7**). On the lower ground to the north, 'Calp' limestone bedrock occurs. To the west, on the slightly lower ground of the Dodder Valley, Ordovician bedrock of the Aghafarrell Formation occurs. Many of the changes in bedrock type are marked by faults (**Figure 7.7**), but there are no faults mapped within 500 m of the proposed LRD Site.

As Ordovician Metasediments such as the Butter Mountain Formation are acidic rocks, they are not subject to dissolution and karstification.

Bedrock is not mapped as cropping out at or just below surface anywhere on the subject proposed LRD Site, on the GSI manuscript maps (1871, see **Figure 7.8**), with the closest outcrop approx. 375 m to the east where 'slaty rock' is mapped adjacent to 'granite', along the roadside along Stocking Lane.

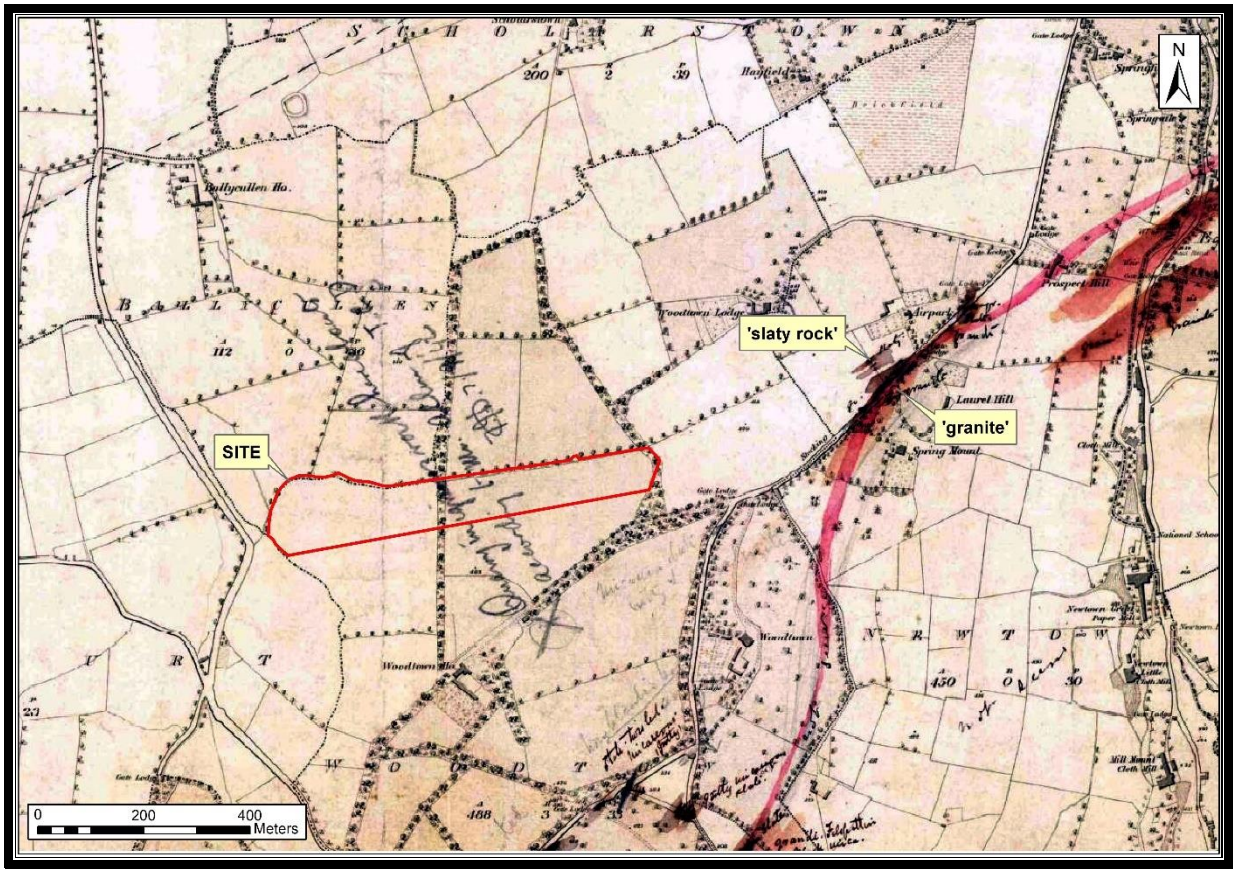


Figure 7.8 GSI six inch bedrock geology manuscript map of the proposed LRD Site and its environs (after www.gsi.ie)

7.3.6 Geological Resource Importance

The metasediment bedrock at the proposed LRD Site is classified as being of "Low" importance. The bedrock could be used on a "sub-economic" local scale for construction purposes only. Furthermore, the bedrock in the locality is poorly exposed due to the coverage of deep till subsoils.

The till subsoil deposits at the proposed LRD Site can also be classified as "Low" importance as the till is not designated as being a resource in this area and is also locally abundant in the general region.

7.3.7 Designated Sites

Under the Irish legal framework specified habitats and species, and areas which contribute surface water or groundwater resources to drinking water, are given various levels of protection to maintain both healthy and sustainable ecosystems and drinking water.

Protected areas or conservation areas are therefore locations which receive protection because of their recognized natural, ecological or cultural values. There are several kinds of protected areas in Ireland, which vary by level of protection depending on enabling laws or the regulations of the international organizations involved.

Natura 2000 is a network of protected areas established by the European Union across all Member States. It is made up of Special Areas of Conservation (SACs) and Special protection Areas (SPAs) designated respectively under the Habitats Directive and the Birds Directive. In Ireland, 7,155 km^2 are designated as terrestrial SAC sites, and 5,700 km^2 as SPA sites. SPAs and SACs aim to maintain or restore the favourable conservation status of habitats and species of community interest.

SPAs are designated based on the EU Birds Directive (2009/147/EC) which aims to protect all wild bird species which naturally occur in the European Union. Each of Ireland's 154 SPA sites has been protected by individual Statutory Instruments. SAC sites are designated based on the EU Habitats Directive (92/43/EEC) which was transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). The Habitats Directive ensures the conservation of a wide range of rare, threatened, or endemic animal and plant species.

Some rare and characteristic habitat types are also targeted for conservation in their own right, as Natural Heritage Areas (NHAs). The designation includes areas considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Geological/geomorphological sites, such as karst pavement or early fossil sites, are also afforded protection through the NHA designation. In addition to NHAs, there are a number of proposed NHAs (pNHAs), which were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated as full NHAs. These sites are of significance for wildlife and habitats. Prior to statutory designation, pNHA sites are subject to limited protection.

The closest designated site to the proposed LRD Site is the Wicklow Mountains SPA which is just under 4 kilometres southeast of the site, and on higher ground there.

A NIS accompanies this planning application under separate cover.

The Proposed Natural Heritage Areas of the Dodder Valley and the Glenasmole Valley occur just over 1.75 kilometres northwest and 3 kilometres west-southwest of the proposed LRD Site respectively.

7.3.8 Geological Heritage Sites

The Irish Geological Heritage (IGH) Programme in GSI complements other nature conservation efforts of the last decade, by assessing Ireland's geodiversity. Geodiversity is the foundation of the biodiversity addressed under European Directives on habitats and species by the designations of SAC and more recently on a national scale by the introduction of NHAs as the national nature conservation method. As a targeted conservation measure to protect the very best of Irish geology and geomorphology the IGH Programme fills a void which has existed since the abandonment of the Areas of Scientific Interest scheme, listed by An Foras Forbartha in 1981.

The IGH Programme does this by identifying and selecting the most important geological sites nationally for designation as NHAs. It looks at the entire spectrum within Irish geology and geomorphology under 16 different themes:

IGH THEMES

1. Karst
2. Precambrian to Devonian Palaeontology
3. Carboniferous to Pliocene Palaeontology
4. Cambrian-Silurian
5. Precambrian
6. Mineralogy
7. Quaternary
8. Lower Carboniferous
9. Upper Carboniferous and Permian
10. Devonian
11. Igneous intrusions
12. Mesozoic and Cenozoic
13. Coastal geomorphology
14. Fluvial and lacustrine geomorphology
15. Economic geology
16. Hydrogeology

A fundamental approach is that only the minimum number of sites necessary to demonstrate the particular geological theme is selected. This means that the first criterion is to identify the best national representative example of each feature or major sequence, and the second is to identify any unique or exceptional sites. The third criterion, identifying any sites of International importance, is nearly always covered by the other two.

Designation of geological NHAs will be by the GSI's partners in the Programme, the National Parks and Wildlife Service (NPWS). Once designated, any geological NHAs will be subject to normal statutory process within South Dublin County Council's Planning Departments and other relevant divisions. However, compared to many ecological sites, management issues for geological sites are generally fewer and somewhat different in nature.

From a national perspective, as a result of extensive comparison of similar sites to establish the best among them, there is now a good knowledge of many other sites, which are not the chosen best example, but which may still be of national importance. Others may be of more local importance or of particular value as educational sites or as a public amenity. All these various important sites are proposed for County Geological Site (CGS) listing in the County Development Plan.

Currently, in 2025, a Master List of candidate CGS and NHA sites is being used in GSI, originally compiled with the help of Expert Panels for all the 16 IGH themes, for the majority of counties. For several themes, the entire

process has been largely completed and detailed site reports and boundary surveys have been completed along with a Theme Report.

But in 2014, ten County Geological Sites were formally identified in South County Dublin. None are considered to be of national importance, whereby the sites would be put forward as a potential Geological Natural Heritage Areas (NHAs). This follows the comprehensive Irish Geological Heritage Audit of the county (Hennessy et al., 2015).

The terraces of the River Dodder at Bohernabreena, approximately 1.95 kilometres west-southwest of the proposed LRD Site, have been designated as a County Geological Site as part of this Irish Geological Heritage (IGH) Programme by the GSI. This is the closest County Geological Site.

Any potential hydrological/hydrogeological effects on the Dodder Terraces at Glenasmole are discussed in Chapter 8 (Hydrology, Hydrogeology and Drainage).

All designated sites and geological heritage sites are screened out for further assessment with regard land, soils and geology due to lack of potential direct effects. Indirect hydrological and hydrogeological effects are assessed in Chapter 8 (Hydrology, Hydrogeology and Drainage).

7.3.9 Soil Contamination

There are no known areas of soil contamination on the proposed LRD Site. During the site walkovers or investigations, no areas of contamination concern were identified. This was also confirmed by a visual appraisal of the water quality in the streams running through the site (refer also to Chapter 8 Hydrology, Hydrogeology and Drainage).

According to the EPA online mapping (http://gis.epa.ie/Envision), there are no licensed waste facilities on or within the immediate environs of the proposed LRD Site.

There are no historic mines at or in the immediate vicinity of the proposed LRD Site that could potentially have contaminated tailings.

7.3.10 Economic Geology

The GSI online Aggregate Potential Mapping Database shows that the proposed LRD Site is located within an area mapped as being typically Low to Moderate in terms of crushed rock aggregate potential and with no potential for granular aggregate potential (i.e. potential for gravel reserves).

7.3.11 Geohazards

The GSI Landslide database (www.gsi.ie) does not record any historic landslides in the vicinity of the proposed LRD Site or in the surrounding lands.

The GSI Landslide Susceptibility Map (www.gsi.ie) classifies the probability of a landslide occurring at a given location. The probability of a landslide occurring at the proposed LRD Site is mapped as being mainly Low, with a very small area of Moderately Low in the extreme southeastern corner of the site.

As the proposed LRD Site is entirely underlain by mineral subsoil, and as there is no peat of any thickness, a site-specific, site scale Peat Stability Risk Assessment was not required on the site.

7.4 CHARACTERISTICS OF THE PROPOSED PROJECT

The proposed LRD Project construction will mainly involve removal of mineral soils and mineral subsoils for access roads, underground cabling and pipework, hardstanding areas, house, duplex and simplex foundations, a construction compound and drainage works. Some crushed rock for construction purposes will be sourced off-site from nearby commercial quarries.

Approximately 27,665 m^3 of material will be required as fill for the proposed LRD Site footprint with all of this to be provided by the movement of granular soils and subsoils won on-site. There will be no requirement for the importation of any soil or subsoil / landscaping material from licenced quarries or gravel pits.

Generally during house construction, gravity foundations depths are expected to be between 0.3 m and 0.6 m deep, depending on ground conditions at each house locality.

All house hardstands will be founded on a suitable bearing material requiring the excavation of any encountered 'soft' ground materials, if present.

The total volume of spoil (soil and subsoil superficial deposits) requiring placement/reinstatement within the proposed LRD Project Site is consequently estimated at 27,665 m^3 (refer to **Table 6** below).

Any remaining spoil from 'cut' (57,116.5 m^3) will be exported to a licenced waste facility.

Comment	Spoil Reinstatement Volume (m^3)
25% reinstatement of total volume	27,665
Spoil Stockpile Areas	57,116.5
Total	79,101.5

Table 7.6 Summary of soil reinstatement volumes for the proposed LRD Project

7.5 LIKELY AND SIGNIFICANT IMPACTS ON LAND, SOILS AND GEOLOGY

7.5.1 Do Nothing Scenario

If the proposed development does not go ahead, there would be no potential impacts on the soil, subsoil and bedrock geology underlying the subject site (as well as on the hydrology, hydrogeology and drainage).

The area of the site, including the fields and hedgerows within, would continue as is on the site, with rainfall infiltrating to ground and surface water running into the stream watercourses, and the hedgerows would not be encroached upon. Agricultural practices would continue. This would have no impact on the underlying substrate, and there would be no change to the environmental profile of the site in relating to Land, Soils, Geology, or to Hydrology, Hydrogeology and Drainage.

7.5.2 Potential Impacts and Mitigation Measures – Construction Phase

The proposed development will include the following accommodation;

The proposed development will consist of 494 no. residential units (108no. 1-bed, 168no. 2-bed, 160 no. 3-bed; 58 no. 4-bed) comprising 189no. 2 storey houses (terraced/semi-detached/detached) (17no. 2-bed, 114no. 3-bed; 58no. 4-bed) and 28no. 3 and 4 storey simplex/duplex apartment blocks providing 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (c.475sq.m), public open space, car parking (surface/undercroft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. Vehicular access to be provided from the existing spur road connection to Stocking Avenue to the west of the site, and via Stocking Wood Drive to the east of the site (with relocation of existing ESB substation and associated works to the existing hammerhead). Additional pedestrian only routes will be provided into Abbot's Grove Park and Stocking Wood Copse with future connections provided for into Stocking Wood Manor, White Pines Park and the future school site to the north of the application site. The proposed development includes all associated site development works (including site reprofiling, retaining structures and downing of ESB overhead lines), landscaping, boundary treatments and services provision.

The site is located on the northern lower backslope of a high, unnamed, dome-shaped ridge feature at Woodtown, which itself is a spur-ridge off the northeastern side of Mountpelier Hill, from which views of the surrounding countryside at the northwest, north and northeast are attained.

The site will be accessed via the entrance to the proposed LRD site which is proposed from the existing road to the east of Abbott's Grove, at the northwest, into the (current) western field of the two-field landholding that forms the site and a second entrance via the Stocking Wood housing development. There will be no basements in any of the houses on the site, and the foundation levels will be set just below existing ground levels, largely on the pre-existing, *in situ* subsoil.

Detailed desk study review of available soils, subsoils and bedrock geological maps for the site show the presence of deep soil and subsoil beneath the majority of the site, with bedrock close to (within 1 metre of) the surface in the central eastern portion of the site. The construction activity at the site will comprise the extraction and movement of relatively small portions of soil and subsoil material. It is envisaged that only minimal amounts of rock-breaking will be required across portions of the site area during construction, as the proposed alteration of site levels where required will require removal of glacial till material for the most part, as ensured by the design of the geometry of the proposed cut and fill and the related proposed floor levels for the site.

As the proposed development will not involve major excavations as no subterranean car parks or basements are proposed, the construction works will not impact on groundwater resources locally, and as there is no observed or visible geological connection between the impure metasediments (slates) bedrock beneath the site and either the Wicklow Mountains SPA or the Proposed Natural Heritage Areas of the Dodder Valley and the Glenasmole Valley pNHAs to the south-southeast and northwest / west-southwest respectively.

A significant amount of the extracted topsoil will be retained on the site for use in landscaping and remediation of the site following completion of the construction phase. This is described in more detail in the enclosed Construction and Environmental Management Plan.

In the course of the works it is estimated that there will be an approximate 5% loss of the usable topsoil, subsoil and rock material due to the nature of handling such material.

In extraction, any existing topsoil layer (approx. 300 mm - 500 mm) will be removed from phased working areas. Any subsoil material from the phased working areas will then be removed from the ground using a mechanical excavator, as will bedrock, where possible. No blasting shall be employed in the removal of topsoil, subsoil or bedrock and should any rock be required to be removed following breaking, this shall only be removed using a mechanical excavator.

Any topsoil, subsoil or rock stockpiles will likely only store a maximum of $300m^3$ of topsoil at any one time (depending on the exact sequence of works).

The maximum dimensions of any stockpiles shall be 3m in height, approximately 10m deep and approx. 10m long. On this basis, it is estimated that there should be no more than 2 No. stockpiles of topsoil.

The stockpiles will be formed so that they do not hold ponds of water on the surface and the stock piles will be rolled or tamped smooth such that the upper layer will resist water ingress into the material below. Where the spoil is wet, it may be spread to allow air drying during periods of dry weather.

All works will be carried out under the supervision of suitably experienced and competent overseers. All personnel on site will be informed of all ground conditions to be expected on site and made aware of any mitigation measure necessary to successfully complete the construction of the project.

During the initial site preparation and construction stage, there will be a significant volume of machinery and equipment at the subject site, including trucks, excavators and screeners. There will be potential for leakage of fuel and oil from these vehicles into the surrounding groundmass, particularly during refuelling operations. The storage of large quantities of fuel or oils on site is not anticipated.

A Construction Management Programme will be implemented by the Principal Contractor for the duration of the construction phase, which will also cover associated and related environmental issues. This will require all potentially polluting material *e.g.* fuel and oil, be stored in appropriate, bunded containment; that all spills are cleaned promptly; and spill cleanup waste disposed of appropriately, and that all spills are notified to the site manager. Given the site topography, with a gently sloping gradient down-hill towards existing houses, and given

the results from trial pitting on the site, it is not expected that any significant volumes of shallow, 'perched' groundwater will be encountered during excavation work. Surface water, which may collect in shallow excavations, has the potential to be contaminated with silt or other contaminants and would not be considered suitable for the discharge to any local surface water bodies without appropriate treatment. Hence, surface water will be discharged to soakaways constructed at localities across the site.

Though the above outlines a significant work package to be carried out on-site, there will be little impact to the site as the bedrock substrate and any associated landscaping of soil and subsoil will not be over-compacted when restoring the site.

7.5.2.1 Effects on Land and Land Use of the proposed LRD Site Construction

There will be loss of land as a result of the proposed LRD Site (Proposed Project).

The loss of agricultural land amounts to 10.1 ha and there is no loss of forestry as it is proposed to retain the central woodland and hedgerow to the east of the site.

There will be no effects on the lands adjoining the proposed LRD Site. Agriculture will continue during the construction of the proposed LRD Project.

Pathway: Land take

Receptor: Land and Landuse (i.e. the land upon which the proposed LRD Project will occur)

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land use.

Impact Assessment: The loss of agricultural land resulting from the proposed LRD Project on a local or regional scale is minimal and therefore the effects of actual agricultural land loss are imperceptible.

Mitigation Measures: No mitigation is proposed with regard agricultural or forestry loss of land.

Residual Impact: Due to the small footprint of the proposed LRD Project on a local scale the residual effect is negative, direct, slight, likely, permanent impact on land and land use.

Significance of Effects: For the reasons outlined above, no significant effects on land or land use will occur as a result of the proposed LRD Project.

7.5.2.2 Effects on Soil, Subsoil and Bedrock Excavation of the proposed LRD Site Construction

There will be excavations required for the proposed LRD Site (Proposed Project).

Excavation of soil, subsoil and bedrock will be required for construction of works and for the installation of access roads, site drainage network, as well as all ancillary site works.

This will result in a permanent removal and relocation of in-situ soil and subsoil at most excavation locations. Estimated volumes of spoil to be relocated are summarised above in **Table 2**. There is proposed to be no a net loss of soil and subsoil, but much of the removed soil and subsoil will be relocated within the Site.

Pathway: Extraction/excavation.

Receptor: Soil, subsoil and bedrock.

Potential Pre-Mitigation Potential Effect: Negative, slight/moderate, direct, likely, permanent effect on soil, subsoil and bedrock due to excavation, relocation within the proposed LRD Project Site, and exportation off-site.

Proposed Mitigation Measures by Design:

- As much of the soil, subsoil and bedrock as possible which will be removed during the construction phase will be localised to the proposed LRD Site infrastructure, compounds and access roads;
- The proposed LRD Project has been designed to avoid, insofar as possible, sensitive habitats within the Site; and,
- Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping.

Residual Impact Assessment: The mineral soil and subsoil at the Site can be classified as of "Low" importance and the bedrock of "Low" importance.

