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Marine & Environmental Consultancy

Ecological Impact Assessment (EcIA) for a Proposed Residential Development at Kildalkey Road, Trim, Co. Meath.

8th June 2026

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Loughglynn Developments

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Document Control Sheet			
Project	Ecological Impact Assessment (EcIA) for a Proposed Residential Development at Kildalkey Road, Trim, Co. Meath.		
Report	Ecological Impact Assessment		
Date	8th June 2026		
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Draft 01	Gayle O'Farrell	Bryan Deegan	8th June 2026

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Introduction

Background

Ecological Impact Assessment (EcIA) has been defined as '*the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components*' (Treweek, 1999). "*The purpose of EcIA is to provide decision-makers with clear and concise information about the likely ecological effects associated with a project and their significance both directly and in a wider context. Protecting and enhancing biodiversity and landscapes and maintaining natural processes depends upon input from ecologists and other specialists at all stages in the decision-making and planning process; from the early design of a project through implementation to its decommissioning*" (IEEM, 2010).

The following EcIA has been prepared by Altemar Ltd. at the request of Loughglynn Developments. This project relates to a proposed housing development at Kildalkey Road, Trim, Co. Meath.

Study Objectives

The objectives of this EcIA are to:

1. Outline the project and any alternatives assessed;
2. Undertake a baseline ecological feature, resource and function assessment of the site and zone of influence;
3. Assess and define significance of the direct, indirect and cumulative ecological impacts of the project during its construction, lifetime and decommissioning stages;
4. Refine, where necessary, the project and propose mitigation measures to remove or reduce impacts through sustainable design and ecological planning; and
5. Suggest monitoring measures to follow up the implementation and success of mitigation measures and ecological outcomes.

The following guidelines have been used in preparation of this EcIA:

- Guidelines on the information to be contained in EIARs (2022);
- Guidelines for Ecological Impact Assessment (EcIA) (IEEM, 2019);
- Advice Notes on current practice in the preparation of EIS's (EPA, 2003);
- Institute of Ecology and Environmental Management Guidelines for EIA (IEEM, 2005).

Altemar Ltd.

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments. Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 32 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

Project Description

The proposed development comprises a Large-Scale Residential Development (LRD) on lands at Crowpark (1st Division), Kildalkey Road, Trim, Co. Meath.

The scheme provides a total of 183 residential units, comprising 127 houses and 56 apartments. The housing mix includes 19 no. detached 4-bedroom houses, 9 no. semi-detached/end-terrace 4-bedroom houses, 4 no. detached 3-bedroom houses, 43 no. semi-detached/end-terrace 3-bedroom houses, and 52 no. mid-terrace 3-bedroom houses, with building heights from 2 to 2 ½ storeys. The apartment element comprises 56 no. units in two blocks of up to four stores, including 16 no. one-bedroom and 40 no. two-bedroom units.

The development also includes a crèche facility, new vehicular and pedestrian accesses from Kildalkey Road.

The proposal provides for associated infrastructure and site works, including landscaping, public and communal open space, internal streets and footpaths, car and bicycle parking, bin stores, private open space, boundary treatments, plant and waste management areas, utility infrastructure and a foul sewer connection to the existing network adjoining the OPW offices on Jonathan Swift Street, to be delivered beneath the River Boyne and Trim Pitch & Putt.

The proposed site location, layout, elevations and sections are demonstrated in Figures 1-7.

Landscape

The landscape plan for the proposed development has been prepared by Jane McCorkell Design. The landscape plan is shown in Figure 8.

Arborist

An Arboricultural Report has been prepared by Charles McCorkell Arboricultural Consultancy for the proposed development. It outlines the following tree impacts and mitigation:

'Arboricultural Impacts

6.1 ***Loss of trees –*** *The proposed development will require the removal of 2 trees and the partial removal of 1 hedgerow of moderate quality and value (B Category), 5 trees, 4 hedgerows, 2 shrub groups and 1 tree group, and the partial removal of 1 hedgerow, of low quality and value (C Category), and 2 trees of poor quality (U Category).'*

'6.3 The proposed development has been carefully designed to retain and incorporate the majority of trees and hedgerows located around the perimeter of the site. The retention of these trees and hedgerows will add an element of maturity to the new landscape and have a positive impact on the character and appearance of the new development.'

'6.6 There is only a small section of the moderate quality native hedgerow (H17) located along the western boundary to be removed. This is to facilitate a future possible connection with the neighbouring field. Its removal will have an insignificant impact on the surrounding local area.'

'6.16 ***Drainage and services*** *– The main drainage proposal has been designed to avoid the RPAs of retained trees. No special methods of construction are therefore required; however, it will be necessary to ensure that site operations do not impact trees or the soil environment upon which they rely. Details of the measures to be taken to protect trees are included in the Tree Protection Plans at Appendix B.'*

'6.19 ***Tree protection measures –*** *All retained trees and hedgerows can be successfully protected during the proposed development works by using robust fencing measures which comply with the recommendations outlined within BS 5837:2012. The location of tree protection measures is highlighted in the Tree Protection Plans at Appendix B.'*

'6.20 ***Landscape operations -*** *Landscaping operations will typically take place at the end of the construction period. These works will normally require the removal of protective fencing to facilitate access for works. There is a risk that machinery may damage soil structure where tree roots are growing. These risks can be managed by maintaining good professional standards of work and working to a method statement. The principle of avoiding soil disturbance or changes in levels within the RPAs of retained trees should be followed unless arboricultural advice has been sought.'*

'Arboricultural Mitigation

6.21 A detailed landscape plan has been designed and will form part of the planning application for the development proposal. This design includes the planting of a large number of new high-quality trees and hedgerows.
6.22 The proposed new planting will mitigate the loss of hedgerows and trees required to facilitate the development and will enhance the tree cover throughout the site and within the local area. This will have a positive impact on the local canopy cover and the character and appearance of development, and the surrounding landscape.'