The design measures incorporated into the proposed LRD Project as described above in particular the practice of avoidance areas of bedrock subcrop as much as possible combined with the 'low' importance of the deposits means that the residual effect will be negative, slight, direct, likely, permanent effect on soil, subsoil and bedrock due to disturbance and relocation within the Site.

Significance of Effects: For the reasons outlined above, no significant effects on soils, subsoils and bedrock will occur as a result of the proposed LRD Project.

7.5.2.3 Contamination of Soil, Subsoil and Bedrock by Leakages and Spillages of Hydrocarbons or Chemicals in the proposed LRD Site Construction

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk at the proposed LRD Project Site and therefore both are assessed herein.

The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects (i.e. contamination of soils and subsoils and pollution of the underlying bedrock aquifer) on the geological and water environment.

Pathway: Soil and subsoil and underlying bedrock pore spaces.

Receptor: Soil and subsoil, bedrock.

Pre-Mitigation Potential Effect: Negative, slight, direct, short-term, unlikely effect on soil, subsoils and bedrock.

Proposed Mitigation Measures:

- On-site re-fuelling will be undertaken using a double skinned bowser with spill kits kept on site for accidental leakages or spillages;
- Only designated trained operatives will be authorised to refuel plant on-site;

- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose;
- Safety data sheets for all chemicals used will be kept on-site; and,
- An emergency response plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan.

Residual Effect Assessment: The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect for the proposed LRD Project will be negative, imperceptible, direct, short-term, unlikely effect on soil, subsoils and bedrock.

Significance of Effects: For the reasons outlined above, and with the implementation of the listed mitigation, no significant effects on soil, subsoils and bedrock will occur as a result of the proposed LRD Project.

7.5.2.4 Erosion of Exposed Soils and Subsoils during the proposed LRD Site Construction

Soils and subsoils are at risk of erosion at the proposed LRD Project Site during the construction phase. There is a high likelihood of erosion of spoil during its excavation and during landscaping works at the Proposed Project site. The main impacts associated with this aspect is to the water environment, and therefore this aspect is further assessed in detail in Chapter 8. The potential impacts on air are explored in Chapter 9.

Pathway: Vehicle movement, surface water and wind action.

Receptor: Soil and subsoil.

Pre-Mitigation Potential Effect: Negative, slight, direct, short-term, likely effect on soils and subsoils by erosion and wind action.

Proposed Mitigation Measures:

- The upper vegetative layer (where still present) of excavated soil will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the soil within the spoil repository areas;
- Re-seeding and spreading/planting will also be carried out in these areas;

- Brash mats will be put in place to support vehicles on soft ground, reducing mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur.

Residual Effect Assessment: Soils and spoil can be eroded by vehicle movements, wind action and by water movement. To prevent this, all excavation works will be completed in accordance with a detailed Spoil Management Plan, material will remain within the proposed LRD Project Site and reseeding and planting will be completed to bind landscaped spoil. Following implementation of these measures the residual effects will be negative, slight, direct, short-term, likely effect on soils and subsoils by erosion and wind action.

Significance of Effects: For the reasons outlined above, no significant effects on soils, subsoils or bedrock will occur as a result of the proposed LRD Project.

7.5.3 Potential Impacts and Mitigation Measures – Operational Phase

There are very few potential direct impacts are envisaged during the operational phase of the proposed LRD Project.

No potential impacts will be significant, as they would be small scale and also of an intermittent nature.

Mitigation measures for land, soils and geology during the operational phase include the use of aggregate from authorised quarries for use in road and hardstand maintenance. Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network.

These mitigation measures are considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality.

7.5.4 Risk of Major Accidents and Disasters

Due to the nature of the proposed LRD Project site, i.e. absence of soft peat deposits, there is no risk of peat movement occurring. As well as this, all excavations are relatively shallow and will be completed using the Mitigation Methodologies outlined above e.g. in dry weather, etc.

The residual effect of a landslide occurring is therefore determined to be imperceptible.

7.5.5 Human Health Effects

Potential health effects arise mainly through the potential for soil and ground contamination. The proposed LRD Project is not a recognized source of pollution (e.g. it's not a waste management site, or a chemical plant), and so the potential for effects during the operational phase is very low.

Hydrocarbons will be used onsite during construction; however, the volumes will be small in the context of the scale of the proposed LRD Project and will be handled and stored in accordance with best practice mitigation

measures. The potential residual effects associated with soil or ground contamination and subsequent health effects are imperceptible.

7.5.6 Cumulative Effects

The potential for impact between the proposed LRD Project, and other relevant developments has been carried out with the purpose of identifying what influence the proposed LRD Project will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, as set out in Chapter 2 of this EIAR.

Please see Section 2.4.2 of Chapter 2 for cumulative assessment methodology.

7.5.6.1. Construction Phase

The nature of the construction works within the proposed LRD Project Site mean that the effects on the land, soils and geology environment are restricted to the immediate areas of the construction works.

The only cumulative effect of the proposed LRD Project with respect to the lands, soils and geology will be due to the potential removal and transport of material to a licensed waste facility, if required.

The environmental effects of the placement of material within the licenced waste facility will have been previously assessed during the licensing process of this facility.

There will be no further cumulative effects on the land, soils and geology environment during the construction phase of the proposed LRD Project.

7.5.6.2. Operational Phase

During the operational phase of the proposed LRD Project all aspects of the land, soils and geology environment will remain constant, with no alteration of any aspect of this environment.

As a result, there will be no cumulative effects during the operational phase due to the proposed LRD Project.

7.5.7 Post Construction Monitoring

Due to the nature of the proposed LRD Project site, there will be no requirements for any monitoring of the site post construction.

REFERENCES

Building Research Establishment (1991). BRE Digest 365. Soakaway design. 8pp.

British Standards, BS5930 (1999). Code of Practice for Site Investigations.

Clark, C.D. and Meehan, 2001. Subglacial bedform geomorphology of the Irish Ice Sheet reveals major configuration changes during growth and decay. Journal of Quaternary Science, 16(5), p. 483-496.

Daly, D. and Craig, M. (2009). Chemical and Quantitative Status of Groundwater Bodies. A Measure of the Present, A Signpost to the Future. IAH Irish Group. Proceedings 29th Annual Groundwater Conference, International Association of Hydrogeologists, Irish Group, Tullamore, April 21-22, 2009.

DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.

Environmental Protection Agency (2002). Guidance on the Information to be contained in Environmental Impact Statements. Environmental Protection Agency, Dublin, 45 pp.

Environmental Protection Agency (2005). Water Quality in Ireland 2005: Key Indicators of the Aquatic Environment. EPA, Johnstown Castle, Wexford. 32pp.

Environmental Protection Agency (2011). Water Framework Status Update based on Monitoring Results 2007-2009. Aquatic Environment Unit, Office of Environmental Assessment of the Environmental Protection Agency. Ecological Status and Chemical Status of Surface Waters and Chemical and Quantitative Status of Groundwaters. *Prepared in fulfilment of Articles 24 and 25 of SI 272 of 2009. 21 June 2011*.

Environmental Protection Agency (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency, Dublin, 90 pp.

European Communities Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive).

European Communities Environmental Objectives (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) (Natural Habitat Regulations).

European Communities Environmental Objectives (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003) (Water Policy Regulations).

European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) (Groundwater Regulations).

Fitzsimons, V., Daly, D. and Deakin, J. (2003). Draft GSI guidelines for assessment and mapping of groundwater vulnerability to contamination. Groundwater Section, Geological Survey of Ireland.

Forest Service, Department of the Marine and Natural Resources (2000). Code of Best Forest Practice: Ireland. Forest Service, Dublin, 101 pp.

Gardiner, M. and Radford, T. (1980). Soils Associations of Ireland and their land-use potential. An Foras Taluintais, Dublin.

Geological Survey of Ireland (1871). Bedrock Geology Manuscript Sheets.

Geological Survey of Ireland (2025). Online Quaternary Sediments map viewer. www.gsi.ie

Government of Ireland, 2009. European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272/2009).

Government of Ireland, 2010. European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9/2009).

Government of Ireland, 2014. European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014).

Government of Ireland, 2019. European Union Environmental Objectives (Surface Water) Amendment Regulations (S.I. No. 272/2009).

Harned, D.A., and Daniel, C.C., III (1992). The transition zone between bedrock and regolith: Conduit for contamination?, in Daniel, C.C., III, White, R.K., and Stone, P. A., eds., Ground water in the Piedmont, Proceedings of a Conference on Ground Water in the Piedmont of the Eastern United States, Charlotte, N.C., Oct. 16-18, 1989: Clemson, S.C., Clemson University, p. 336-348.

Institute of Environmental Management & Assessment (1999). Draft Guidelines on Public Participation in Environmental Decision Making. Institute of Environmental Management and Assessment, Lincoln, UK.

Institute of Geologists of Ireland (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapter of Environmental Impact Statements. Institute of Geologists of Ireland, Dublin. 50pp.

Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater – Dependent Terrestrial Ecosystems under the Water Framework Directive.Environmental Research Centre Report Series No. 12.

McConnell, B. and Philcox, M.E. (1994). Geology of Kildare - Wicklow: A Geological Description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare - Wicklow. With contributions from K. Claringbold, W. Warren and G. Wright. Geological Survey of Ireland, Dublin.

Meehan, R., Gallagher, V., Parkes, M., and Gatley, S. (2013). The Geological Heritage of Monaghan. An audit of County Geological Sites in County Monaghan. Geological Survey of Ireland, 137 pp.

National Roads Authority (2009). Guidelines on Procedures for Assessment and Hydrogeology for National Road Schemes. National Roads Authority, Dublin, 189 pp.

Official Journal of the European Communities (2000). Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327) 22 December 2000.

Ó Súilleabháin, C. (2000). Assessing the Boundary between High and Moderately Permeable Subsoils. Unpublished M.Sc. thesis, Trinity College Dublin.

Ó Súilleabháin, C. (2004). The Attenuation Capacity of Different Subsoils Receiving Domestic Wastewater Effluent. Ph.D. Thesis, Trinity College Dublin.

Teagasc (2006a). Digital soil map of County Dublin. Prepared as part of the EPA Soil and Subsoil Mapping Project, Teagasc, Kinsealy, Dublin.

Teagasc (2006b). Digital subsoil map of County Dublin. Prepared as part of the EPA Soil and Subsoil Mapping Project, Teagasc, Kinsealy, Dublin.

UK TAG (2008). Application of Groundwater Standards to Regulation. UK Technical Advisory Group Paper 11b(iii). Available on the www.wfduk.org website.

UK TAG (2011). Defining & Reporting on Groundwater Bodies. UK Technical Advisory Group. Working Draft Paper. Water Services National Technical advisory Group.

Wright, G.R. and Gately, C. (2002). Kilcullen Groundwater Body. Geological Survey of Ireland, 5 pp.

APPENDIX 7.1

TRIAL PIT LOGS (2006)

(No change)

APPENDIX E – EIAR CHAPTER 8 HYDROLOGY, HYDROGEOLOGY AND DRAINAGE

HYDROLOGY, HYDROGEOLOGY AND DRAINAGE

8.1 INTRODUCTION

8.1.1 Background and Objectives

Dr. Robert Meehan was retained on behalf of Stephen Ward Planning and Development Consultants Limited in September 2024, to undertake an assessment of the potential likely and significant effects of the proposed Large Scale Residential Development (LRD) by Lagan Homes Ballycullen Limited (Proposed Project) on a site south of Stocking Avenue, in the townland of Woodtown, Ballycullen, Dublin 16 (*Irish Transverse Mercator Grid Reference 712000 725740*), where it is proposed to construct a residential development comprising a number of accommodation unit types, on the Hydrology, Hydrogeology and Drainage aspects of the receiving environment.

The Proposed LRD Project is described in full in Chapter 3 of this EIAR.

Where the 'proposed LRD Site' is referred to it refers to the entire site boundary encompassing the proposed

- 4 no. Type A1 dwelling houses (three-bedroomed, semi-detached),
- 10 no. Type A2 dwelling houses (three-bedroomed, end of terrace),
- 6 no. Type B1 dwelling houses (three-bedroomed, semi-detached),
- 34 no. Type B2 dwelling houses (three-bedroomed, end of terrace),
- 15 no. Type C1 dwelling houses (four-bedroomed, semi-detached),
- 8 no. Type C2 dwelling houses (four-bedroomed, semi-detached),
- 1 no. Type C3 dwelling house (four-bedroomed, detached),
- 17 no. Type D dwelling houses (two-bedroomed, mid-terrace),
- 9 no. Type E1 dwelling houses (four-bedroomed, detached),
- 25 no. Type E2 dwelling houses (four-bedroomed, semi-detached),
- 30 no. Type F dwelling houses (three-bedroomed, semi-detached),
- 30 no. Type G dwelling houses (3-bedroomed, mid-terrace)
- 108 no. of either Type 1a, 1b, 1c or 1d Apartments (all one-bedroomed),
- 151 no. of either Type 2a, 2b, 3a, 3b Apartments (all two-bedroomed),
- 46no. 4a or 4b Apartments (all 3-bedroomed)
- creche

and all ancillary site works.

This report provides a baseline assessment of the environmental setting and description of the Proposed Project, as described in Chapter 3, in terms of Hydrology, Hydrogeology and Drainage, and discusses the potential likely and significant effects that the construction and operation of the Proposed Project will have. Where required, appropriate mitigation measures to avoid any identified significant effects to Hydrology, Hydrogeology and Drainage (i.e. natural water resources) are recommended and the residual effects of the Proposed Project post-mitigation are assessed.

The Proposed Project study area with regard Hydrology, Hydrogeology and Drainage is defined by the EIAR Site Boundary. The full extent of the area which is the subject of the investigations is identified in **Figure 8.1** below as a red outline, which is a site covering c. 10.35 hectares. Through the desk study and investigations undertaken and having regard to other environmental and design considerations a suitable design of the Proposed Project was subsequently identified for the site, which includes the absence of basement storeys and associated inherent construction mitigation measures. This has also in turn informed the extent and level of detail of this report on Hydrology, Hydrogeology and Drainage (again for the site outlined in red below). Because the regional hydrology and hydrogeology has a bearing on the site hydrology and hydrogeology, in this case, the study area is larger than the application site; thus, much of the baseline data presented in this chapter extends beyond the application site itself.

The objectives of the assessment are:

- Produced a baseline study of the existing water environment (surface water and groundwater natural resources) in the area of the proposed LRD Project;
- Identify likely significant effects of the Proposed Project on surface water and groundwater natural resources during the construction and operational phases of the proposed LRD Project;
- Identify mitigation measures to avoid, reduce or offset significant negative effects;
- Assess significant residual effects, and;
- Assess the cumulative effects of the proposed LRD Project itself, as well as other local developments (as described in Chapter 2 of this EIAR).

The Water Study Area for assessing the potential zone of impact and cumulative effects assessment is the Liffey River catchment. The Liffey River catchment is shown on **Figure 8.2** below (Regional Hydrology Map).

8.1.2 Statement of Authority

EurGeol. Dr. Robert Meehan, PGeo. is a specialist geological, hydrological, hydrogeological and environmental sole trader who delivers a range of water and environmental management consultancy services to the private and public sectors across the Republic of Ireland. Robert began working a as a self-employed Consultant Geologist in 2003, with his office located in Navan, County Meath.

Robert's core areas of expertise and experience includes soils, subsoils, geology, hydrogeology and hydrology. Robert routinely completes impact assessments for land, soils and geology, hydrology and hydrogeology for a large variety of project types including housing developments, large-scale infrastructure projects and quarry enterprises.

Robert Meehan (B.A., Ph. D, PGeo., EurGeol.) is an Environmental Geologist / Hydrogeologist with over 30 years' environmental consultancy experience in Ireland. Robert initially worked for Geological Survey Ireland (GSI, 1993 – 1998) on the initiation of Groundwater Protection Schemes across the country, and then worked for Teagasc between 1998 and 2006 completing the first countrywide mapping of subsoil (and related soils) coverage, which is that still used today in all Environmental Impact Assessments across the country. Since beginning life as a

consultant while with Teagasc in 2003, Robert has completed numerous hydrological and hydrogeological impact assessments of various types of development in Ireland. He has also worked for GSI on their National Groundwater Protection Scheme, as well as Irish Geological Heritage Audits of all counties across Ireland. Robert acts as a consultant to the EPA on on-site waste water treatment systems, and was a co-author of the current Code of Practice (Domestic Waste Water Treatment Systems, 2021). Robert has been a lead trainer on the (formerly FAS, now Water Services Training Group) course on 'Site Assessment for On-Site Waste Water Treatment Systems' since in's inception in 1998. Robert has managed the geological and hydrogeological aspects of EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in geological and hydrogeological site investigations, site suitability assessments for on-site waste water, geological heritage mapping and appraisal, wetland hydrology and hydrogeology, water resource assessments, surface water drainage and SUDs design, and surface water/groundwater interactions.

8.1.3 Relevant Legislation

The EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

- The Planning and Development Act 2000 (as amended);
- Planning and Development Regulations, 2001 (as amended);
- S.I. No 296/2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of the EIA Directive as amended by the Directive 2014/52/EU into Irish Law;
- S.I. No. 94/1997: European Communities (Natural Habitats) Regulations, resulting from EU Directives 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and 79/409/EEC on the conservation of wild birds (the Birds Directive);
- S.I. No. 293/1988: Quality of Salmon Water Regulations;
- S.I. No. 272/2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722/2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC). Since 2000 water management in the EU has been directed by the Water Framework Directive (WFD). The key objectives of the WFD are that all water bodies in member states achieve (or retain) at least 'good' status by 2015. Water bodies comprise both surface and groundwater bodies, and the achievement of 'good' status for these depends also on the achievement of 'good' status by dependent ecosystems. Phases of characterisation, risk assessment, monitoring and the design of programmes of measures to achieve the objectives of the WFD have either been completed

or are ongoing. In 2015 it replaced a number of existing water related directives, which are successively being repealed, while implementation of other Directives (such as the Habitats Directive 92/43/EEC) will form part of the achievement of implementation of the objectives of the WFD;

- S.I. No. 41/1999: Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 294/1989: Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 74/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. S.I. No. 99/2023: European Communities Environmental Objectives (Drinking Water) (Amendment) Regulations 2023;
- S.I. No. 287/2022: European Communities Environmental Objectives (Groundwater) (Amendment) Regulations 2016;
- S.I. No. 9/2010: European Communities Environmental Objectives (Groundwater) Regulations 2010;
- S.I. No. 272/2009: European Communities Environmental Objectives (Surface Water) Regulations 2009;
- S.I. No. 77/2019: European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 2019, and;
- The Heritage Act 1995, as amended.

8.1.4 Relevant Guidance

The Hydrology, Hydrogeology and Drainage chapter of this EIAR was prepared in accordance with, where relevant, the guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- European Commission (2017): Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report;
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;

- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Services (Draft) Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006);
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and,
- Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), (European Commission 2017).

8.2 ASSESSMENT METHODOLOGY

8.2.1 Desk Study

A desk study of the Site was completed in advance of undertaking the walkover survey, mapping and site investigations. This involved collecting all relevant geological, hydrological, hydrogeological and meteorological data for the Site and Water Study area. This included consultation with the following data sources:

- the Environmental Protection Agency's online environmental database (www.epa.ie);
- Geological Survey Ireland's (GSI's) Groundwater and Geology Databases (www.gsi.ie/geology or www.gsi.ie/groundwater);
- Geological Survey Ireland's Geological Heritage site mapping (www.gsi.ie/geoheritage);

- GSI's Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow). Geological Survey Ireland (GSI, 1994);
- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow). Geological Survey Ireland (GSI, 1994);
- Geological Survey Ireland (2003) – Kilcullen Groundwater Body Initial Characterization Reports;
- General Soil Map of Ireland (Teagasc, 1980, 2nd edition, viewable on www.epa.ie); and,
- Aerial Photography, 1:5,000 and 6 inch sheet base mapping.
- OPW Past Flood Event Mapping (www.floodinfo.ie); and,
- OPW Flood Extents Mapping and National Indicative Fluvial Mapping (www.floodinfo.ie/map/floodmaps).

8.2.2 Baseline Monitoring and Site Investigations

Walkover surveys, including geological/hydrological/hydrogeological baseline monitoring and site investigations, were undertaken by Robert Meehan (refer to Section 1.2 above for qualifications and experience) on 6th and 7th November 2024, and 13th March 2025.

Intrusive Site Investigations had previously been conducted across the site area by Ground Investigations Ireland, The Grange, 12th Lock Road, Lucan, County Dublin, on 21st September 2006, and by Waterman Moylan Ltd., Block S, EastPoint Business Park, Alfie Byrne Road, Dublin D03 H3F4, on 16th February 2024.

The objectives of the intrusive site investigations included mapping the distribution and depth of mineral subsoils at the proposed LRD Site along with assessing the mineral subsoil / bedrock conditions at key Proposed Project locations. These data were used to inform the final layout design.