The tree survey and constraints, removals and protection plans are shown in Figures 9-14.

Lighting

The lighting strategy for the proposed development has been prepared by ORS. The site lighting report outlines the following:

'Site Lighting Design
It is proposed to install new luminaires throughout the scheme:

- *49 x Metro Streetlight 27w LED 2700K (38 x Street Optic R03 and 11 x Forward Throw A Optic) mounted on 6m columns with no tilt.*
- *19 x Metro Streetlight 14w LED 2700K Street Optic R01 (9 no. with integrated external shield along the southern boundary) mounted on 6m columns with no tilt.*

The design also includes 8 x 36w Streetlights LED 4000K mounted on 6m columns as an estimated representation of the existing lighting along Kildalkey Road.

1.1 Proposed Lighting Fittings
The lighting design is based on the following light fittings:

Veelite Metro Streetlight 27w LED Street Optic R03		
	Led:	No. 38 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours. (at 25°C).
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 27w LED Forward Throw A Optic		
	Led:	No. 11 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 14w LED Street optic R01		
	Led:	No. 19 x 14w 8 LED / 2700K G4 (of which 9 no. with integrated external shield along the southern boundary)
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

The majority of light spill will be contained within the site boundary specifically along the southern, eastern and western boundaries, and open space areas will be kept unlit. The proposed site lighting layout is shown in Figure 15. Lighting is compliant with bat lighting guidelines with a temperature of 2700K

Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

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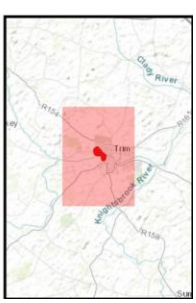