Site investigations to address the Land, Soil and Geology section of the EIAR included the following:

- Walkover surveys and geological mapping of the Site area were undertaken to assess ground conditions;
- A total of 26 no. deep trial pits excavated inside the proposed LRD Site boundary, and 2 no. excavated just outside of it at the southeast, to determine the thickness and geomorphology of mineral subsoils overlying the Site;
- Measurement of flow in streams flanking the site and that running through the site; and
- Mineral subsoils were logged according to the British Standard BS: 5930 Subsoil Classification scheme.

As there is an absence of peat of any depth across all portions of the site (see following Sections), and as the soil and subsoil is all mineral, the requirement for a Peat Stability Risk Assessment Report and Peat Management Plan does not arise.

8.2.3 Impact Assessment Methodology

The desk study investigations commissioned were to characterise the detailed three-dimensional soils, subsoils and bedrock geology of the proposed LRD Site (see Chapter 7), as well as resultant interpreted hydrogeology. As well as this, an assessment as to whether there would be any impact on any SACs, SPAs, NHAs or pNHAs around the site, was an inherent part of this study. The resulting report provided the resultant description of the geological character of the lands, and details the nature, extent and complexity of the geological material from the surface downwards through the mineral subsoil to the bedrock. As part of this desk study mapping and modelling exercise, field investigations were undertaken and involved a detailed walk over of the site and its surrounding environs, and mapping of salient features.

Overall therefore, the results of the desk study, visual assessment of the site, groundwater and surface water level analysis and trial pit analysis (see Chapter 7) have been collated to conclude that the lands could be used for the construction of the proposed LRD development, as well as the associated drainage scheme, and assert that there will be no detrimental impact on the soils and subsoils geology, or hydrogeology and drainage on the site (Chapter 8) or at any nearby SACs, SPAs, NHAs or pNHAs, from the construction of same.

The rating of potential environmental impacts on the soils and geology environment is based on **Table 8.1** following which takes account of the quality, significance, duration and type of impact characteristic identified.

The appraisal methodology is completed in accordance with the Environmental Protection Agency (EPA) document '*Guidance on the Information to be contained in Environmental Impact Statements*' (EPA, 2002), the Institute of Geologists of Ireland (IGI) publication '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapter of Environmental Impact Statements*' (2013) and the EPA document entitled '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*' (2022) classification of environmental impacts. In addition, the document entitled '*Guidelines on Procedures for Assessment and Hydrogeology for National Road Schemes*' by the National Roads Authority (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

In EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the environmental impacts of the proposed activities on that cited attribute. These impact ratings presented in below are in accordance with impact assessment criteria provided in the EPA (2022) publication.

Impact characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment

	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Slight	An impact which causes noticeable changes in the character
Impact	Moderate	An impact that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Profound	An impact which obliterates sensitive characteristics
Duration	Short term	Impact lasting one to seven years
	Medium-term	Impact lasting seven to fifteen years
	Long-term	Impact lasting fifteen to sixty years
	Permanent	Impact lasting over sixty years
	Temporary	Impact lasting for one year or less
	Cumulative	The addition of many small impacts to create one larger, more significant impact
Type	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	Indeterminate	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is not permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents
	'Worst Case'	The impact arising from a development in the case where the mitigation measures may substantially fail

Table 8.1 Glossary of potential impacts following EPA (2022) Guidance document.

The duration of each impact is considered to be either temporary, short-term, medium term, long-term, or a permanent impact. Temporary impacts are considered to be those which are construction related and last less than one year. Short term impacts were seen as impacts lasting one to seven years; medium-term impacts lasting seven to fifteen years; long-term impacts lasting fifteen to sixty years; and permanent impacts lasting over sixty years.

The NRA criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and area presented in **Table 8.2** below.

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Table 8.2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA, 2009).

The guideline criteria (EPA, 2022) for the assessment of likely significant effects require that likely effects are described with respect to their extent, magnitude, type (i.e. negative, positive or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this environmental impact assessment report are those set out in the EPA (2022) Glossary of effects as shown in Chapter 1 of this EIAR. In addition, the two impact characteristics proximity and probability are described for each impact and these are defined in **Table 8.3** following.

Impact Characteristic	Degree/ Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Unlikely	A low likelihood of occurrence of the impact.
	Likely	A medium likelihood of occurrence of the impact

Table 8.3 Additional Impact Characteristics

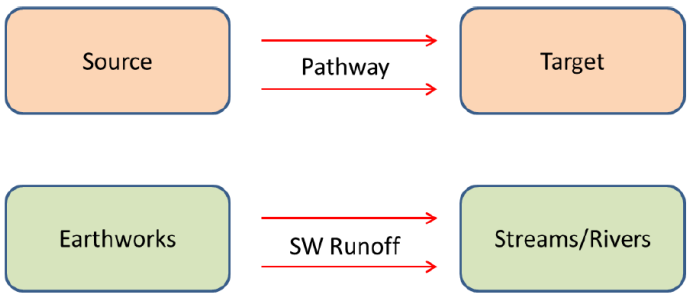
In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of effects are related to examples of potential likely significant effects on the geology and morphology of the existing environment, as listed in **Table 8.4**.

Impact Characteristics	**Potential Hydrological Impacts**	
Quality	**Significance**	**Potential Hydrological Impacts**
Negative only	Profound	Widespread permanent impact on: • The extent or morphology of a cSAC. • Regionally important aquifers. • Extents of floodplains. Mitigation measures unlikely to remove impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: • The extent or morphology of a cSAC / ecologically important area. • A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). • Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not fully remove impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: • The extent or morphology of a cSAC / NHA / ecologically important area. • A minor hydrogeological feature. • Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

Table 8.4 Impact Descriptors relating to the Receiving Environment

8.2.4 Overview of Impact Assessment Process

The conventional source-pathway-target model (see following) was applied to assess potential impacts on downstream environmental receptors (see below as an example) as a result of the Proposed Project.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

Step 1	Identification and Description of Potential Impact Source: This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to this type of development, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	Post Mitigation Residual Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	Significance of Effects:	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

Table 8.5 Impact Assessment Process

In order to provide an understanding of the stepwise impact assessment process applied below (Section 8.5 following), a summary guide has first been presented above that defines the steps (1 to 7) taken in each element of the impact assessment process. The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all construction and operation and decommissioning activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

8.2.5 Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of the Land, Soils and Geology Chapter of this EIAR. The site investigations and follow up monitoring carried out were thorough and exhaustive.

8.3 EXISTING ENVIRONMENT

8.3.1 Site Description and Topography

The Site is located in the northern foothills of the Dublin – Wicklow Mountains, in the townland of Woodtown, approximately 1.5 kilometres southeast of the centre of the town of Firhouse and immediately south of Ballycullen, in south central County Dublin (see **Figure 8.1**). The site lies at ground surface elevations between approximately 106 and 126 mAOD, and is bounded by the Ballycullen Road at the west and the Regional R115 road approximately 150 m to the southwest. The existing Abbott's Grove and Stocking Wood housing developments are immediately adjacent at the northwest and northeast of the site, respectively (see **Figure 8.1**). The site itself is made up of two long, west-southwest to east-northeast oriented fields, and the entrance to the proposed LRD site is proposed from the existing spur road to the east of Abbott's Grove, at the northwest, and via Stocking Wood development into the (current) eastern field.

The Ordnance Survey Ireland 1:50,000 Discovery Series Map shows a multi-contoured topography in and around the site (**Figure 8.1**) and though no streams or other watercourses are shown as flowing through or adjacent to the site on this map, it is noted that a number of small, unnamed, potentially ephemeral streams seem to flow northwards through the centre of the site, as well as along it's eastern boundary, on the six inch to one mile map sheets of the locality, from the 1840's.

The proposed LRD Site itself is situated on the northern lower backslope of a high, unnamed, dome-shaped ridge feature at Woodtown, which itself is a spur-ridge off the northeastern side of Mountpelier Hill. The dome-shaped ridge on which the site is located rises to 208 m elevation AOD approximately 850 m southeast of the

site, with Mountpelier Hill rising to 383 mAOD 2 kilometres south-southwest of the site (**Figure 8.1**).

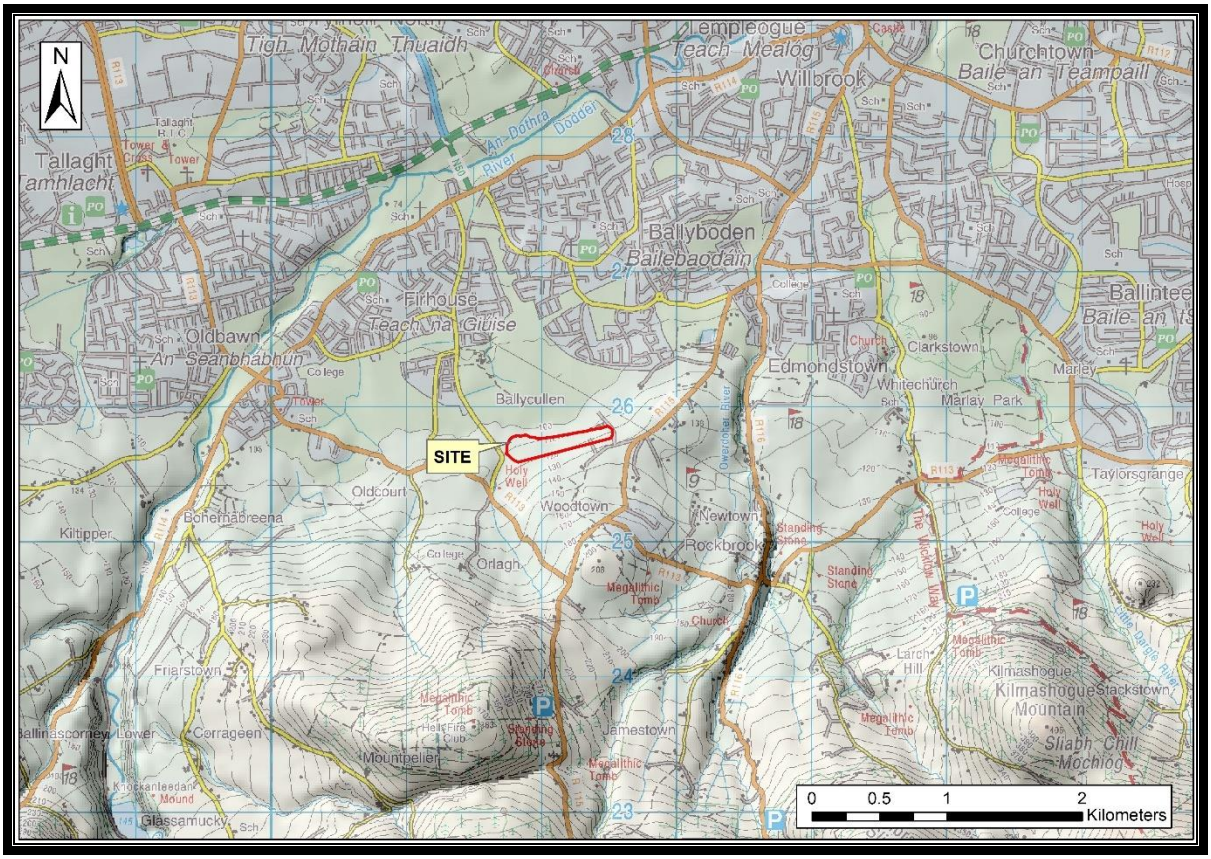


Figure 8.1 Geological and Hydrological Study Area, Application Site Area and Surrounding Features. Grid squares are 1 km distance (O.S. Licence EN 057925).

The overall form / geometry of the site itself is of a ridge or 'bank' type feature along the lower backslopes of much higher, bedrock-cored ridges, undulating with gentle to moderate slopes. Currently (January 2025) the site itself is comprised completely of agricultural pasture, with a narrow band of broadleaf forestry running north to south through the central portion of the site and bounding the two component fields, and a mature hedgerow / treeline along the eastern boundary. Both of these belts of trees and shrubs are incised by shallow stream channels. Pockets of scrub vegetation also occur at the northeastern extreme of the site, and the site is bounded by fences and walls elsewhere. To the north, west and east, the land in the housing estates has a concrete, tarmacadam or hardstand cover, and to the south and in a narrow area at the north centre of the site, pasture also occurs. There are currently no buildings across any locality within the site confines. The northwestern edge of the site comprises a relatively high, cliffed slope at the edge of Abbott's Grove, generally 4 m – 5m high.

Plate 8.1 View of the western field on the site, from the west

Plate 8.2 View of the eastern field on the site, also from the west

Plate 8.3 The cliffed edge of the northwestern end of the site at the edge of Abbot's Grove (at the proposed road entrance)

8.3.2 Water Balance

Long term Average Annual Rainfall (AAR) and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (1981 - 2010) recorded at Ballyboden rainfall station (Station I.D. 6623), located 880 metres northeast of the proposed LRD Site, are presented in **Table 8.6**. This is the most appropriate station to use with respect to distance (from the proposed LRD Site) and elevation. The average annual rainfall from 1981 to 2010 was 706 mm/year.

Met Éireann also provide a grid of average annual rainfall for the entire country for the period of 1991 to 2020. Based on this more site-specific modelled rainfall values, the average annual rainfall at the proposed LRD Project site ranges from 921 to 1,017 mm/year. The mid-point between 921 and 1,017 mm/ year (1991 to 2020 data) i.e. 969 mm/year, was considered to be the most accurate estimate of average annual rainfall from the available sources.

Station		**X – Co-ordinate**		**Y – Co-ordinate**		**Elevation (mAOD)**		**From**		**To**		
Ballyboden		713026		726528		107		1967		present		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
91.64	63.15	68.76	62.13	67.06	63.70	46.02	68.17	67.54	76.64	87.73	94.28	856.62

Table 8.6 Local Average Long-Term Rainfall Data (1981-2010)

The closest synoptic[1] station is at the Phoenix Park, approximately 10 kilometres north of the proposed LRD Site, but the nearest synoptic station with potential evapotranspiration (PE) data readily available is at Dublin Airport, which is 16 kilometres to the north-northeast. Daily rainfall and daily potential evapotranspiration data at the Dublin Airport synoptic station are available since 1942. The long-term average PE for this station is 548 mm/year. This value is used as a best estimate of the proposed LRD Site PE. Actual Evaporation (AE) at the proposed LRD Site is estimated as 520.6 mm/year (which is 0.95 × PE).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the Site is calculated as follows:

Effective rainfall (ER) = AAR – AE

= 969 mm/year – 520.6 mm/year

ER = 448.4 mm/year

According to the GSI subsoil permeability mapping, the majority of the proposed LRD Site (66%) is mapped as being underlain by "Moderate" permeability subsoils, while the other 34% (at the northwestern end) is mapped as being underlain by "Low" permeability subsoils.

Based on recharge coefficient estimates from the GSI, an estimate of 60% recharge is assigned for a large proportion (66%) of the proposed LRD Site (mapped by GSI as "moderate permeability subsoil overlain by poorly drained gley soil"), while areas mapped as "low permeability subsoil" (34% of site area) are assigned recharge coefficients of 7.5% to 15%.

The weighted average recharge coefficient for the proposed LRD Site is calculated to be 44%. The Site hydrology is therefore characterised by naturally (relatively) high surface water runoff rates (56%) and lower groundwater recharge rates. The relatively high drainage density (see next Section) across the site is reflective of the relatively low groundwater recharge rates, and corroborates this.

Therefore, annual recharge and runoff rates for the proposed LRD Site are estimated to be 197 mm/year and 251.4 mm/year respectively.

Climate change projections for Ireland are provided by Regional Climate Models (RCM's) downscaled from larger Global Climate Models (GCM's). Projections for the period 2041-2060 (mid-century) are available from Met Eireann. The data indicates a projected decrease in summer rainfall from 0 to 13% under the medium-low emission range scenario and an increase in the frequency of heavy precipitation events of ~20%. In total the projected annual reduction in rainfall near the proposed LRD Project site is -10% under the medium-low emission scenario and -8% under the high emissions scenario.

[1] Meteorological station at which observations are made for synoptic meteorology and at the standard synoptic hours of 00:00, 06:00, 12:00, and 18:00.

In addition to average rainfall data, extreme value rainfall depths are available from Met Éireann. **Table 8.7** below presents return period rainfall depths for the area of the proposed LRD Site. These data are taken from https://www.met.ie/climate/services/rainfall-return-periods and they provide rainfall depths for various storm durations and sample return periods (1-year, 10-year, 30-year and 100-year). The 10-year rainfall depths are the basis of the proposed LRD Project drainage hydraulic design as described further below.

Return Period (years)				
Storm Duration	**1**	**10**	**30**	**100**
5 minutes	3.6	7.3	9.9	13.7
15 minutes	5.8	12.0	16.3	22.5
30 minutes	7.8	16.1	21.9	30.2
1 hour	10.6	21.7	29.5	40.7
6 hours	22.8	46.7	63.4	87.5
12 hours	30.6	62.8	85.3	117.6
24 hours	41.2	84.5	114.7	158.2
2 days	50.8	98.4	130.4	175.3

Table 8.7 Return Period Rainfall Depths (mm) for the proposed LRD Project Site

8.3.3 Regional and Local Hydrology

The Site is located in the regional River Liffey and Dublin Bay Catchment within Hydrometric Area 09 of the Eastern River Basin District (ERBD). A regional hydrology map is shown as **Figure 8.2**.

On a more local scale the proposed LRD Site is located in the Dodder_SC_010 surface water subcatchment. The proposed LRD Site drains to the River Dodder, which is located approximately 1.85 kilometres downstream (northwest) of the Site, *via* a number of stream tributaries.

8.3.4 Project Site Existing Drainage

8.3.4.1 Drainage Regime

The proposed LRD Site is drained by a network of 2 no. tributary streams (1st/2nd order) that flow northwards in the central portion of the proposed LRD Site and along the Site's eastern boundary. These two streams merge together at the northeastern corner of the Knocklyon Wilderness and Wetland Park, to the north of the proposed LRD Site and just south of the M50, where the stream becomes culverted beneath housing estates north of the M50 in Scholarstown.

A third stream also flows northwards along the Ballycullen Road, but outside the site, and approximately 40 m west of the site boundary, a deep drainage ditch (1 m to 1.5 m deep) conduits runoff from the western portion of the site towards this, and runs along the proposed LRD Site's western boundary.

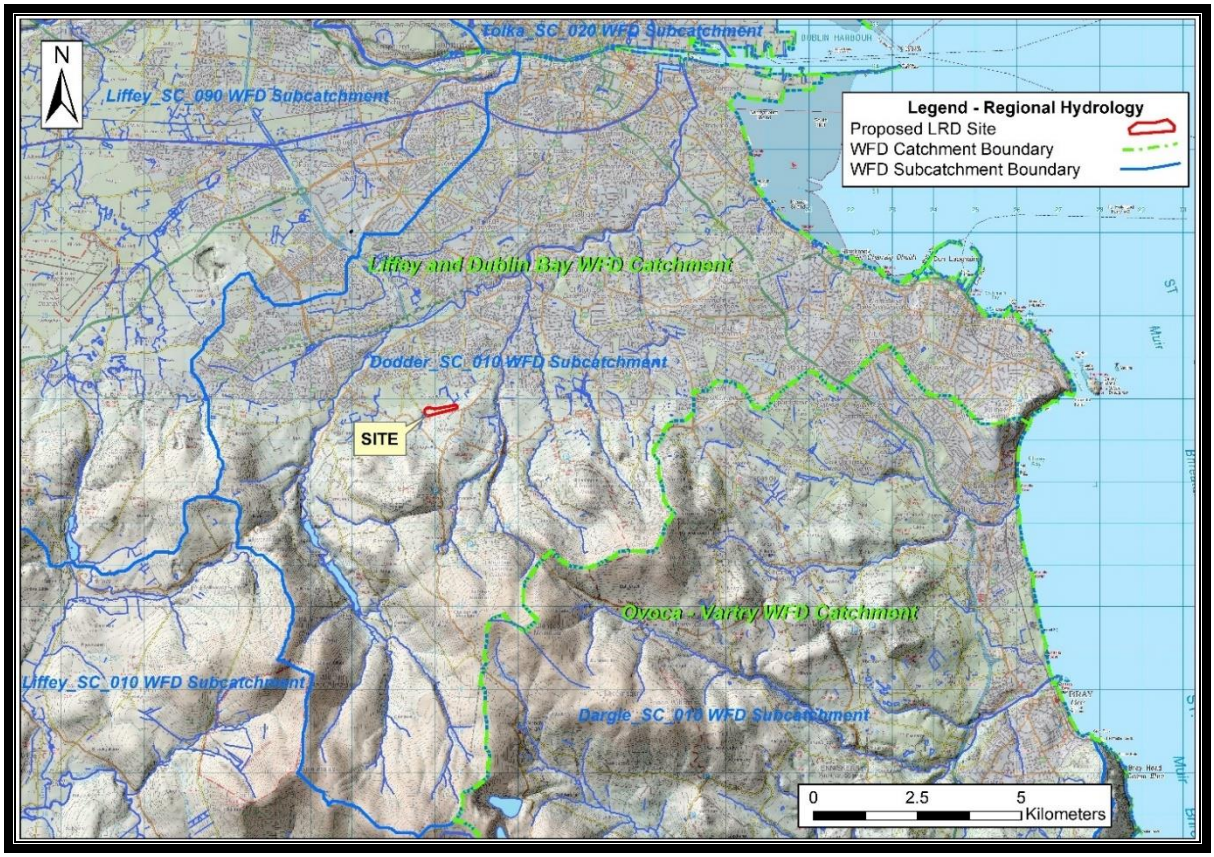


Figure 8.2 Regional Hydrology Map around the proposed LRD Site. Grid squares = 1 km distance (O.S. Licence EN 057925).

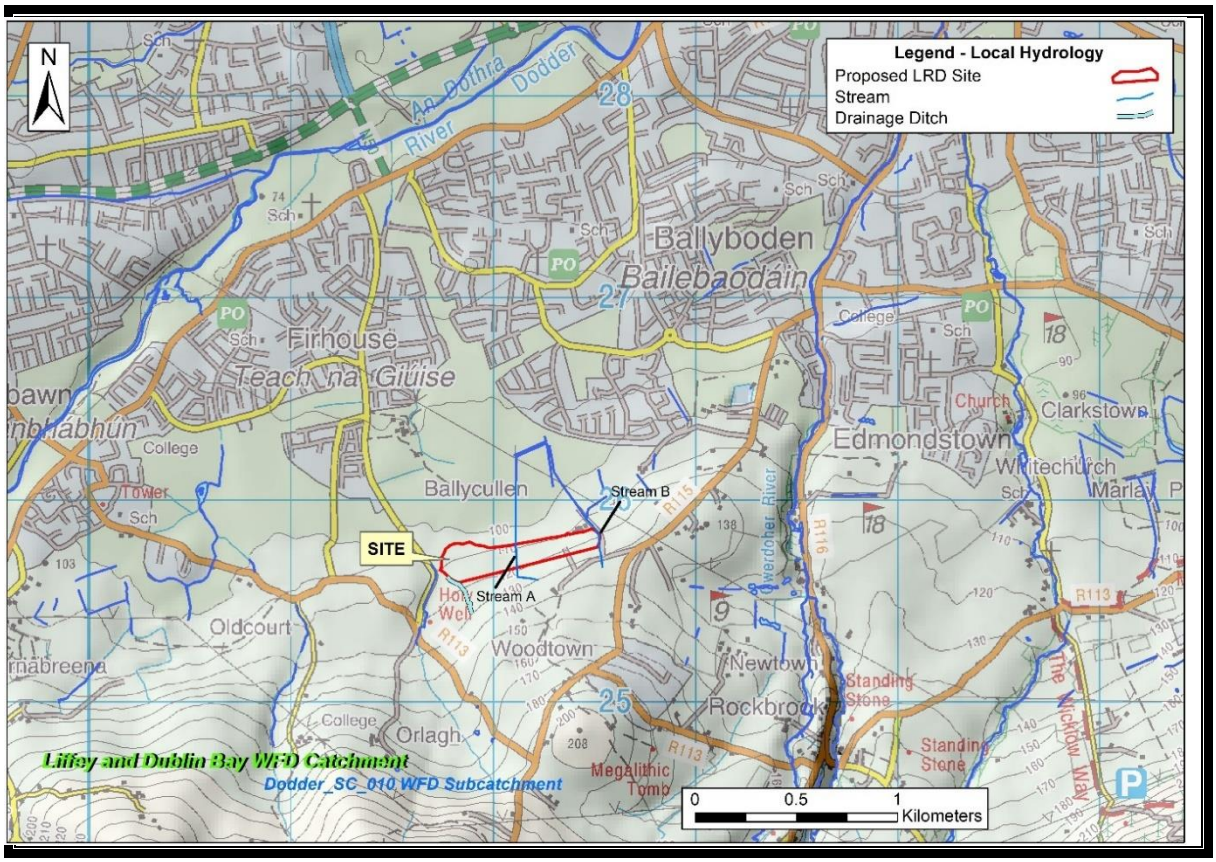


Figure 8.3 Local Hydrology Map around the proposed LRD Site. Grid squares = 1 km distance (O.S. Licence EN 057925).

A local hydrology / Site Drainage map is shown as **Figure 8.3**.

In terms of the detailed hydrological stream characteristics at the proposed LRD Site locality, the larger of the 2 no. tributary streams (referred to as Stream B, see **Figure 8.3**) draining the Site rises to the southeast of the Site and flows in a northerly direction along the eastern boundary of the Site. Approximately one-third of the area of the proposed LRD Site drains overland towards Stream B. The stream exits a culvert at the southeastern corner of the site, and enters one at the northeastern corner, where it begins passage under the Stocking Wood Manor housing development.

The second of the tributary streams (Stream A) flows into the central portion of the site from the south, and then flows northerly through the central portion of the Site before exiting the site and eventually merging with Stream B. The flow in Stream A largely comprises groundwater discharge from a spring along the Woodtown Manor road approximately 200 m to the southeast of the proposed LRD Site.

Both streams flow through channels incised into glacial till subsoil.

Aside from these two streams draining the proposed LRD Site as described above, the stream 40 m west of the Site flowing northwards along the Ballycullen Road is culverted and disappears subsurface at the entrance to the Abotts Grove Park Housing Development, and continues to flow beneath surface through a wide swathe of housing developments and 'Made' ground in Ballycullen, Firhouse and Knocklyon (see **Figure 8.3**).

There are some other short (owing again to subterranean culverting) stream channels to the northeast of the site, as well as further west, and then the two main hydrological conduits in the area are the Owendoher River approximately 1 kilometre to the east, and the River Dodder approximately 1 kilometre to the northwest (**Figure 8.3**).

8.3.4.2 Surface Water Flow Measurements

Given that the site is underlain by non-karstified bedrock (see Section 7.3.5 in Chapter 7 "Land, Soils and Geology"), there is no possibility of losing streams or reaches along any of the surface water courses in the locality.

Flow Monitoring Location (FML) details and flow measurements for Streams A and B are shown in **Table 8.8** below. The FML locations are shown in **Figure 8.4**.

Location	Watercourse	07/11/2024	13/03/2025
		Flow (m^3/s)	Flow (m^3/s)
Flow_Loc_1	Stream A	0.00265	0.00127
Flow_Loc_2	Stream B	0.00112	0.00086
Flow_Loc_3	Stream B	0.00454	0.00271

Table 8.8 Surface Water Flow Monitoring Data for the proposed LRD Project Site

Flows were measured on 2 no. occasions (dates and flows shown in **Table 8.8** above) and all measurements for Stream B show an increase in flow at the downstream location (Flow_Loc_2 to

Flow_Loc_3) which suggests there are no detectable losing reaches along Stream B within the proposed LRD site, as would be expected given the non-calcareous and non-karstic nature of the bedrock geology. Also, as outlined in Chapter 7 "Land, Soils and Geology", Streams A and B are underlain by glacial till subsoil which is of 'Moderate' subsoil permeability, and would thus have a natural barrier preventing any surface water leakage from the stream into the underlying glacial deposits/bedrock aquifer.

The depths to bedrock across the proposed LRD Site as a whole were found to be relatively deep, being a minimum of 0.4 m deep and a maximum of >4.4 m deep. The individual depths to bedrock at the trial pit point localities are shown in **Figure 7.4** of the "Land, Soils and Geology" Chapter 7.

Across the majority of the site, the till subsoil was found to be directly underlain by bedrock described as either schist or shale in the Site Investigation reports. In one trial pit (TP20, 2006) interbedded layers of SAND and GRAVEL were encountered at depth, between 1.3 m and 4.0 m below ground (and just above bedrock).

The till deposits are typically comprised of slightly sandy gravelly CLAY, with some cobbles and boulders. The confirmed depth of glacial tills in grassland areas on the proposed LRD Site are therefore between 0.4 m (TP5, 2006) and > 4.4 m deep (TP6, 2024).

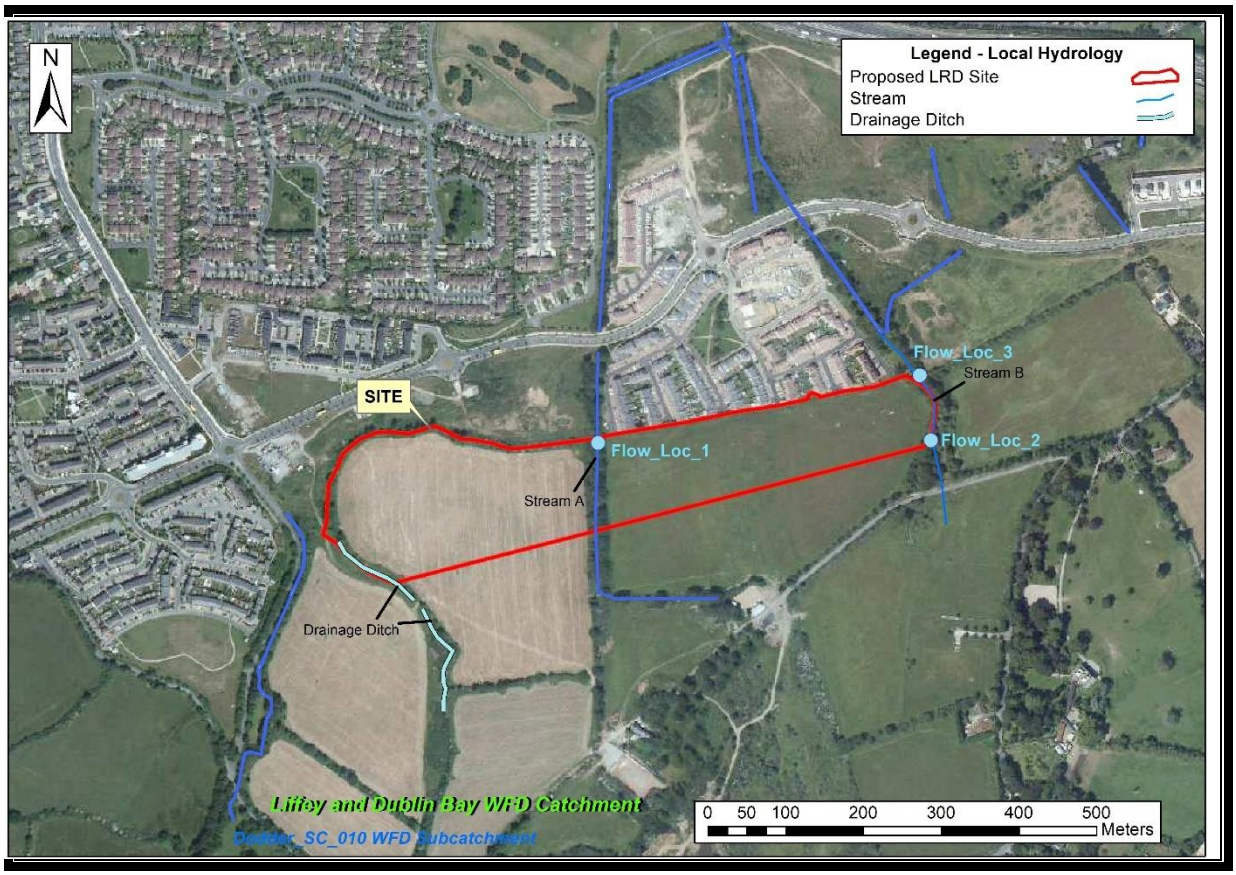


Figure 8.4 Site Drainage Hydrology Map of the proposed LRD Site and it's environs, showing surface water monitoring locations (O.S. Licence EN 057925).

Plate 8.4 Till subsoil exposed along the banks of Stream A, flowing through thew central portion of the proposed LRD site; note again here the complete absence of bedrock outcrop along the channel sides and in the stream base.

8.3.5 Flood Risk Assessment

This section is a summary of a site-specific flood risk assessment (FRA) undertaken for the Site. The full FRA report, completed by Waterman Moylan, is enclosed with this application.

The FRA was carried out at the early design stage of the proposed LRD Project design in order to ensure as much of the proposed infrastructure was placed outside of any potential mapped flood zones.

OPW's River Flood Extents Mapping, National Indicative Fluvial Mapping, Past Flood Event mapping (https://www.floodinfo.ie/map/floodmaps/), historical mapping (i.e. 6" & 25" base maps) and GSI Groundwater/Surface Water Flood Maps were consulted to identify those areas of the Site as being potentially at risk of fluvial, pluvial and surface water flooding. A number of walkover surveys were also conducted as part of the site-specific FRA.

No recurring flood incidents within the Site boundary were identified from OPW's Past Flood Event Mapping (see **Figure 8.5**), and in fact none occur within 2 kilometres of the proposed LRD Site boundary either.

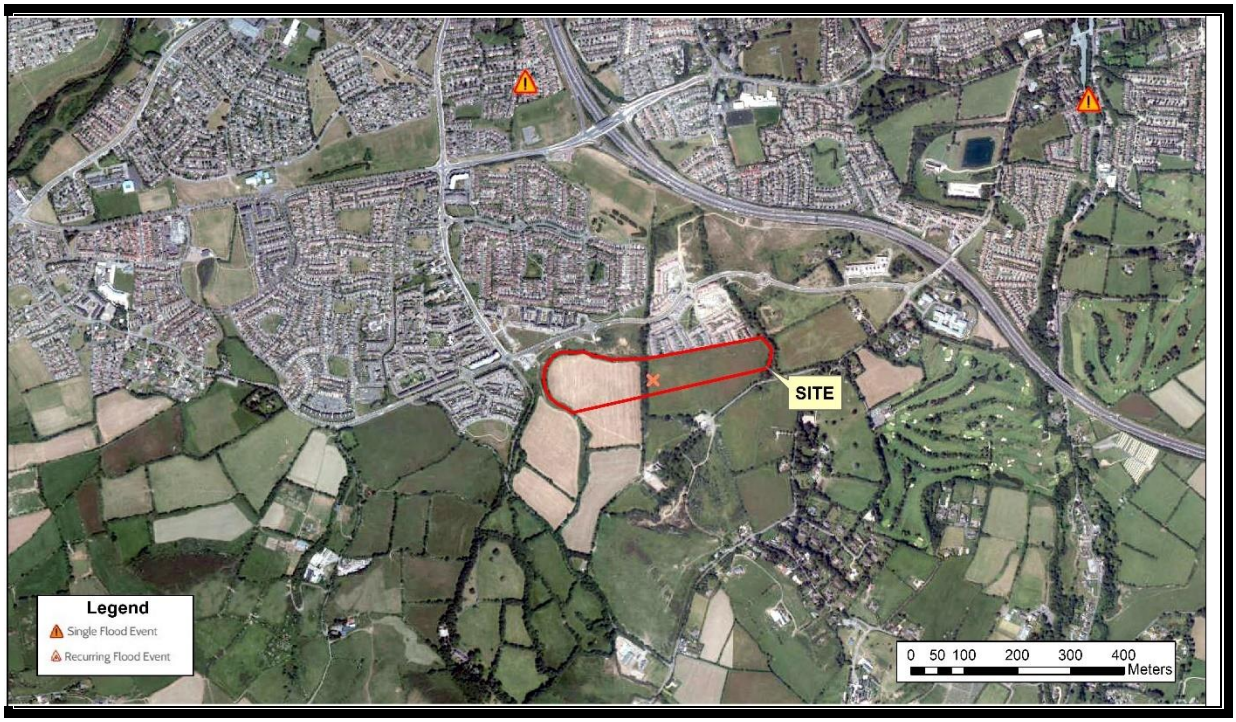


Figure 8.5 OPW Past Flood Event Mapping around the proposed LRD Site (O.S. Licence EN 057925).

The closest mapped flood events are both Single Flood Events, along the Owendoher River approximately 1.5 kilometres to the northeast of the proposed LRD Site, on Edmondstown Road in November 2000, and at Castlefield, Glenvara and Glenlyon, just under 1 kilometre north of the proposed LRD Site, in October 2011.

Figure 8.6 OPW National Indicative Flood Mapping for the region around the proposed LRD Site (O.S. Licence EN 057925).

As stated above, there are no mapped recurring fluvial flood events within 2 kilometres of the proposed LRD Site, and in particular none downstream of the proposed Site along the streams running through it or adjacent to it.

Identifiable map text on local available historical 6" or 25" mapping for the proposed LRD Site area do not identify any lands that are "Liable to Floods".

There is no OPW River Flood Extents Mapping available for the area of the Site and therefore the National Indicative Fluvial Mapping (NIFM) was consulted which has estimated current and future scenario 100-year and 1000-year fluvial flood zones for the streams adjacent to the proposed LRD Site.

Based on the National Indicative Fluvial Mapping (NIFM) as shown in **Figure 8.6** above, there are no 100-year or 1000-year flood zones associated with the environs of the site, and neither are there with any reaches of Streams A or B. The nearest most extensive mapped fluvial flooding zones occur just under 2 kilometres northwest of the site, along the River Dodder in Oldbawn.

Thus, no elements of the proposed development are located inside an NIFM flood zones.

The GSI Groundwater Flood Maps and Winter 2015/2016 Surface Water Flooding Maps have no groundwater flood zones mapped within the confines of or adjacent to the proposed LRD Site either.

All potential vulnerable LRD infrastructure, including all dwelling houses and apartments, all roadways, and all ancillary site works are located above the mapped 1000-year flood level and therefore all this infrastructure is located outside any potential flood zones. This is also expected given the site elevation and topography (see also Chapter 7 "Land, Soils and Geology").

8.3.6 Surface Water Quality

In the presence of pollution, characteristic and well-documented changes are induced in the flora and fauna of surface waters. Particularly well documented are the changes brought about by organic pollution in the macroinvertebrate community i.e., the immature aquatic stages of aerial insects (mayflies, stoneflies, etc.) together with *Crustacea* (e.g., shrimps), *Mollusca* (e.g. snails and bivalves), *Oligochaeta* (worms) and *Hirudinea* (leeches) (EPA, 2005). The changes are due to the varying sensitivities of the different components of the community to the stresses caused by pollution. The EPA scheme of Biotic Indices or Quality (Q) Values uses the macroinvertebrate community structure to rank water quality. The relationship between the Q value, water quality and WFD Status is outlined in **Table 8.9**.

Biotic index	Water quality	WFD status
Q2, Q1-2, Q1	Seriously Polluted	Bad status
Q3, Q2-3	Moderately Polluted	Poor status
Q3-4	Slightly Polluted	Moderate status
Q4	Unpolluted	Good status
Q5, Q4-5	Unpolluted	High status

Table 8.9 Relationship between the Q value, water quality and WFD Status (after EPA, 2005, 2011)

The EPA monitors Q values within the Liffey and Dublin Bay Catchment at 179 monitoring stations. Neither Stream A or Stream B, which pass through the proposed LRD Site, are monitored by the EPA.

EPA Q-rating data (https://www.catchments.ie/data) are available though for the Mount Venus Road Tributary of the Owendoher River (1.2 kilometres southwest of the site) and the River Dodder at Friarstown (2.9 kilometres west-southwest of the site). Both of these sites have 'High' status river waters (Last sampling date was 1991 for both). Moving downstream along both rivers, the Q value reduces to 'Good' along the Owendoher at Edmondstown (sampled 2020), and at Oldbawn on the Dodder (sampled 2022), respectively (see **Figure 8.7** following).