***Figure 1**. Proposed site location*

Figure 2. *Proposed Site Outline*

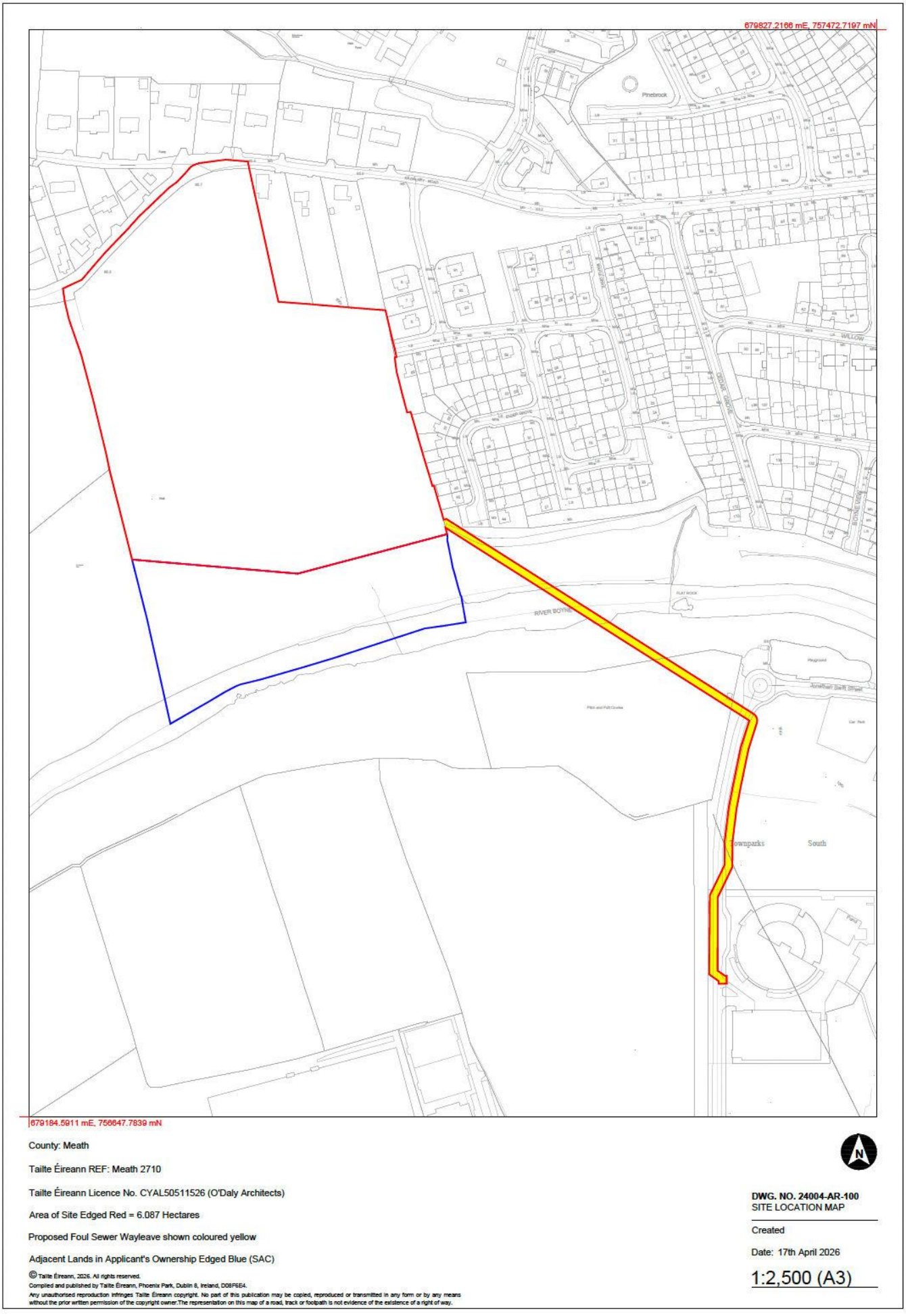


Figure 3. *Proposed Site Location*

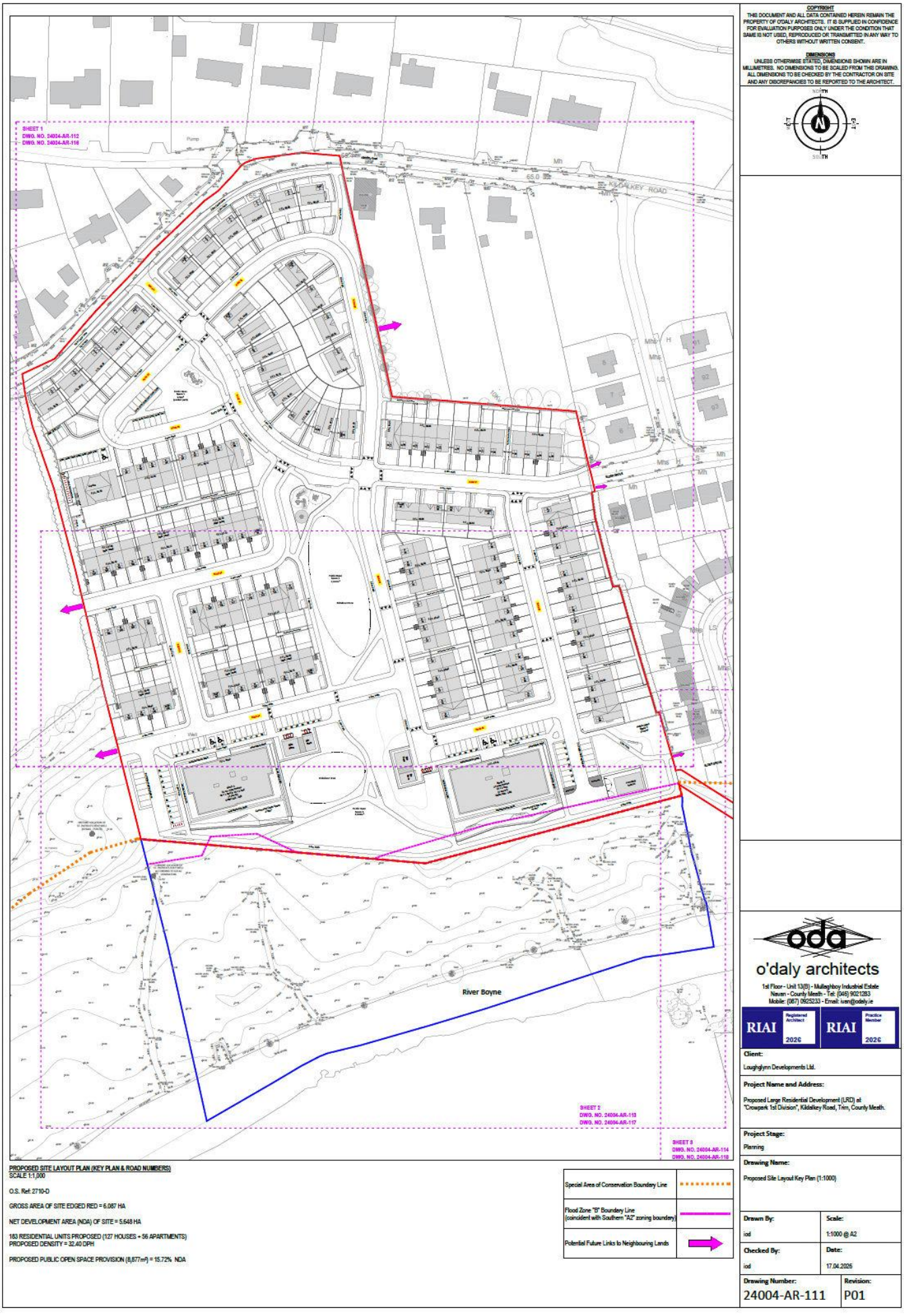


Figure 4. *Proposed Site layout*

Figure 5. *Proposed contiguous elevations 1-6*

***Figure 6**. Proposed contiguous elevations 7-12*

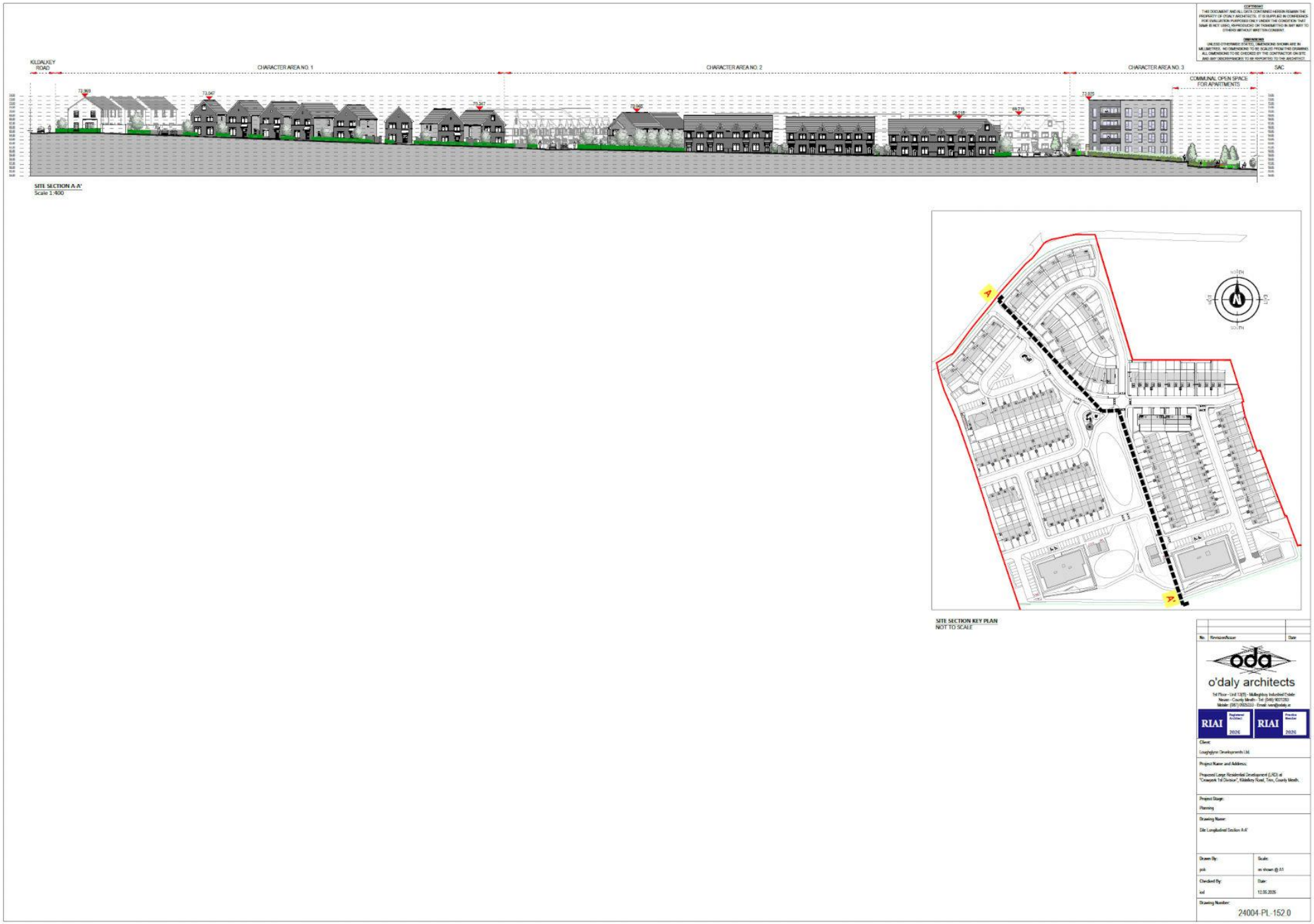


Figure 7. *Proposed Longitudinal Section A-*

Figure 8. *Proposed Landscape Plan*

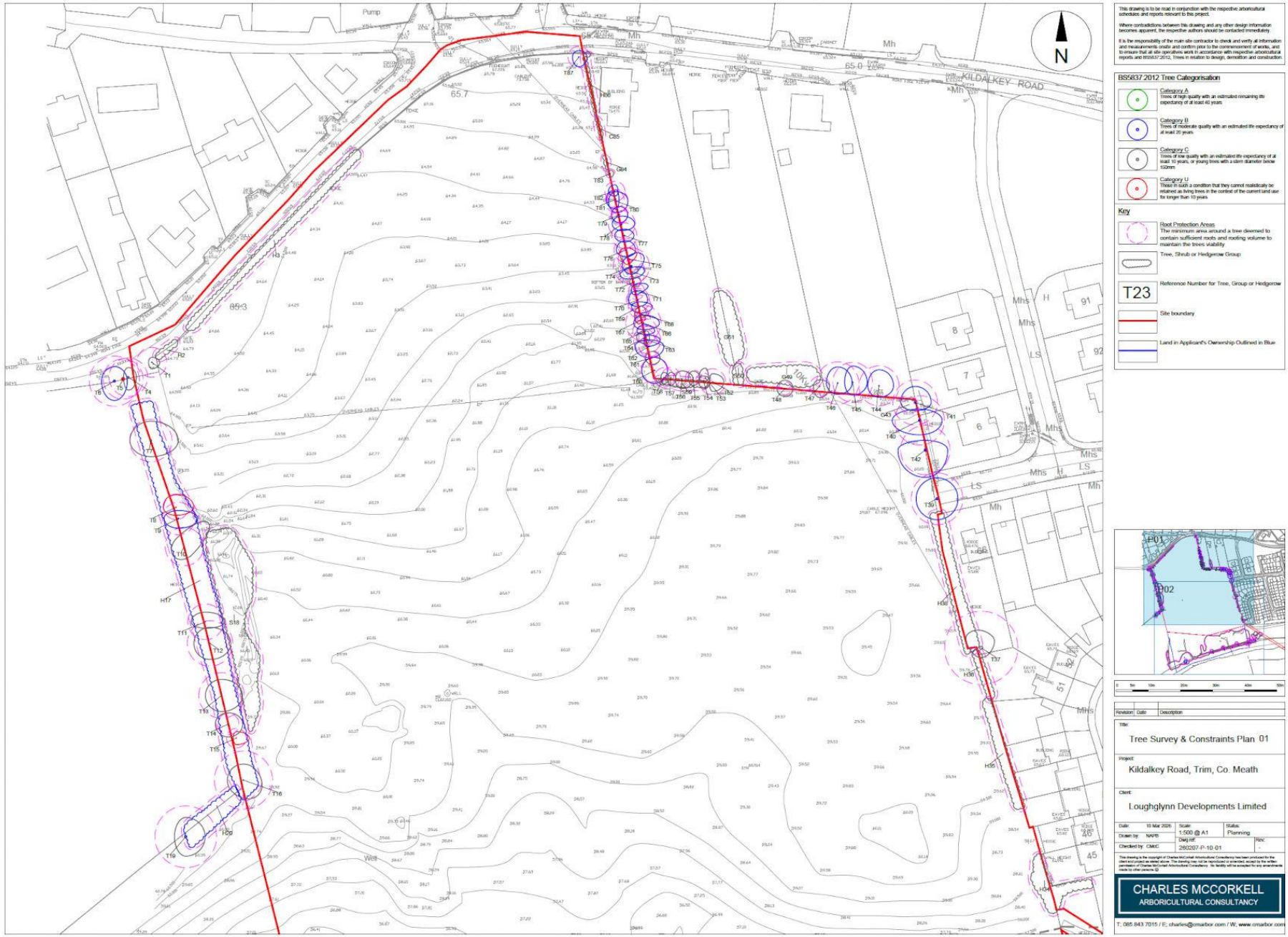


***Figure 9**. Tree survey and constraints plan (1/2)*

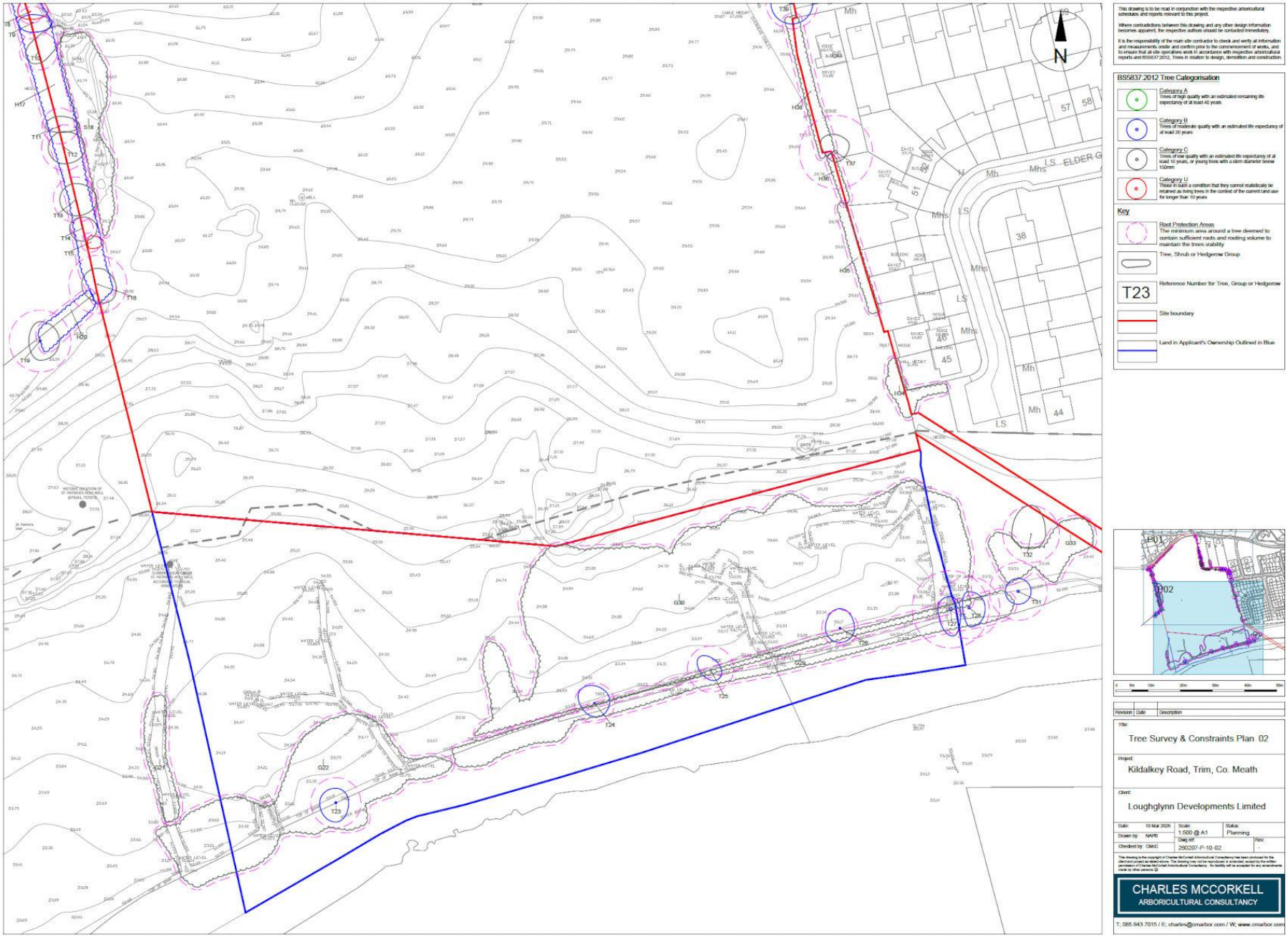


***Figure 10**. Tree survey and constraints plan (2/2)*

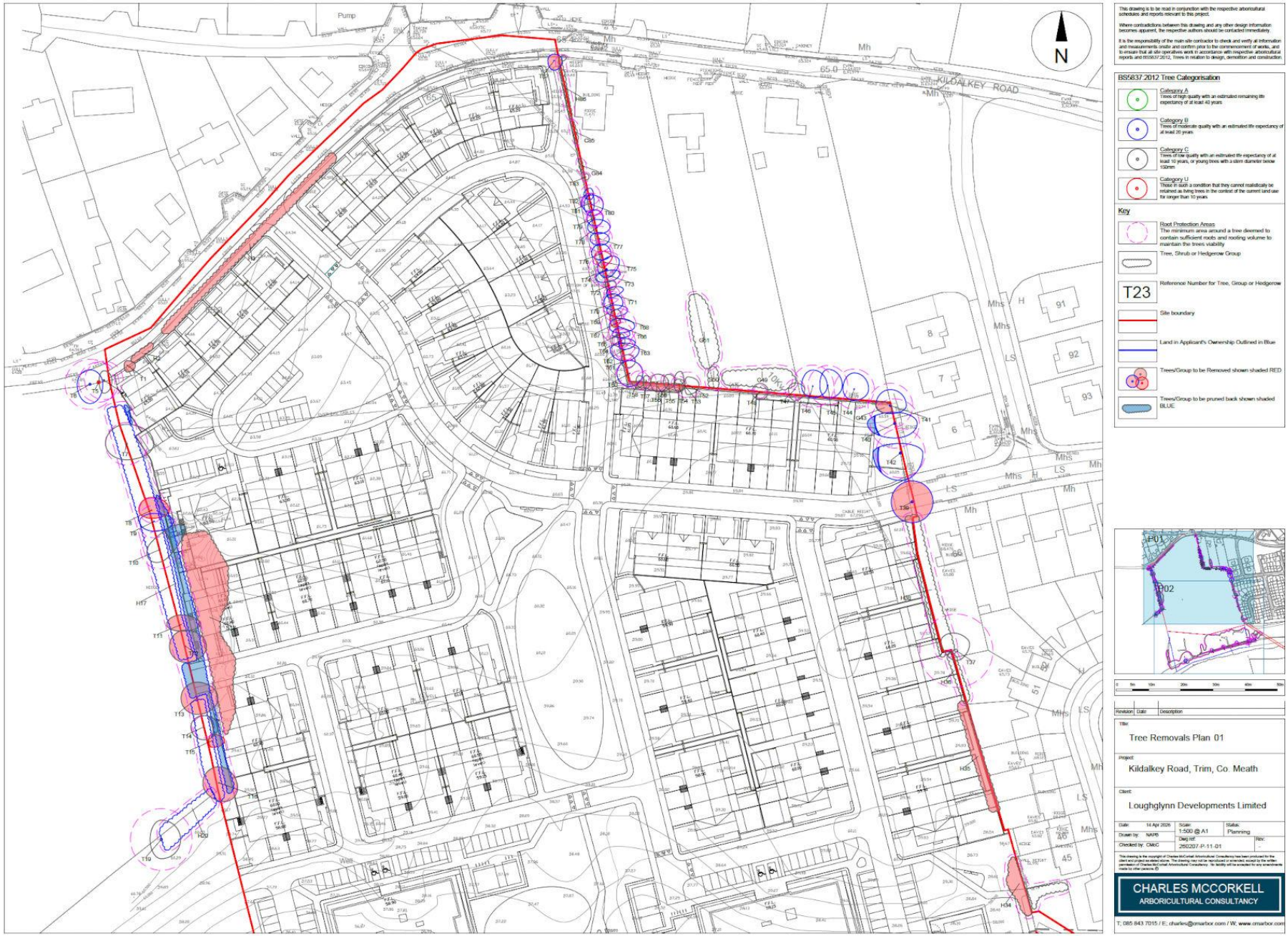


***Figure 11**. Tree removals plan (1/2)*

***Figure 12**. Tree removals plan (2/2)*

***Figure 13**. Tree protection plan (1/2)*

***Figure 14**. Tree protection plan (2/2)*

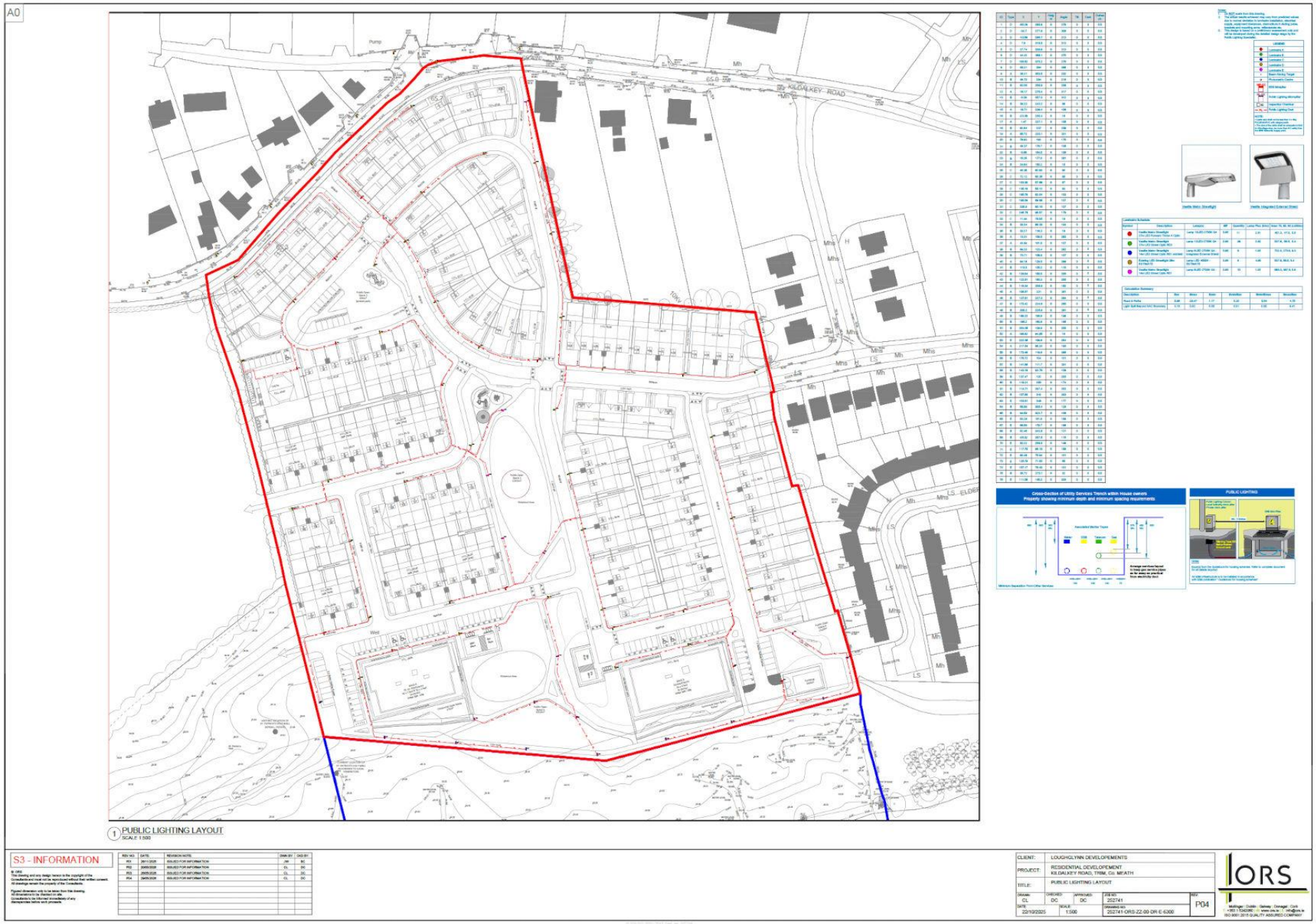


Figure 15. *Site services – public lighting*