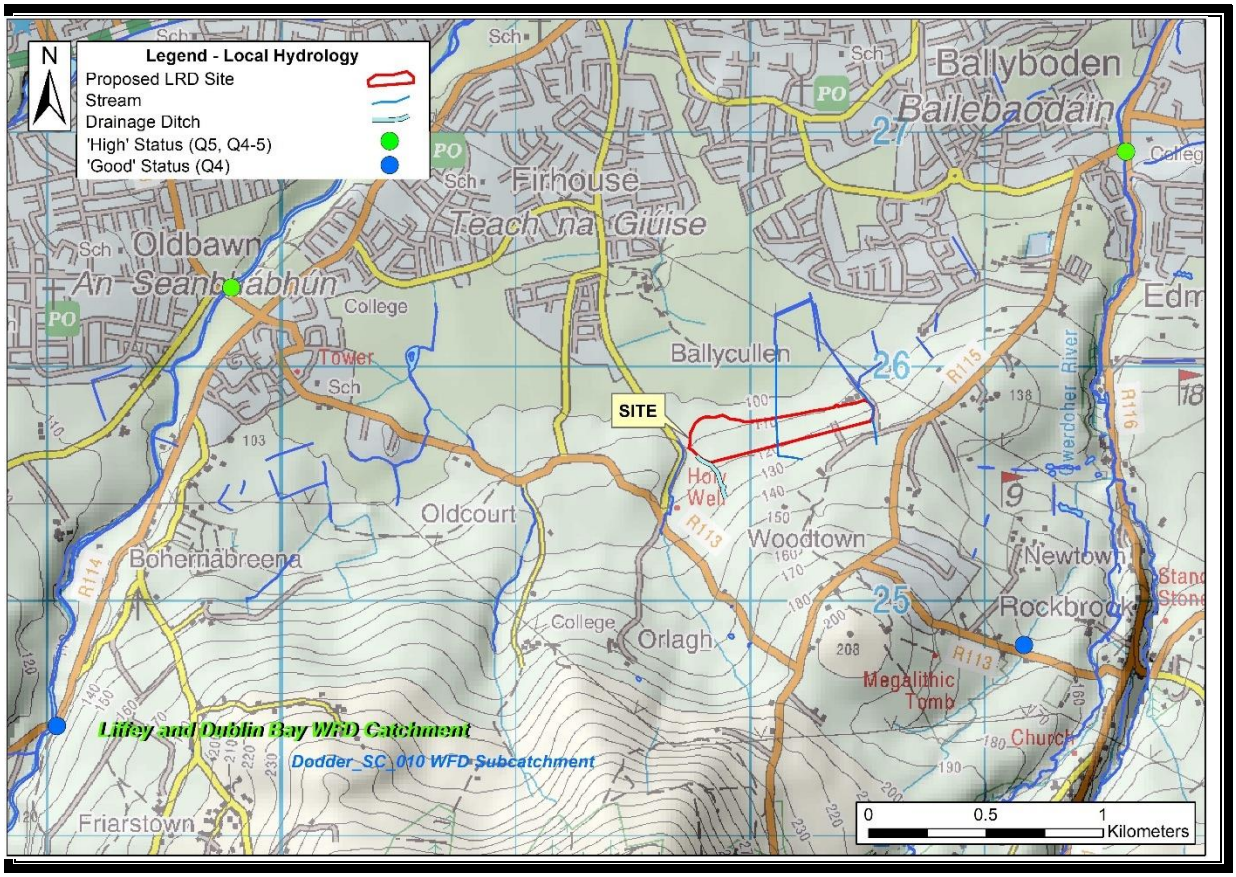


Figure 8.7 Surface water monitoring stations and Q values last recorded (1991 for 'High' status sites, 2020 / 2022 for 'Good' status sites) in the vicinity of the proposed LRD Site (O.S. Licence EN 057925).

8.3.7 Regional and Local Hydrogeology

The bedrock of the Butter Mountain Formation which underlies the Site (see Chapter 7) is classified by the GSI as a Locally Important Bedrock Aquifer – Bedrock that is Moderately Productive only in Local Zones (Ll, see **Figure 8.8**).

Groundwater is defined as water that moves through and is stored within sub-terrain geological strata. The aquifer potential of a bedrock unit is determined by the groundwater productivity, and the productivity is determined based on hydraulic characteristics compiled from borehole data throughout the country. These

impure slate rocks are generally devoid of intergranular permeability. Groundwater flows through fissures, faults, joints and bedding planes.

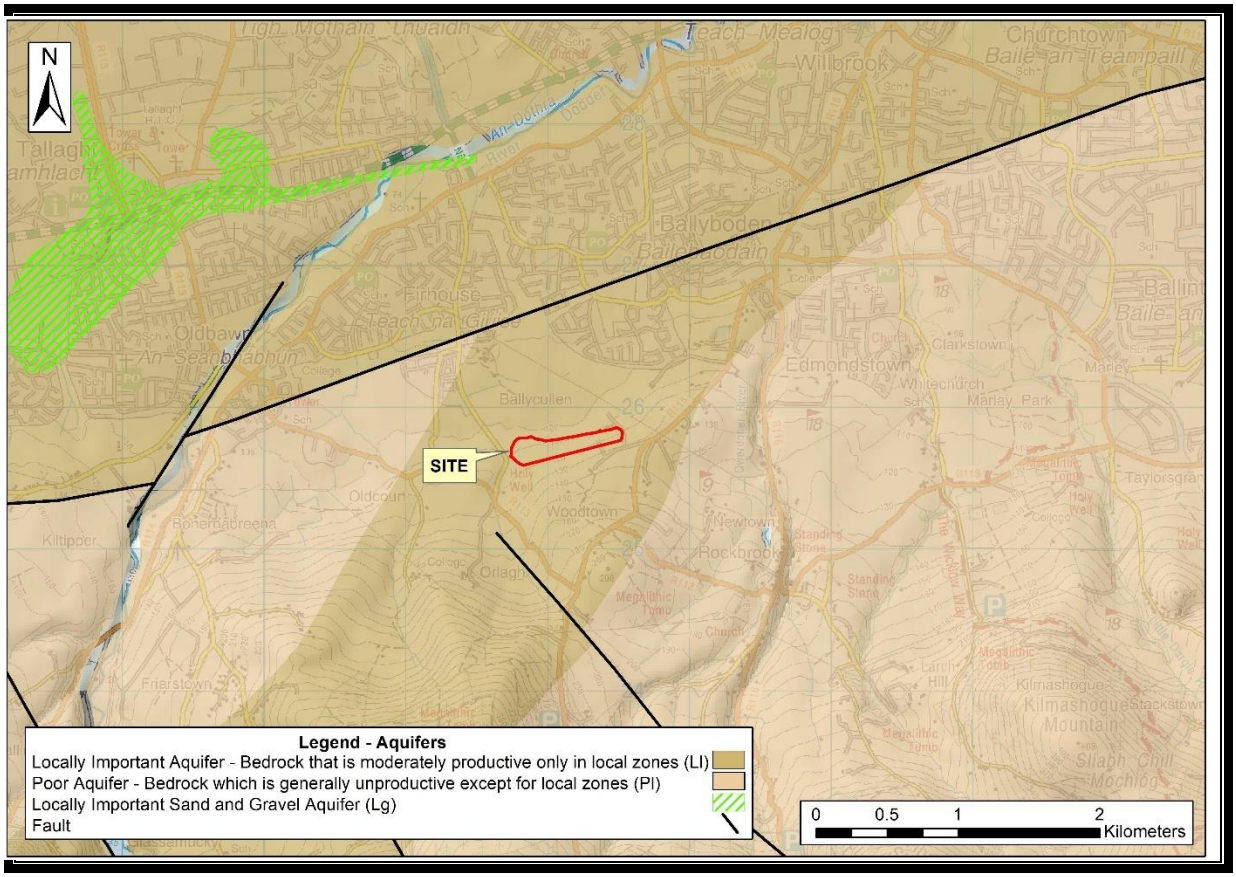


Figure 8.8 Aquifer map of the proposed LRD Site and it's environs (O.S. Licence EN 057925).

An aquifer map was published by the GSI as part of the characterisation of the Eastern River Basin District for the EU Water Framework Directive. The dark blue to grey slates of the Butter Mountain Formation are poorly permeable and relatively unproductive. The aquifer map therefore indicates that the Butter Mountain Formation is classified as a Locally Important Bedrock Aquifer – Bedrock that is Moderately Productive only in Local Zones, which is generally unproductive except for local zones (Ll, see **Figure 8.8**), where a limited and relatively poorly connected network of fractures, fissures and joints exists, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres.

'Karstification' is the process whereby limestone is slowly dissolved away by percolating waters. It most often occurs in the upper bedrock layers and along certain fractures, fissures and joints, at the expense of others. Karstification frequently results in the uneven distribution of permeability through the rock, and the development of distinctive karst landforms at the surface (*e.g*. swallow holes, caves, dry valleys), some of which

provide direct access for recharge/surface water to enter the aquifer. The landscape is characterised by largely underground drainage, with most flow occurring through the more permeable, solutionally-enlarged, interconnected fissure/conduit zones, which may be several kilometres long. Groundwater velocities through fissures/conduits may be high and aquifer storage is frequently low. Groundwater often discharges as large springs (>2,000 m^3/d), which range from regular and dependable to highly variable ('flashy'). There is strong interconnection between surface water and groundwater. The degree of karstification ranges from slight to intense. GSI recognises two types of karst aquifer: those dominated by diffuse flow (Rkd) and those dominated by conduit flow (Rkc). As above, the bedrock aquifer beneath the proposed LRD Site locality is dominated by a poorly developed fracture flow system, and as the Butter Mountain Formation bedrock is non-calcareous, there are no karst features anywhere within several kilometres of the site.

In areas underlain by 'Locally Important' aquifers, groundwater flow directions broadly follow topography. Thus, in the area of the proposed LRD Site, groundwater would flow generally northwards.

The proposed LRD Site is also located in the Kilcullen Groundwater Body (IE_EA_G_003) which has a mapped surface area of 630.49 km^2 (see **Figure 8.9** following).

The bedrock type of the Kilcullen GWB is predominantly either Granites of the Leinster Chain or Silurian or Ordovician Metasediments, the latter which also underlies the proposed LRD Site.

The Groundwater body summary sheet, produced by the GSI for the Kilcullen Groundwater Body, of which the Ballycullen proposed LRD Site forms part, states that there are no large scale abstractions in the area around the site.

The majority of groundwater flow in this aquifer will thus take place in the upper 3 m of the bedrock. This will be lateral flow towards discharge point such rivers and streams. Deeper groundwater flow is possible and deep-water strikes are often encountered (between 10 and 40 m bgl) but they are more isolated features located along open fractures, which allow groundwater flow. Regional groundwater flow paths are not considered to develop, as the rocks do not have sufficient transmissivity to transport water over long distances. Typical groundwater flow paths will be in the order of a couple of hundred metres, with discharge occurring to the closest surface water feature.

Overall, groundwater flow directions within the GWB are reported to be towards the north, with all groundwater flowing towards and discharging to the River Liffey (GSI, 2004).

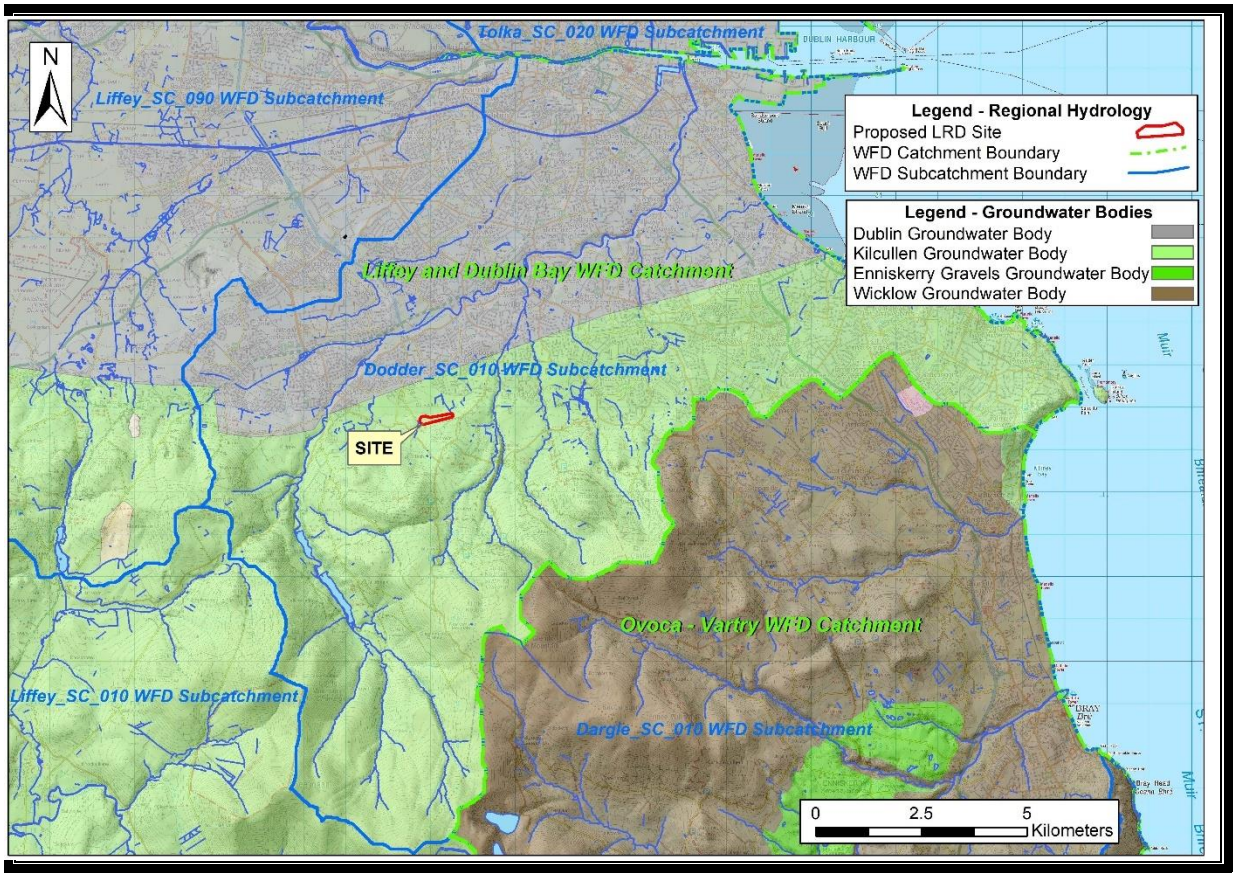


Figure 8.9 Groundwater Bodies (GWBs) around the proposed LRD Site, with surface water catchments and subcatchments also shown (O.S. Licence EN 057925).

Diffuse recharge occurs over the GWB via rainfall percolating through the permeable subsoil, and this type of recharge is dominant in this GWB.

There are no GSI mapped groundwater Source Protection Areas (SPAs) within 3 kilometres of the Site relating to Group Water Scheme (GWS) or Public Water Supply (PWS) sources.

It is also worth noting that the overall surface water drainage pattern of stream A and Stream B flowing through and/or within the proposed LRD Site, and in the general area of the site, is in a northerly direction.

8.3.8 Site Hydrogeology

8.3.8.1 Introduction

Refer to the Land, Soils, and Geology (Chapter 7) for more comprehensive information relating to the intrusive site investigations conducted at the Site.

In order to determine the full geological profile (soil, subsoil and bedrock) at the proposed LRD Site, extensive ground investigations were carried out in September 2006 and February 2024 to determine the geological and hydrogeological setting of the proposed LRD Site.

A total of 26 no. deep trial pits excavated inside the proposed LRD Site boundary, and 2 no. excavated just outside of it at the southeast, to determine the thickness and geomorphology of mineral subsoils overlying the Site. Of these, 20 no. trial pits were dug in 2006, with a further 8 no. in 2024.

Figure 8.10 Location of trial pits excavated across the proposed LRD Site area.

Trial pit logs are attached as Appendix 7-1 in the "Land, Soils and Geology" Chapter, and the locations of the investigation points are shown on **Figures 10** and **11**. Refer to **Table 10** for a summary of the investigation trial pitting.

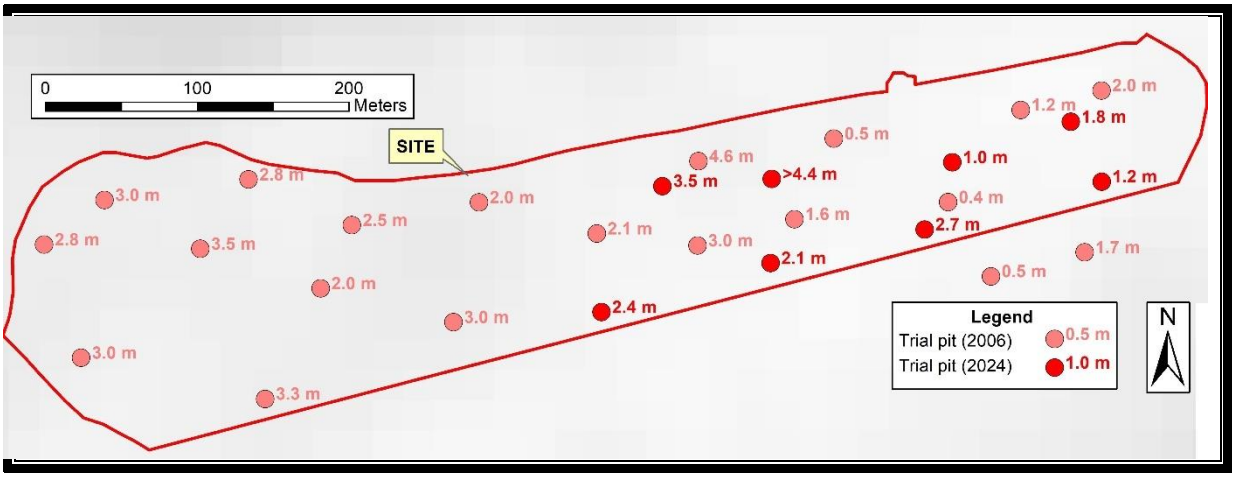


Figure 8.11 Point depths to bedrock at trial pit localities excavated across the proposed LRD Site area.

8.3.8.2 Site Investigation Summary

Bedrock was confirmed in 27 of the 28 trial pits excavated on the site.

Water table was met in one trial hole excavated during infiltration testing at the site, in the western extreme of the site (Trinity Green, 2020). The water level was at 1.4 m bgl and mottling was observed above this to 1.0 m depth below ground. Trinity Green considered that this was a localised, perched water table. 'Trickles' of water were also met in two trial holes at the eastern extreme of the site (Waterman Moylan, 2024). As both of these localities are relatively low-lying and close to expected discharge zones near watercourses, this is expected. It is also expected that water might be perched above the bedrock in the winter time, given the 'Poor' Aquifer status of the bedrock beneath the site (see Section 8.3.7 above). The depths to bedrock across the proposed LRD Site as a whole were found to be relatively deep, being a minimum of 0.4 m deep but a maximum of >4.4 m deep. The individual depths to bedrock at the trial pit point localities are shown in **Figure 8.11**.

Across the majority of the site, the till subsoil was found to be directly underlain by bedrock described as either schist or shale in the Site Investigation reports. In one trial pit (TP20, 2006) interbedded layers of SAND and GRAVEL were encountered at depth, between 1.3 m and 4.0 m below ground (and just above bedrock).

The till deposits are typically comprised of slightly sandy gravelly CLAY, with some cobbles and boulders (**Table 8.5**).

The confirmed depth of glacial tills in grassland areas on the proposed LRD Site are therefore between 0.4 m (TP5, 2006) and > 4.4 m deep (TP6, 2024). In contouring the depths to bedrock, the subsoil depths deepen generally westwards across the proposed LRD Site, and there does seem to be a bedrock 'high' where bedrock is generally close to the surface in the east central portion of the site (**Figure 8.12**). This bedrock deepens rapidly to deep depth of over 4 m in the east central portion of the site (**Figure 8.12**).

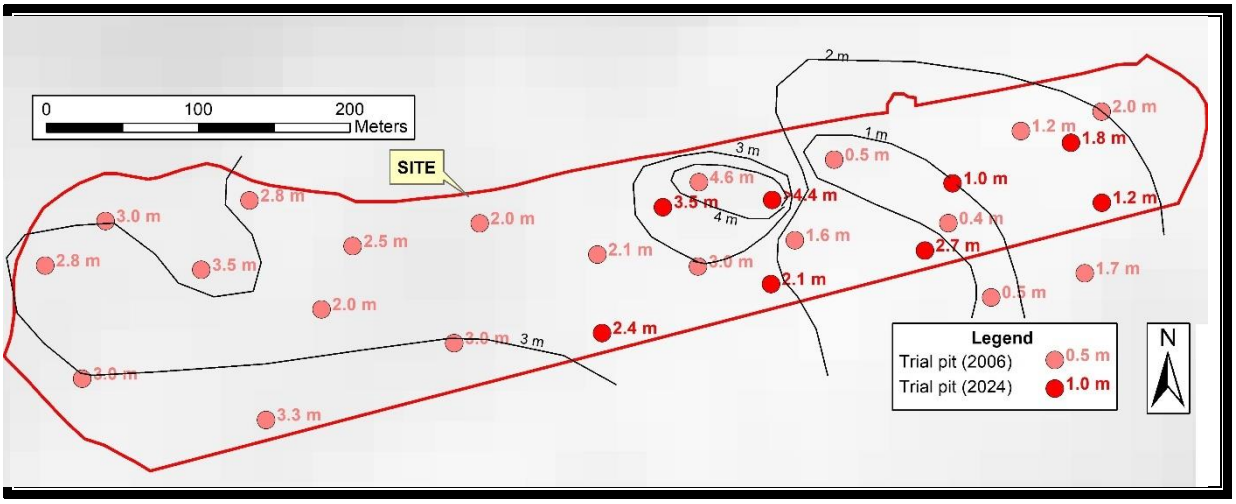


Figure 8.12 Interpreted depth to bedrock contour map across the proposed LRD Site area.

As the proposed LRD Site is entirely underlain by mineral subsoil, no peat probing to determine peat thickness or morphology / composition was required to be carried out across the site.

All depths to bedrock have been considered in the proposed finished floor levels, and associated cut and fill element for site preparation, across the site, and the deepest areas of cut, in the east central, north central and southwestern portions of the site (4.846 m bgl, 3.148 m bgl and 2.198 m bgl) have all been sited in the localities with the deepest soil and subsoil above bedrock (see detail in accompanying sheets of Cut and Fill Analysis by Waterman Moylan). Thus, it is envisaged that minimal elements of excavation to and into the bedrock substrate will be completed during construction works on the site.