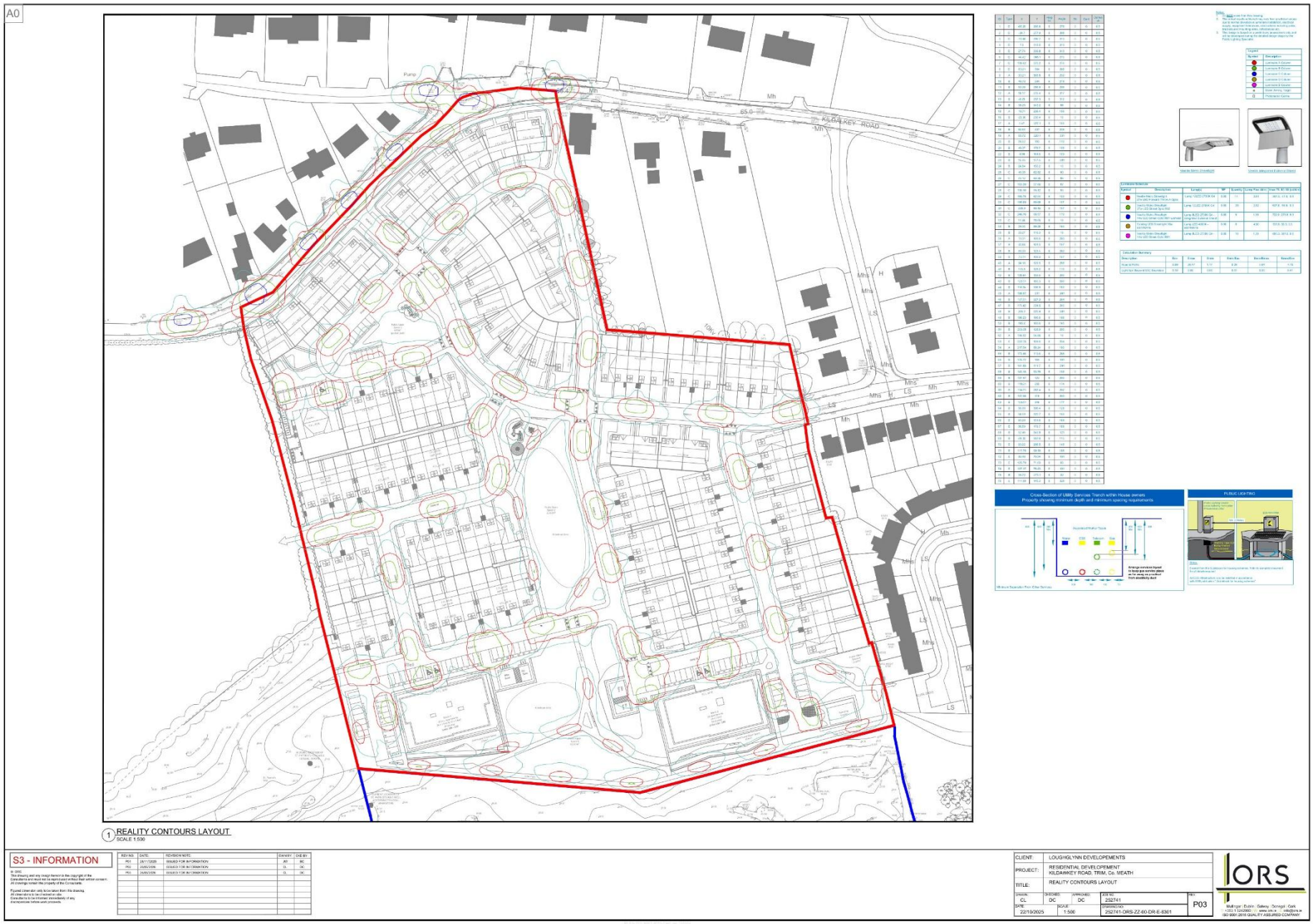


Figure 16. *Site services – reality contours layout*

Drainage

An Engineering Assessment Report has been prepared by Waterman Moylan Consulting Engineers Limited to accompany this planning application. The report outlines the following:

Surface Water Drainage

In relation to surface water drainage, the report states:

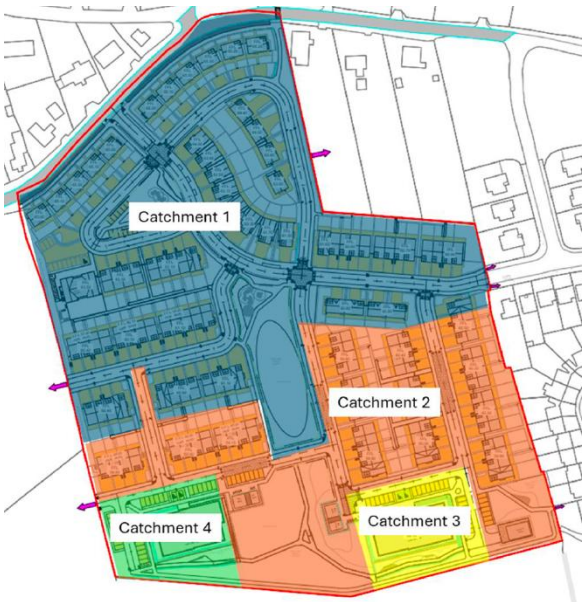
Surface water drainage introduction:

'The surface water drainage for the development has been designed with individual soakaways for each house unit and surface water from the public areas will be divided into four catchments, each discharging via gravity into separate underground soakaways. The proposed houses in the north will drain into the soakaway located at the centre of the site. Part of the proposed houses in the centre will drain into the soakaway to the south. The apartment block in the southwest will drain into the southwest soakaway, and the apartment block in the southeast will drain into the southeast soakaway.

The proposed houses in the north will drain into the surface water network and outfall onto a soakaway located at the centre of the site.'

Proposed surface water drainage strategy:

'*The surface water network for the proposed development has been divided into four separate catchments as shown in the following figure... It is proposed that surface water will drain by a network of gravity surface water pipes to the soakaway in each catchment*.



… During site investigations, Petrifying Tufa springs, which constitute a protected habitat associated with the adjoining SAC, were identified within the wider study area. The presence of these features was identified through ecological assessment undertaken by Dr. Joanne Denyer.

Following identification of the Tufa springs, the proposed surface water drainage strategy was developed in consultation with Dr. Joanne Denyer and Dr. Robbie Meehan (Hydrologist) to ensure that the existing hydrological regime across the site and adjoining SAC is maintained.

The proposed drainage design has therefore been carefully developed to avoid any alteration to existing groundwater flows, seepage patterns, or hydrological conditions which could adversely impact the Petrifying Tufa habitat.

Accordingly, the proposed development is not expected to result in any hydrological impacts on the identified Tufa springs or the adjoining SAC. Please refer to Appendix H for the Petrifying Tufa Springs Walk-Over Survey prepared by Dr. Joanne Denyer.

Catchment 1

Catchment 1 is located to the north area of the site and covers a catchment area of c. 2.20 hectares. The total impermeable area is c. 1.05 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 2

Catchment 2 is located at the central and south area of the site and covers a catchment area of c. 1.28 hectares. The impermeable area is approximately 0.52 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 3