No drilling was undertaken on the site to characterise the subsurface deep substrate, as all of the proposed houses and apartments on the LRD site will be constructed at a shallow depth only, and no cut and fill will be completed below depths of 5 m below ground level.

As can be seen from the trial pit results (**Table 8.10** following), there is no recorded confining layer between the glacial till deposits and the underlying weathered bedrock/competent bedrock layers. As such the interpretation is that the bedrock and glacial till deposits are connected, albeit that connection is somewhat limited by the moderate permeability characteristics recorded in the glacial till deposits.

Location	Date excavated	Depth of trial pit (m)	Depth to bedrock (m)	Glacial till thickness (m)	Glacial till description
TP1	21st September 2006	2.20	2.00	2.00	slightly sandy silty gravelly CLAY
TP2	21st September 2006	2.00	1.70	1.70	slightly sandy silty gravelly CLAY
TP3	21st September 2006	1.90	1.20	1.20	slightly sandy gravelly CLAY
TP4	21st September 2006	1.50	0.50	0.50	slightly sandy gravelly CLAY/SILT
TP5	21st September 2006	0.90	0.40	0.40	sandy gravelly SILT
TP6	21st September 2006	1.40	0.50	0.50	sandy CLAY
TP7	21st September 2006	2.00	1.60	1.60	sandy gravelly CLAY
TP8	21st September 2006	3.90	3.00	3.00	slightly sandy silty gravelly CLAY
TP9	21st September 2006	4.90	4.60	4.60	slightly sandy silty gravelly CLAY
TP10	21st September 2006	3.30	2.10	2.10	slightly sandy gravelly CLAY
TP11	21st September 2006	3.70	2.00	2.00	sandy gravelly CLAY
TP12	21st September 2006	3.40	3.00	3.00	slightly sandy gravelly CLAY
TP13	21st September 2006	3.80	2.50	2.50	sandy gravelly CLAY
TP14	21st September 2006	3.00	2.00	2.00	slightly sandy gravelly CLAY
TP15	21st September 2006	3.80	3.30	3.30	sandy gravelly CLAY
TP16	21st September 2006	3.80	3.50	3.50	slightly sandy gravelly CLAY
TP17	21st September 2006	3.50	2.80	2.80	sandy gravelly CLAY
TP18	21st September 2006	3.50	3.00	3.00	sandy gravelly CLAY
TP19	21st September 2006	3.50	3.00	3.00	slightly sandy slightly gravelly CLAY
TP20	21st September 2006	4.00	2.80	1.30	sandy gravelly CLAY over SAND/GRAVEL
TP1 ('24)	16th February 2024	3.60	1.20	1.20	No description given
TP2 ('24)	16th February 2024	2.00	1.80	1.80	No description given
TP3 ('24)	16th February 2024	1.10	1.00	1.00	No description given
TP4 ('24)	16th February 2024	3.10	2.70	2.70	No description given
TP5 ('24)	16th February 2024	2.60	2.10	2.10	No description given
TP6 ('24)	16th February 2024	4.40	>4.40	>4.40	No description given
TP7 ('24)	16th February 2024	3.80	3.50	3.50	No description given
TP8 ('24)	16th February 2024	2.80	2.40	2.40	No description given

Table 8.10 Summary depth to bedrock and subsoil data from trial pitting across the proposed LRD Site

Given that all trial pits on the site were backfilled following excavation, no medium or long-term groundwater level monitoring was carried out on the site. As all trial pits were dry, excepting the locality with the perched water unit in the western extreme of the site, it is assumed that groundwater levels are generally at depths below 3 m – 4 m across the entire proposed LRD Site area.

8.3.8.3 Groundwater Levels and Flows

Given that the depths to groundwater table across the site are all well below the level of foundations / cuttings / incisions in to the subsurface on the site, and as the potential impacts of the proposed LRD development on the groundwater in the locality will be low, no groundwater level monitoring network was established at the site.

Nonetheless, information determined by the intrusive investigations across the site, and known, on groundwater levels and flows, can ne summarise as follows:

- Any perched water levels within the till subsoils are isolated from the underlying, deep groundwater system;
- There is a low density of manmade drains and natural watercourses draining the ground surface of the proposed LRD Site;
- There are significant depths of overburden (glacial tills) recorded above the bedrock across the majority of the proposed LRD site;

- Groundwater levels below the subsoils and below the grassland areas remain at depth throughout the year; and,
- There is no significant underground drainage occurring because of the absence of karstified bedrock.

In addition, this indicates that there is substantive recharge/vertical groundwater flow from the glacial deposits down into the underlying bedrock aquifer at the proposed LRD site. This is also confirmed by the low stream density and man-made drainage density at the Site. The general absence of these implies there is no need to drain surface water, as it can recharge/drain readily to the underlying locally important groundwater system.

Therefore, the majority (60% based on GSI recharge rates) of the rainfall that infiltrates into the glacial tills at the site is more likely to move laterally at depth and discharge into the local streams that flow through the proposed LRD Site (i.e. Streams A and B) having recharged vertically into the underlying bedrock aquifer.

8.3.9 Groundwater Vulnerability

Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability category is based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. The permeability and thickness of the subsoil, which influence the attenuation capacity of subsoil, are important aspects in determining the vulnerability of groundwater.

A groundwater protection scheme has been completed at a scale of 1:40,000 for South County Dublin by Geological Survey Ireland, and the groundwater vulnerability of the area around the proposed LRD Site has been determined on a precise empirical basis.

With respect to depth-to-bedrock, the proposed LRD Site is situated in an area where bedrock is mapped as being greater than 3 m and less than 5 m from the land surface, while the depth to bedrock is interpreted to increase towards the north into the lowlands. Thus, the depth-to-bedrock at the proposed LRD Site is interpreted to be at least 3 m thick by the GSI, increasing to 5 m and eventually to 10 m at the western extremity of the site. With such a depth-to-bedrock, the groundwater vulnerability is interpreted to range from 'High' to 'Low' (**Figure 8.13)**. Given the depths to bedrock encountered across the site during the Site Investigations (Trinity Green, 2020; Waterman Moylan, 2024) , this vulnerability rises to 'Extreme' or 'High' in a site-specific scale. Hence the design of the proposed LRD ensures no deep excavations into the bedrock across the site.

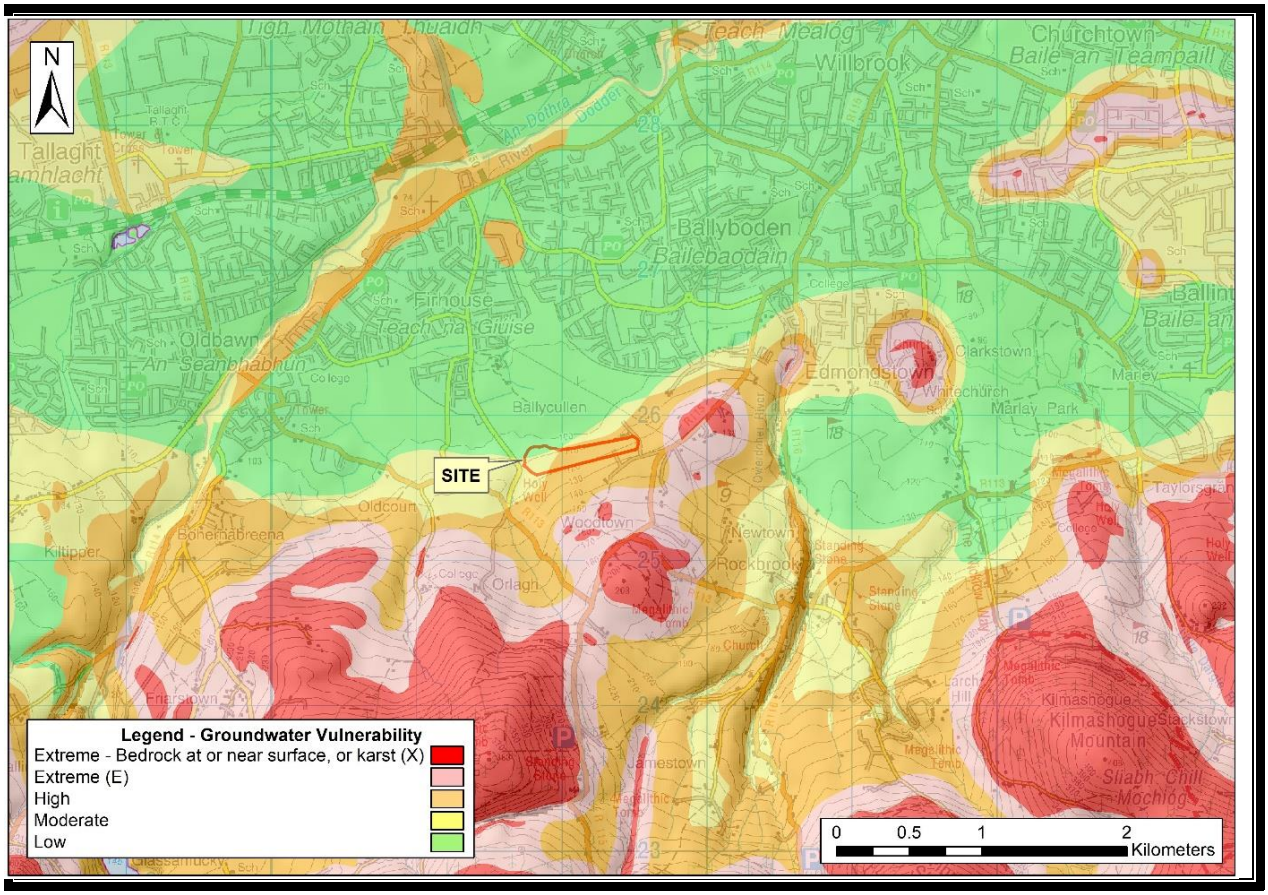


Figure 8.13 Groundwater Vulnerability map of the site and its environs (after www.gsi.ie)

8.3.10 Groundwater Quality Hydrochemistry

No groundwater sampling was carried out anywhere within the site confines, as the proposed development will all be sited above, and will not affect, the groundwater table beneath the site.

8.3.11 Groundwater Body and Status

The descriptions of groundwater bodies throughout Ireland are available from the GSI website: www.gsi.ie and the 'status' is obtained from the EPA Catchments / Water Framework Directive website: www.catchments.ie.

The subject site and the surrounding localities are located within the Kilcullen Groundwater Body which is categorised at 'Good Status' by the EPA, which is defined based on the quantitative status and chemical status of the GWB. The assigned risk status (WFD 3rd Cycle) is 'At Risk'. The main groundwater pressures are reportedly due to agriculture and other anthropogenic pressures.

8.3.12 River Water Body Status, and Risk

The Local River and Stream Waterbody status and WFD risk classification are available from (www.catchments.ie) and are summarised in **Table 8.11** below. These risk classifications are also shown on **Figure 8.13** following.

European Code	SWB Name	Ecological Status	Overall Status	Risk Status	Pressure Category
IE_EA_09D010620	Dodder_040	Moderate	Moderate	At Risk	Hydromorphology

Table 8.11 River Waterbody Status and Risk near the proposed LRD Site

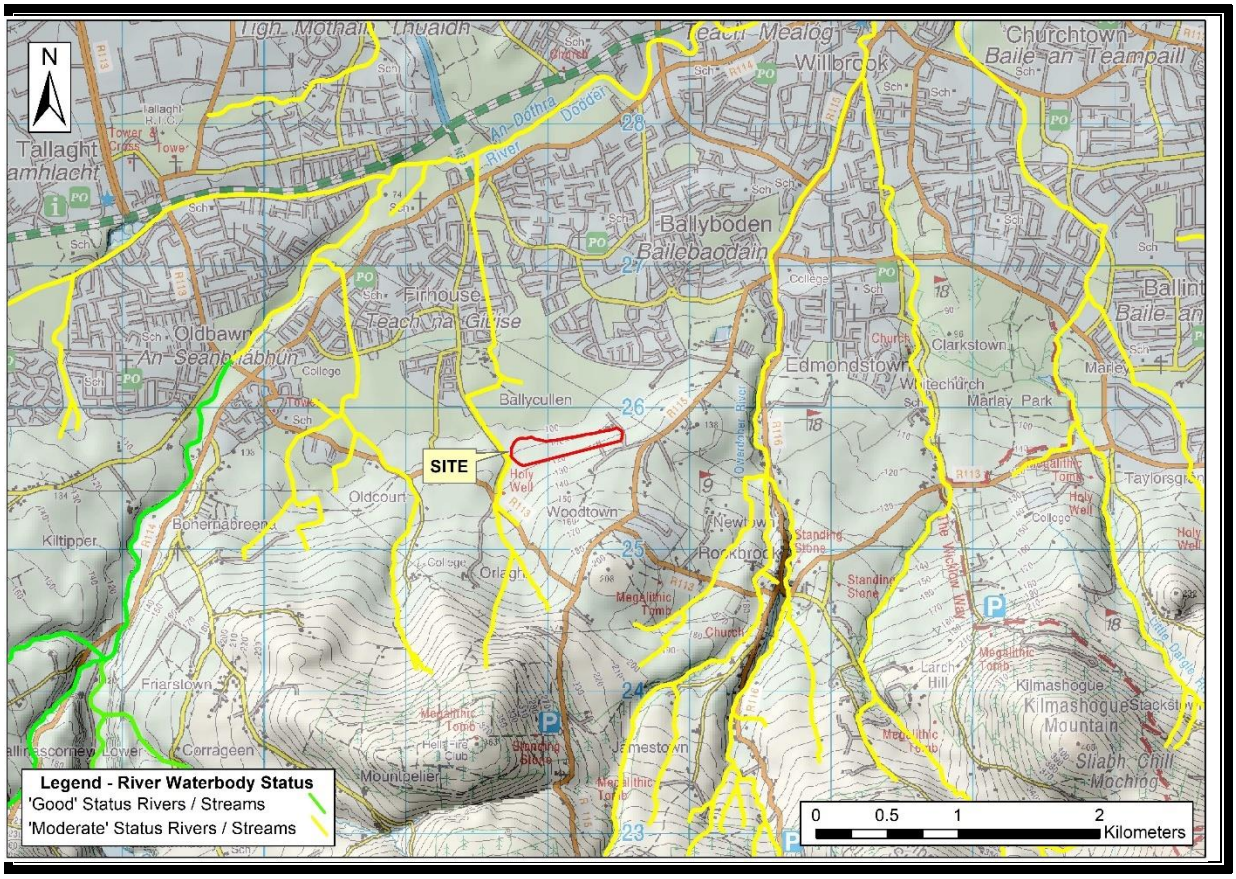


Figure 8.14 River Waterbody Status around the proposed LRD Site (after www.epa.ie). Note that only the culverted stream at the western end of the site is included in the EPA's Monitoring Programme for the locality / area, and the streams flowing through the site (Streams A and B of Figure 4) are not monitored by the EPA.

Table 8.11 and **Figure 8.14** above gives summary details of the river waterbodies in which the Proposed LRD Site are directly located.

The proposed LRD Site is wholly located within the Dodder_040 sub-basin.

In terms of Surface Waterbody River Risk Status, the majority of the rivers and streams around the site are 'At Risk', with only the Dodder itself and some of It's tributaries 'Not at Risk' or under 'Review' (see **Figure 8.15** following).

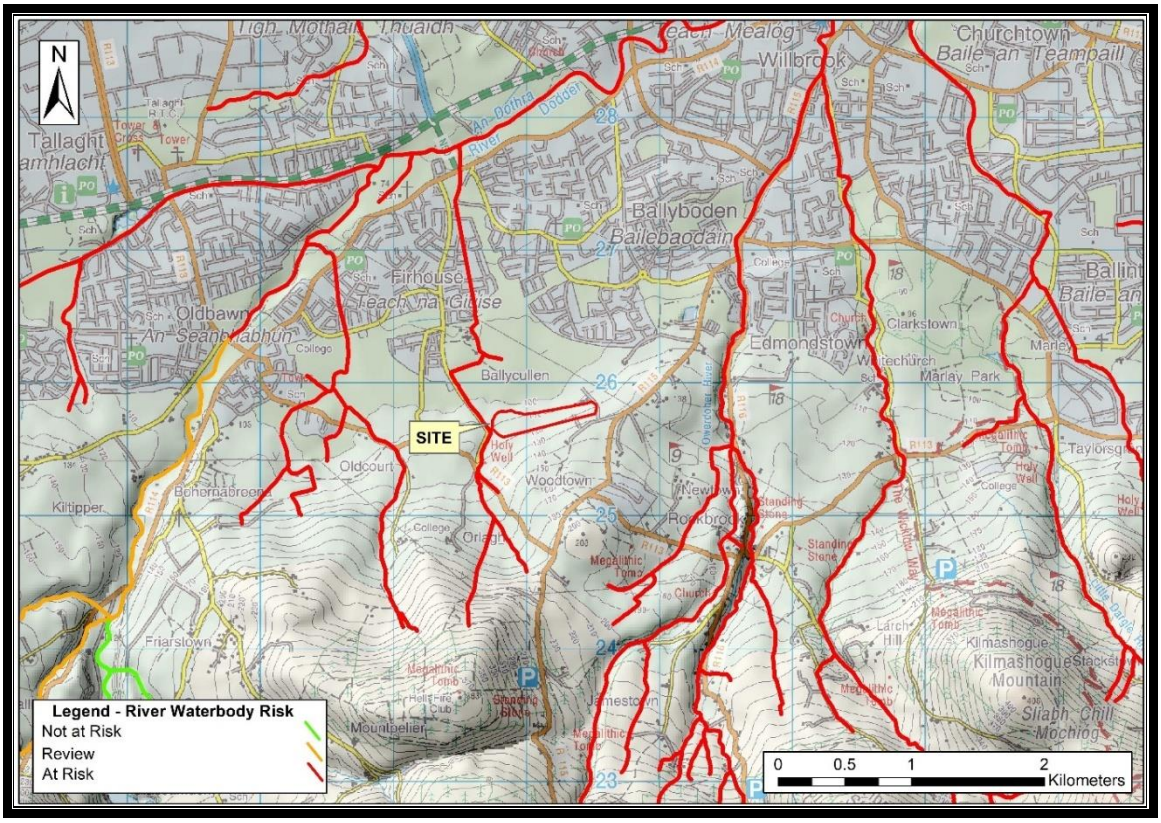


Figure 8.15 River Waterbody Risk around the proposed LRD Site (after www.epa.ie). Note again that only the culverted stream at the western end of the site is included in the EPA's Monitoring Programme for the locality / area, and the streams flowing through the site (Streams A and B of Figure 4) are not monitored by the EPA.

8.3.13 Designated Sites and Habitats

As iterated in Chapter 7 "Land, Soils and Geology", under the Irish legal framework specified habitats and species, and areas which contribute surface water or groundwater resources to drinking water, are given various levels of protection to maintain both healthy and sustainable ecosystems and drinking water. These include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs) (see **Figure 8.16** following).

The closest designated site to the proposed LRD Site is the Wicklow Mountains SPA which is just under 4 kilometres southeast of the site, and on higher ground there.

The Proposed Natural Heritage Areas of the Dodder Valley and the Glenasmole Valley occur just over 1.75 kilometres northwest and 3 kilometres west-southwest of the proposed LRD Site respectively.

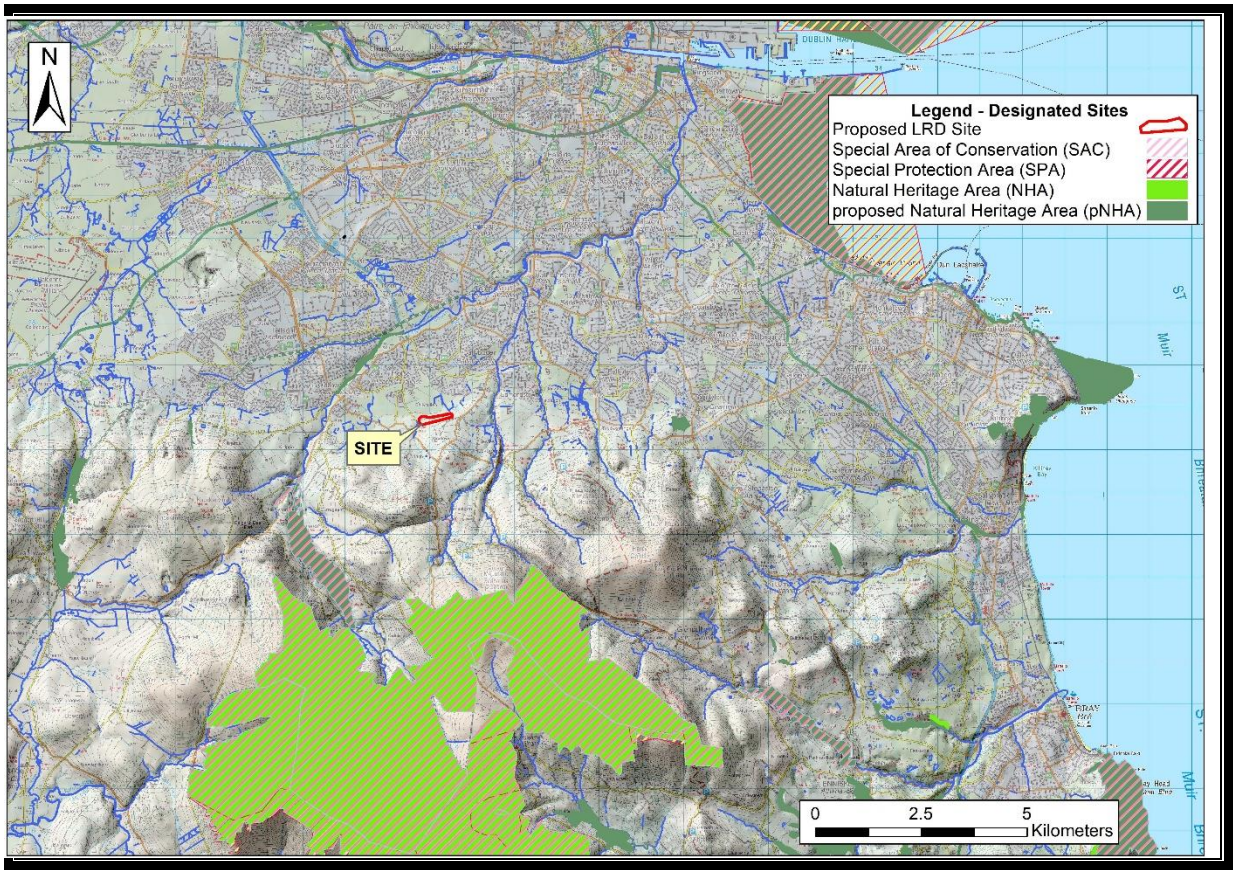


Figure 8.16 Designated Sites around the proposed LRD Site (datasets downloaded from www.npws.ie)

8.3.14 Water Resources

8.3.14.1 Public / Group Water Schemes

Public supply mains water supplies all of the area around the proposed LRD Site (see **Figure 8.17** following), and will also supply water to the Site.

There are no GSI mapped groundwater Source Protection Areas (SPAs) within 15km of the proposed LRD site relating to Group Water Scheme (GWS) or Public Water Supply (PWS) sources.

8.3.14.2 Private / Domestic Wells

A search of private well locations on GSI well database (www.gsi.ie) reveal no mapped private wells within 3 km of the Site.

In order to be conservative and following the worst case assumptions, it has been assumed that all dwellings in the surrounding lands not supplied by Mains Water have a private groundwater well. A number of private dwelling houses were identified along the local roads to the southeast and east of the proposed LRD Site (generally in the area to the south that is outside the area identified in **Figure 8.17** as being supplied by Public Supply Mains water, and is also up-gradient with respect to groundwater flow).

A field-scale assessment of private wells in the lands surrounding the Site has been completed and the closest well is approx. 150m south of (and up-gradient of) the proposed LRD Site.

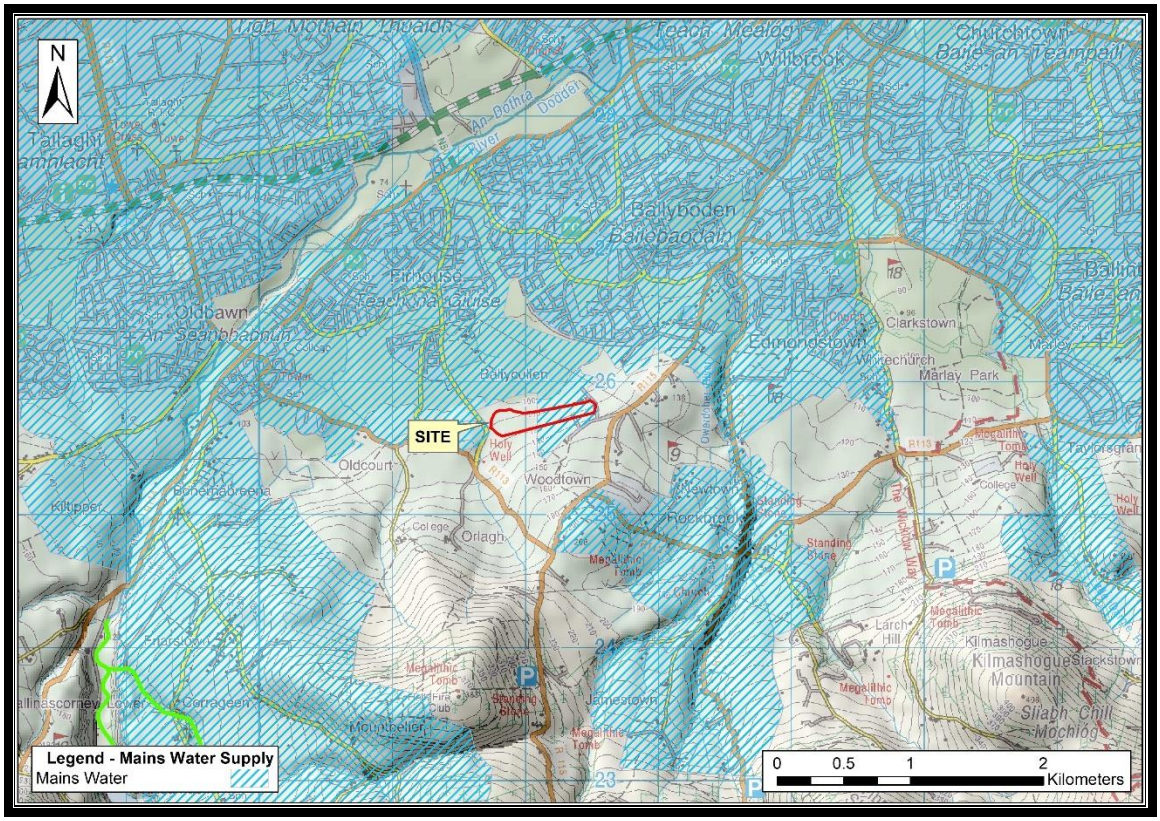


Figure 8.17 Areas supplied by Public Supply Mains water in the vicinity of the proposed LRD Site. Note that there are no Source Protection Zones or Zones of Contribution to groundwater wells or springs in the area of the map; neither are there any surface water Drinking Water Protected Areas.

8.3.14.3 Surface Water Resources

There are no river waterbodies in the vicinity of the proposed LRD Site which are identified as Drinking Water Protected Areas (DWPAs).

8.3.15 Receptor Sensitivity

Due to the nature of proposed LRD developments being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the Site would be from hydrocarbon spillage and leakages into excavations.

These are common potential impacts to all construction sites (such as road works and industrial sites). These potential contamination sources are to be carefully managed at the Site during the construction and operational phases of the development and mitigation measures are proposed below to deal with these potential minor impacts.

It is acknowledged that the Site is underlain by a Locally Important Aquifer, and the groundwater vulnerability rating of the Site ranges from Low to High. This is because the majority of the Site is covered by moderate permeability subsoil which is at least 3m thick. Thus, the relatively deep glacial deposits act as a protective cover to the underlying aquifer.

Any contaminants which may be accidentally released on-site are more likely to travel to nearby streams within surface runoff. The deep and moderate permeability of the glacial deposits means contaminants are unlikely to reach the bedrock and will instead disperse with the glacial deposits and would remain localised to the source or would be removed as runoff during wet periods.

The EIAR acknowledges that there are no sensitive water supply sources within the vicinity of the site. Furthermore, there are no hydraulic pathways between the Site and any Public Water Supply or Group Scheme Sources, or domestic wells (none occur down-gradient).

Mitigation measures will ensure that surface runoff from the developed areas of the Site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies. Any introduced drainage works at the Site will mimic the existing hydrological regime thereby avoiding changes to flow volumes leaving the Site.

The large setback distance from sensitive hydrological features means they will not be impacted by excavations/drains etc. It also allows adequate room for the proposed drainage mitigation measures (discussed below) to be properly installed up-gradient of primary drainage features. This will allow attenuation of surface runoff to be more effective.

8.4 CHARACTERISTICS OF THE PROPOSED PROJECT

The proposed LRD Project construction will mainly involve removal of soils and mineral subsoils for access roads, underground cabling and pipework, hardstanding areas, house, duplex and simplex foundations, a construction compound and drainage works. Crushed rock for construction purposes will be sourced off-site from nearby commercial quarries.

The main characteristics of the proposed LRD Site could impact on hydrology and hydrogeology are the excavation of foundations and the ‘cut and fill’ sequence across the site.

Welfare facilities will be provided at the proposed LRD Site, along with a temporary construction compound.

8.4.1 Proposed Drainage Management

Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the proposed LRD Site. The first method involves ‘keeping clean water clean’ by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, construction areas and temporary storage areas.

The second method involves collecting any drainage waters from works areas within the proposed LRD Site that might carry silt or sediment, and nutrients, to route them towards stilling ponds prior to controlled diffuse release over vegetated surfaces. There will be no direct discharges to surface waters.

During the construction phase all runoff from works areas (i.e. dirty water) will be attenuated and treated to a high quality prior to being released.

Due to the high to low groundwater vulnerability rating of the Site, and the absence of extensive areas of 'Extreme' groundwater vulnerability, and the poor surface water and bedrock aquifer interaction, no special design requirements are needed to prevent the ingress of surface water drainage into the groundwater system.

It is vital that there is no deterioration in water quality in the streams that occur within the application site. This will protect both habitats and species that are sensitive to pollution. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the construction process should be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses. Guidelines in the following best practice documents should be adhered to:

- Construction Industry Research and Information Association (CIRIA) (2005) Environmental Good Practice on Site (C692)
- Construction Industry Research and Information Association (2001) Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532)
- Construction Industry Research and Information Association (2000) Environmental Handbook for Building and Civil Engineering Projects (C512)
- Environmental Protection Agency (2015) List of Waste and Determining if Waste is Hazardous or Non-Hazardous
- Environment Agency et al. (2015) Guidance on the Classification and Assessment of Waste, Technical Guidance
- Environmental Protection Agency (2013) Guidance (and Templates) on the Management of Contaminated Land and Groundwater at EPA Licensed Site
- Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR11).
- All relevant guidelines within the document Inland Fisheries Ireland Requirements for the Protection of Fisheries Habitats during Construction and Development Works and River Sites (www.fisheriesireland.ie) and the updated guidelines entitled Guidelines on Protection of Fisheries

During Construction Works in And Adjacent to Waters (2016) should also be adhered to and they include.

- The construction team must implement the following specific mitigation measures, and these measures should be incorporated into a Construction and Environment Management Plan. This CEMP must include measures to prevent the release of hydrocarbons, aggregates, polluting chemicals, sediment and silt and contaminated waters into water course on-site.
- Surface waters from the construction site should be managed using a system of temporary on-site attenuation features, and these should be fitted with silt barrier devices.
- Silt fences and berms should be installed prior to the commencement of construction on site. These should be set back at a minimum of 10m from the streams on site. As the streams within the application site are associated with existing treelines and woodland habitats, the silt fences could be incorporated

into the protective fencing that is required for the woodland habitats. The silt fences should be sturdy and constructed of a suitable geotextile membrane to ensure that water can pass through, but that silt will be retained. An interceptor trench will be required in front of this interceptor fence. The silt fence must be capable of preventing particles of 425 µm from passing though.

- The silt fences should be monitored daily to ensure that they remain functional throughout the construction of the proposed development. Maintenance of the fences should be carried out regularly.
- Fences should be inspected thoroughly after periods of heavy rainfall.

Discharge water generated during laying of concrete should be removed off site for treatment and disposal.

The following pollution control measures must also be employed on site:

- A dedicated re-fuelling location must be established on site, and this must be situated away from any watercourses on site.
- Spill kits stations must be provided at the fuelling location for the duration of the works.
- Staff must be provided with training on spill control and the use of spill kits.
- All fuel storage containers must be appropriately bunded, roofed and protected from vehicle movements.
- These bunds will provide added protection in the event of a flood event on site.
- All chemicals must be stored as per manufacturer's instructions. A dedicated chemical bund will be provided on site.
- Storage of fuel, and servicing and refuelling of equipment or machinery must be at least 20m from ground clearance or rock-breaking activities.
- The dedicated refuelling area must be underlain by concrete hard standing. All fuel and oil tank should be inspected on a regular basis for signs of spillages, leaks and damage during use. A record of these inspections must be kept, and any improvements needed be carried out immediately.
- The risk of fuel spillages on a construction site is at its greatest when refuelling plant. Therefore, only designated trained and competent operatives should be authorised to refuel plant on site. Plant and equipment should be brought to a designated refuelling area rather than refuelling at numerous locations about the site.
- Chemicals used on site must be returned to the site compound and secured in a lockable and sealed container overnight in proximity to the fuel storage area.
- Drip trays must be utilised on site for all pumps situated within 20 m away from ground clearance areas.
- Procedures and contingency plans must be established on site to address cleaning up small spillages as well as dealing with an emergency incident. A stock of absorbent materials such as sand, spill granules, absorbent pads and booms must be kept on site, on plant working near streams and at the refuelling area.
- Daily plant inspections must be completed by all plant operators on site to ensure that all plant is maintained in good working order. Where leaks are noted on these inspection sheets, the plant must be removed from operations for repairs.

- All personnel should observe standard precautions for handling of materials as outlined in the Safety Data Sheets (SDS) for each material, including the use of PPE. Where conditions warrant, emergency spill containment supplies should be available for immediate use.

Best practice concrete / aggregate management measures must be employed on site. These will include:

- A designated concrete wash out area should be set up on site; typically, this will involve washing the chutes, pumps into a designated IBC before removing the wastewater off site for disposal. These procedures should be covered during a Site Safety and Environmental Induction session.
- Best practice in bulk-liquid concrete management should be employed on site addressing pouring and handling, secure shuttering, adequate curing times etc.
- Stockpile areas for sands and gravel must be kept to a minimum size, well away from the drains and watercourses (minimum 50m).
- Where concrete shuttering is used, measures must be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils.
- Activities which result in the creation of cement dust must be controlled by dampening down the areas.
- Raw and uncured waste concrete must be disposed of by removal from the site.
- Stockpile areas for sands and gravel will be kept to a minimum size, well away from the watercourse on site.

There should be no disturbances of the habitats along the watercourses within the application site. All vegetation within the 10m buffer zone of the stream must be protected, outside of the point where the box culvert bridge is to be installed. Vegetation within these buffer zone should be retained and enhanced using suitable species and in accordance with any landscaping plan that has been produced for the site. A separate surface water pipe will cross the central woodland area. This will be situated in a tunnel that is bored under the stream.

8.5 LIKELY AND SIGNIFICANT IMPACTS ON HYDROLOGY, HYDROGEOLOGY AND DRAINAGE

The potential impacts of the proposed LRD Project and mitigation measures that will be put in place to eliminate or reduce them are set out below.

8.5.1 Do Nothing Scenario

If the proposed development does not go ahead, there would be no potential impacts on the hydrology, hydrogeology and drainage around and beneath the subject site (as well as on the land, soils and geology).

The area of the site, including the fields and hedgerows within, would continue as is on the site, with rainfall infiltrating to ground and surface water running into the stream watercourses, and the hedgerows would not be encroached upon. Agricultural practices would continue. This would have no impact on the underlying substrate, and there would be no change to the environmental profile of the site in relating to Land, Soils, Geology, Hydrology, Hydrogeology and Drainage.

8.5.2 Potential Impacts and Mitigation Measures – Construction Phase

The proposed development will include the following accommodation;

The proposed development will consist of 494 no. residential units (108no. 1-bed, 168no. 2-bed, 160 no. 3-bed; 58 no. 4-bed) comprising 189no. 2 storey houses (terraced/semi-detached/detached) (17no. 2-bed, 114no. 3-bed; 58no. 4-bed) and 28no. 3 and 4 storey simplex/duplex apartment blocks providing 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (c.475sq.m), public open space, car parking (surface/undercroft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. Vehicular access to be provided from the existing spur road connection to Stocking Avenue to the west of the site, and via Stocking Wood Drive to the east of the site (with relocation of existing ESB substation and associated works to the existing hammerhead). Additional pedestrian only routes will be provided into Abbot's Grove Park and Stocking Wood Copse with future connections provided for into Stocking Wood Manor, White Pines Park and the future school site to the north of the application site. The proposed development includes all associated site development works (including site reprofiling, retaining structures and downing of ESB overhead lines), landscaping, boundary treatments and services provision.

The site is located on the northern lower backslope of a high, unnamed, dome-shaped ridge feature at Woodtown, which itself is a spur-ridge off the northeastern side of Mountpelier Hill, from which views of the surrounding countryside at the northwest, north and northeast are attained.

The construction site will be accessed *via* the entrance to the proposed LRD site which is proposed from the existing road at Abbott's Grove, at the northwest, into the (current) western field of the two-field landholding that forms the site. There will be no basements in any of the houses on the site, and the foundation levels will be set just below existing ground levels, largely on the pre-existing, *in situ* mineral soil and/or mineral subsoil.

No parts of the proposed LRD Site are situated within a Source Protection Zone for a Public Drinking Water Supply, a Zone of Contribution to a Group Scheme, or a Drinking Water Protected Area abstracting from surface water.

Potential effects on groundwater quality with regard to contaminants such oils, fuels, cement and sediments (i.e. from rock breaking, compaction of foundations, and excavation works).

Quantity effects (i.e. flows/spring discharge volumes) are unlikely to arise as the excavations and cut-and-fill will all be above the groundwater table on the site.

The not-insignificant depth of overburden at the proposed LRD site would also ensure that access road construction, trenching for electrical cabling, temporary construction compounds and roadside drainage and attenuation (i.e. settlement ponds) would have no potential to disrupt groundwater flowpaths downslope. Trenching or drains will typically extend no more than 1.2m below ground level.

No point recharge features such as swallow holes, dolines etc are present at the ground surface on the proposed LRD Site, as the setting is within a non-karstified aquifer.

8.5.2.1. Earthworks (Removal of Vegetation Cover, Excavations and 'Cut-and-Fill') Resulting in Suspended Solids Entrainment in Surface Waters (Proposed Project)

There will be earthworks required for the proposed LRD Site and these are assessed herein.

Proposed Project construction phase activities that will require earthworks resulting in the removal of vegetation cover and excavation of mineral subsoil are detailed in Chapter 3 the Description of the Proposed Project. Potential sources of sediment laden water include:

- Drainage and seepage water resulting from infrastructure excavation;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the underground trench resulting in the entrainment of sediment from the excavations during construction; and,
- Erosion of sediment from emplaced site drainage channels.

These activities can result in the release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. Potential impacts could be significant if not mitigated.

Pathway: Drainage and surface water discharge routes.

Receptor: Down-gradient rivers (Dodder River and it's tributaries) and dependent ecosystems.

Pre-Mitigation Potential Effect: Indirect, negative, significant, long-term, likely effect on surface water quality.

Mitigation by Avoidance:

The key mitigation measure during the construction phase of the Proposed Project is the avoidance of sensitive aquatic areas where possible. From **Figure 8.16** it can be seen that all of the key areas of the Proposed Project infrastructure are actually significantly away from any delineated buffer zones. Additional control measures, which are outlined further on in this section, will be undertaken where proposed new roads, and proposed stream crossings, will be emplaced.

The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operated effectively. The proposed buffer zone will:

- Avoid physical damage to watercourses, and associated release of sediment;
- Avoid excavations within close proximity to surface water courses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,

- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Design:

- Source controls:
- Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, filter fabrics, and other similar/equivalent or appropriate systems.
- Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
- Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems.
- Monitoring:
- An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended.
- Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. Checks will be carried out on a daily basis.
- During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP included with this EIAR).
- **Residual Effect:** The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The mitigation measures will ensure that surface water runoff from the site will be equivalent to baseline conditions and will therefore have no potential impact on the status, ecology or hydromorphology of downstream waters. The residual effects of the Proposed Project will be negative, imperceptible, indirect, short-term, likely effect on down-gradient rivers, water quality, and dependent ecosystems.

- **Significance of Effects:** For the reasons outlined above, no significant effects on the surface water quality will occur.

8.5.2.2. Potential Impacts on Groundwater Levels During Excavations (Proposed Project)

There will be excavations required for the proposed LRD Site (Proposed Project).

But groundwater level impacts will not be significant due to the local geological and hydrogeological regime as outlined below. The groundworks proposed do not require active dewatering (albeit some temporary displacement of local groundwater is likely to occur) and therefore has no potential to significantly affect groundwater levels during construction.

Pathway: Groundwater flowpaths.

Receptor: Groundwater levels (Kilcullen GWB and local bedrock aquifers).

Pre-Mitigation Potential Effect: Direct, negative, slight, brief, likely effect on local bedrock aquifers. No significant effects on the Kilcullen GWB will occur due to the small dewatering requirements.

Impact Assessment:

No groundwater level impacts are predicted from the construction of the proposed LRD due to the shallow nature of the excavations (i.e. mostly 0 - ~3m). The deepest excavations will be required in the central portion of the site, ~4m, but these excavations will progress in a more horizontal manner rather than vertical deepening.

Residual Impact: Due to the prevailing geology at the Site, the local and temporary nature of the proposed works, the residual effects of the proposed LRD Project on groundwater levels will be negative, imperceptible, direct, brief and reversible.

Significance of Effects: For the reasons outlined above, no significant effects on groundwater levels and will occur.

8.5.2.3. Potential Release of Hydrocarbons During Construction and Storage (Proposed Project)

Hydrocarbons will be required for the proposed LRD Project and these are assessed herein.

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Groundwater and surface water rivers and streams (Dodder River and it's tributaries).

Pre-Mitigation Potential Effect:

Indirect, negative, slight, short term, likely effect to local groundwater quality.

Indirect, negative, moderate, short term, likely impact to surface water quality.

Proposed Mitigation Measures:

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site, and will be towed around the site by a 4 x 4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;
- Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be included within the Construction and Environmental Management Plan. Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.

Residual Impact: The potential for the release of hydrocarbons to groundwater and watercourse receptors is a risk to surface water and groundwater quality, and also the aquatic quality of the surface water receptors. Proven and effective measures to mitigate the risk of releases of hydrocarbons have been proposed above and will break the pathway between the potential source and each receptor. The mitigation measures will ensure that surface water runoff from the site will be equivalent to baseline conditions and will therefore have no potential impact on the status or ecology of downstream waters. The residual effect of the proposed LRD Project will be negative, imperceptible, indirect, short-term, unlikely impact to local surface water and groundwater quality.

Significance of Effects: For the reasons outlined above, no significant effects on surface water or groundwater quality will occur.

8.5.2.4. Groundwater and Surface Water Contamination from Wastewater Disposal (Proposed Project)

Wastewater management will be required for the proposed LRD Site construction (Proposed Project) and is therefore assessed herein.

Release of effluent from domestic wastewater treatment systems has the potential to impact on groundwater and surface waters if site conditions are not suitable for an on-site percolation unit.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Groundwater quality and surface water quality (Dodder River and it's tributaries).

Pre mitigation Effect:

Indirect, negative, significant, temporary, unlikely effect to surface water quality.

Indirect, negative, slight, temporary, unlikely effect to local groundwater.

Proposed Mitigation Measures:

- It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. It is not proposed to treat wastewater on-site.

Residual Effect: No residual effects of the Proposed Project.

Significance of Effects: No significant effects on surface water or groundwater quality will occur.

8.5.2.5. Potential Hydrological Effects on Designated Sites (Proposed Project)

Designated sites are located downstream of the proposed LRD Project, and are assessed herein.

The closest designated site to the Proposed Project site is the Wicklow Mountains SPA / NHA (Site Code: 0004040), but this is up-gradient of the site.

The proposed LRD does not intercept any European Sites or NHAs / pNHAs, and none are situated down-gradient of the proposed LRD Site either (see **Figure 8.16**).

The groundwater flow direction in the area of the Site (i.e. northwards) means designated sites such as the Wicklow Mountains SPA / NHA (to the south) and all to the northeast (including the South Dublin Bay SAC and the Sandymount Strand / Tolka Estuary SPA) have been screened out.

Pathway: Surface water and groundwater flowpaths.

Receptor: Down-gradient water quality and designated sites (South Dublin Bay SAC and the Sandymount Strand / Tolka Estuary SPA).

Pre-Mitigation Potential Effect: Indirect, negative, moderate, short-term, likely effect on the South Dublin Bay SAC and the Sandymount Strand / Tolka Estuary SPA and Indirect, negative, slight, short-term, unlikely effect on Wicklow Mountains SPA / NHA.

Impact Assessment & Proposed Mitigation Measures:

Drainage mitigation measures for surface water quality protection during the construction phase are summarised again below: (Please refer to Section 5.2.1 above for the full description of these measures and how they will be applied).

- The proposed mitigation measures which will include 50m buffer zones for avoidance of sensitive hydrological features (streams and rivers);
- Pre-construction drainage control measures;
- Robust drainage control measures (i.e. interceptor drains, swales, settlement ponds and treatment trains) will ensure that the quality of runoff from the proposed LRD Project area will be very high; and,

- Best practice measures with regard use of oils, fuels (Section 5.2.3).

Residual Impact: No effects on local designated sites from the proposed LRD Project.

Significance of Effects: No significant impacts on local designated sites will occur.

8.5.2.6. Potential Effects on Local Groundwater Well Supplies from Excavations (Proposed Project)

There will be excavations required for the proposed LRD Project and these are assessed herein in terms of effect on groundwater sourced water supplies.

In the area of the Proposed Project site, private dwelling houses (potential well locations) are mainly located along public roads to the south and east of the proposed LRD Site which is up-gradient to the direction of groundwater flow in the area of the proposed LRD Site (i.e. northerly/north-westerly).

There are therefore no risks to down-gradient wells.

Pathway: Groundwater flowpaths.

Receptor: Private Groundwater Supplies.

Pre-Mitigation Potential Impact: Negative, imperceptible, indirect, short-term, unlikely effect on local wells.

Impact Assessment:

I am satisfied that the proposed LRD Project site will not impact in any significant way on any potential down-gradient private wells, owing to their absence, as well as the large set back distances between the proposed LRD Site and all potential well locations.

8.5.2.7. Effects of Construction Works on the WFD Status of Downstream Waterbodies (Proposed Project)

The proposed LRD Project has the potential to effect WFD status, and this is assessed herein.

WFD status and Risk Results for downstream river waterbodies and the underlying Kilcullen GWB are presented in Sections 8.3.12 and 8.3.13 above.

Due to the high to low groundwater vulnerability rating of the Proposed Project site (and the absence of bedrock at or near surface and thus the absence of 'Extreme' groundwater vulnerability across the Site), the potential to negatively affect the WFD status of the Kilcullen GWB is very low, even in the absence of mitigation.

Without mitigation the proposed construction works do have the potential to adversely impact on surface water quality which may negatively impact on the WFD status of these downstream surface waterbodies.

The understanding of the objectives of the WFD is that surface waters, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed, i.e. there should be no negative change in status at all. This is reflected in the strict mitigation measures in relation to maintaining a high quality of surface water from the proposed LRD

Project will ensure that the status of surface waterbodies in the vicinity of the proposed LRD Project will be at least maintained regardless of their existing status.

Pathways: Drainage and surface water discharge routes.

Receptors: Kilcullen GWB, and Surface waters (Dodder River and it's stream tributaries) and associated dependent ecosystems.

Pre-Mitigation Potential Impact: Indirect, negative, slight, temporary, unlikely effect on river waterbody status. No effects on Kilcullen GWB WFD status will occur.

Proposed Mitigation Measures:

Comprehensive surface water mitigation and drainage controls are outlined in Section 5.2 above. Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's detention basins which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. These mitigation measures are considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality, and will ensure the protection of surface water quality and flows in all downstream receiving watercourses.

Residual Impact: The potential for the release of suspended solids, hydrocarbons, cement-based products or altered flows to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective mitigation measures have been proposed and the Sustainable Drainage System's detention basins design will break the pathway between the potential pollutant sources and the receptor. The mitigation measures will ensure that surface water runoff from the site will be equivalent to baseline conditions and will therefore have no potential impact on the status, ecology or hydromorphology of downstream waters. The residual effect of the proposed LRD Project is negative, imperceptible, indirect, short-term, unlikely impact on down gradient rivers, water quality, and dependent ecosystems. No effects on the status of the Kilcullen GWB will occur.

Significance of Effects: For the reasons outlined above, and with the implementation of the proposed mitigation, no significant effects on waterbody WFD status will occur.

8.5.3 Potential Impacts and Mitigation Measures – Operational Phase

8.5.3.1 Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces (Proposed Project)

Hardstand emplacement will be required at the proposed LRD Site, and is assessed herein.

The potential for increased surface water runoff is the primary potential impact during the operational phase of the proposed LRD.

Progressive replacement of the vegetated surface with impermeable surfaces will decrease the permeability of the ground within the proposed LRD Site footprint (i.e., hardstandings, and the new access roads).

Overall there is an increase in average runoff expected and results from a relatively small area of the overall proposed LRD Project site being developed as hardstand.

Pathway: Site drainage network.

Receptor: Surface waters (Dodder River and it's tributaries) and dependent ecosystems.

Pre-Mitigation Potential Impact: Negative, imperceptible, indirect, long-term, likely effect on all downstream surface water bodies.

Proposed Mitigation by Design:

The proposed drainage philosophy outlined in Section 5.2.1 states that runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the proposed LRD Project. The first being 'keeping clean water clean' and the second involving the collection of any drainage waters in the proposed, designed Sustainable Drainage System's surface water network. The second method therefore relates to proposed design measures that will prevent road surface and other hardstand areas acting as preferential flowpaths. All development site runoff will be collected, attenuated, treated and then released in a diffuse and regular manner that does not significantly change the natural drainage regime/hydrology of the site.

The operational phase drainage system of the proposed LRD Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the drainage drawings submitted with this planning application:

- Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained.
- Detention basins, ponds, permeable paving, tree pits and swales will be used to collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment'.
- These measures will ensure all surface water runoff from new road surfaces will be captured and treated prior to discharge/release.

Residual Impact: Direct, negative, neutral, long term, likely effect of the proposed LRD Project on surface waters.

Significance of Effects: No significant effects on surface water quantity will occur during the operational phase of the Proposed Project.

8.5.3.2 Runoff Resulting in Suspended Solids Entrainment in Surface Waters

Site runoff will occur at the proposed LRD Site and is assessed herein.

During the operational phase, the potential for silt-laden runoff is very low.

There is a very low likelihood of the release of suspended solids to surface water and low potential increase in the suspended sediment load,

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient rivers (Dodder Reiver and it's stream tributaries) and associated dependent ecosystems.

Pre-Mitigation Potential Effect: Negative, slight, indirect, temporary, likely effect on surface water quality.

Proposed Mitigation Measures:

The mitigation measures outlined in Sections 8.5.2.2 and 8.5.2.3 will ensure all surface water runoff from new road surfaces and hardstand areas within the proposed LRD will be captured and treated prior to discharge/release. Detention basins, ponds, permeable paving, tree pits and swales will be used to collect runoff from access roads and hardstanding areas of the site.

Post-Mitigation Residual Effects: With the implementation of the proposed drainage measures as outlined above, and based on the post-mitigation assessment of runoff, residual effects are - Negative, imperceptible, indirect, temporary, unlikely effect on downstream water quality.

Significance of Effects: For the reasons outlined above, no significant effects on the surface water quality will occur.

8.5.4 Risk of Major Accidents and Disasters

Due to the nature of the proposed LRD Project site, i.e. absence of soft peat deposits, there is no risk of peat movement occurring. As well as this, all excavations are relatively shallow and will be completed using the Mitigation Methodologies outlined in Chapter 7 'Land, Soils and Geology' e.g. in dry weather, etc.

The residual effect of a landslide occurring is thus determined to be imperceptible, particularly given the Sustainable Drainage System's design.

Flooding can result in downstream Major Accidents and Disasters. But owing to the relatively small scale of the proposed LRD Project footprint, the naturally moderate runoff rates, the avoidance of fluvial flood zones (see Section 8.3.5) and with the implementation of the proposed mitigation measures, the increased flood risk associated with the proposed LRD Project is imperceptible.

8.5.5 Human Health Effects

Potential health effects arise mainly through the potential for surface and groundwater contamination which can have negative effects on public and private water supplies. The proposed LRD Project is not a recognized source of pollution (e.g. it's not a waste management site, or a chemical plant), and so the potential for effects during the operational phase is very low. Notwithstanding this, the proposed LRD Project design and mitigation measures ensures that the potential for effects on the water environment as a whole will be insignificant.

Hydrocarbons will be used onsite during construction, but the volumes will be small in the context of the scale of the proposed LRD Project and will be handled and stored in accordance with best practice mitigation measures. The potential residual effects associated with surface water or groundwater contamination and subsequent health effects are imperceptible.

Flooding of property can cause inundation with contaminated flood water. Flood waters can carry waterborne disease and contamination/effluent. Exposure to such flood waters can cause temporary health issues.

A detailed Flood Risk Assessment for the proposed LRD Site has been carried out and accompanies this application, and is summarised in Section 8.3.5. This Flood Risk Assessment demonstrates that the risk of the proposed LRD Project contributing to downstream flooding is imperceptible. On-site (construction and operation phase) drainage control measures will ensure no downstream increase in local flood risk.

8.5.6 Cumulative Effects

This section presents an assessment of the potential cumulative effects associated with the Proposed Project and other developments (existing and/or proposed) on the hydrological and hydrogeological environment.

The main likelihood of cumulative effects is assessed to be hydrological (surface water quality) rather than hydrogeological (groundwater). Due to the local hydrogeological setting (i.e. low permeability peat and glacial tills) and the near-surface nature of construction activities, cumulative effects with regard groundwater quality or quantity arising from the Proposed Project are assessed as not likely, as set out in Chapter 3 of this EIAR. Please see Chapter 2 for cumulative assessment methodology.

The primary potential for cumulative effects will occur during the construction phase of the proposed LRD Project as this is when earthworks and excavations will be undertaken at the Site. The potential for cumulative effects during the operational phase of the Proposed Project will be significantly reduced as there will be no exposed excavations, there will be no sources of sediment to reach watercourses, there will be no use of cementitious materials and fuels/oil will be kept to a minimum at the site.

The cumulative Water Study area is delineated by a 15 km buffer around the proposed LRD Site. Outside of this buffer, no cumulative hydrological effects are likely owing to the very high dilution effects afforded by such a large regional catchment, subsequent large surface water flows and the natural attenuation afforded by the Dodder River itself.

8.5.6.1. Cumulative Effects with Housing Developments, Schools, Sports Pitches and Neighbourhood Centres

A detailed cumulative assessment has been carried out for all planning applications (granted and awaiting decisions) within the cumulative assessment area described above.

There are applications are for new residential units, as well as for Sports Pitches and Neighbourhooed Centres. Based on the scale of the works, their proximity to the proposed LRD Site and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Project (construction and operational phases).

PA. Ref. No.	Applicant	Description	Decision
LRD24A/0007	Capami Limited	523 no. residential units	Granted.
SD23A/0260	Ardstone Homes Limited	Construction of 75 no. residential units	Granted
ABP-311141-21 (SA21A/0137)	The Minister for Education & Skills	Provision of a temporary two-storey post-primary school.	Granted
ABP-309836-21	Ardstone Homes Limited	SHD – 241no. residential units in 5no. apartment blocks and a community building.	Granted
ABP-310398-21	Ardstone Homes Limited	SHD – 114no. Build to Rent apartments in 6no. blocks.	Granted
ABP-310337-21 (SD20A/0149)	Capami Ltd	LED floodlighting system and all associated ducting, column foundations and bases and fixtures for a permitted sports pitch.	Granted
SD19A/0345	Ardstone Homes Limited	Neighbourhood Centre comprising a single storey convenience retail unit and a three storey building comprising a creche.	Granted
ABP-302414-18 (SD18A/0204)	Jones Investments Ltd	65no. residential units and outline permission for a primary school and post primary school.	Refused
ABP-247693-16 (SD16A/0059)	Capami Ltd	Playing pitch and associated site works. Site south of Oldcourt Road and east of Oldcourt Lane,	Granted

Table 8.12 Significant Projects within a 15 km radius of the proposed LRD Site

8.5.7 Post Construction Monitoring

Due to the nature of the proposed LRD Project site, there will be no requirements for any monitoring of the site post construction.

REFERENCES

Building Research Establishment (1991). BRE Digest 365. Soakaway design. 8pp.

British Standards, BS5930 (1999). Code of Practice for Site Investigations.

Clark, C.D. and Meehan, 2001. Subglacial bedform geomorphology of the Irish Ice Sheet reveals major configuration changes during growth and decay. Journal of Quaternary Science, 16(5), p. 483-496.

Daly, D. and Craig, M. (2009). Chemical and Quantitative Status of Groundwater Bodies. A Measure of the Present, A Signpost to the Future. IAH Irish Group. Proceedings 29th Annual Groundwater Conference, International Association of Hydrogeologists, Irish Group, Tullamore, April 21-22, 2009.

DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.

Environmental Protection Agency (2002). Guidance on the Information to be contained in Environmental Impact Statements. Environmental Protection Agency, Dublin, 45 pp.

Environmental Protection Agency (2005). Water Quality in Ireland 2005: Key Indicators of the Aquatic Environment. EPA, Johnstown Castle, Wexford. 32pp.

Environmental Protection Agency (2011). Water Framework Status Update based on Monitoring Results 2007-2009. Aquatic Environment Unit, Office of Environmental Assessment of the Environmental Protection Agency. Ecological Status and Chemical Status of Surface Waters and Chemical and Quantitative Status of Groundwaters. *Prepared in fulfilment of Articles 24 and 25 of SI 272 of 2009. 21 June 2011*.

Environmental Protection Agency (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency, Dublin, 90 pp.

European Communities Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive).

European Communities Environmental Objectives (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) (Natural Habitat Regulations).

European Communities Environmental Objectives (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003) (Water Policy Regulations).

European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) (Groundwater Regulations).

Fitzsimons, V., Daly, D. and Deakin, J. (2003). Draft GSI guidelines for assessment and mapping of groundwater vulnerability to contamination. Groundwater Section, Geological Survey of Ireland.

Forest Service, Department of the Marine and Natural Resources (2000). Code of Best Forest Practice: Ireland. Forest Service, Dublin, 101 pp.

Gardiner, M. and Radford, T. (1980). Soils Associations of Ireland and their land-use potential. An Foras Taluintais, Dublin.

Geological Survey of Ireland (1871). Bedrock Geology Manuscript Sheets.

Geological Survey of Ireland (2025). Online Quaternary Sediments map viewer. www.gsi.ie

Government of Ireland, 2009. European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272/2009).

Government of Ireland, 2010. European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9/2009).

Government of Ireland, 2014. European Union (Drinking Water) Regulations 2014 (S.I. No. 122/2014).

Government of Ireland, 2019. European Union Environmental Objectives (Surface Water) Amendment Regulations (S.I. No. 272/2009).

Harned, D.A., and Daniel, C.C., III (1992). The transition zone between bedrock and regolith: Conduit for contamination?, in Daniel, C.C., III, White, R.K., and Stone, P. A., eds., Ground water in the Piedmont, Proceedings of a Conference on Ground Water in the Piedmont of the Eastern United States, Charlotte, N.C., Oct. 16-18, 1989: Clemson, S.C., Clemson University, p. 336-348.

Institute of Environmental Management & Assessment (1999). Draft Guidelines on Public Participation in Environmental Decision Making. Institute of Environmental Management and Assessment, Lincoln, UK.

Institute of Geologists of Ireland (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapter of Environmental Impact Statements. Institute of Geologists of Ireland, Dublin. 50pp.

Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater – Dependent Terrestrial Ecosystems under the Water Framework Directive.Environmental Research Centre Report Series No. 12.

McConnell, B. and Philcox, M.E. (1994). Geology of Kildare - Wicklow: A Geological Description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare - Wicklow. With contributions from K. Claringbold, W. Warren and G. Wright. Geological Survey of Ireland, Dublin.

Meehan, R., Gallagher, V., Parkes, M., and Gatley, S. (2013). The Geological Heritage of Monaghan. An audit of County Geological Sites in County Monaghan. Geological Survey of Ireland, 137 pp.

National Roads Authority (2009). Guidelines on Procedures for Assessment and Hydrogeology for National Road Schemes. National Roads Authority, Dublin, 189 pp.

Official Journal of the European Communities (2000). Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327) 22 December 2000.

Ó Súilleabháin, C. (2000). Assessing the Boundary between High and Moderately Permeable Subsoils. Unpublished M.Sc. thesis, Trinity College Dublin.

Ó Súilleabháin, C. (2004). The Attenuation Capacity of Different Subsoils Receiving Domestic Wastewater Effluent. Ph.D. Thesis, Trinity College Dublin.

Teagasc (2006a). Digital soil map of County Dublin. Prepared as part of the EPA Soil and Subsoil Mapping Project, Teagasc, Kinsealy, Dublin.

Teagasc (2006b). Digital subsoil map of County Dublin. Prepared as part of the EPA Soil and Subsoil Mapping Project, Teagasc, Kinsealy, Dublin.

Trinity Green (2020). Soil Infiltration Test for Design of Soakaway at Woodtown, Ballycullen. Report for submission to South Dublin County Council, 24 pp.

UK TAG (2008). Application of Groundwater Standards to Regulation. UK Technical Advisory Group Paper 11b(iii). Available on the www.wfduk.org website.

UK TAG (2011). Defining & Reporting on Groundwater Bodies. UK Technical Advisory Group. Working Draft Paper. Water Services National Technical advisory Group.

Waterman Moylan (2024). Technical Note on site at Woodtown, Ballycullen, Dublin 16. 4 pp.

Wright, G.R. and Gately, C. (2002). Kilcullen Groundwater Body. Geological Survey of Ireland, 5 pp.