Catchment 3 is located at the southeast area of the site and covers a catchment area of c. 0.34 hectares. The impermeable area is approximately 0.22 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 4

Catchment 4 is located at the southwest area of the site and covers a catchment area of c. 0.36 hectares. The impermeable area is approximately 0.23 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.'

Foul Drainage

As outlined in the Engineering Assessment Report, prepared by Waterman Moylan Consulting Engineers Limited, the proposed foul drainage is as follows:

Introduction

'The site will be served with a new foul sewer system, which will drain by gravity sewers to a proposed pump station located at the southeast of the site and will pump to the outfall into existing 225mm diameter foul sewer on Jonathan Swift Street.

The proposed pumping station is confirmed to comply with Uisce Éireann's Wastewater Infrastructure Standard Details, connection application will be issued to Uisce Éireann for approval with pumping station included.'

Foul water -general

'Foul water sewers within the proposed development will be laid to comply with the requirements of the Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Documents, Section H.

Foul water sewers which will be taken into charge will be laid strictly in accordance with Uisce Éireann's requirements for taking in charge.

In accordance with the Uisce Éireann "Code of Practice for Wastewater Infrastructure",_ _150mm nominal internal diameter sewers have been proposed for carrying wastewater from 20 properties or less; whilst 225mm nominal internal diameter have been proposed for carrying wastewater from more than 20 properties. Furthermore, where there are at least ten dwelling units connected, the 150mm diameter pipes are laid at a minimum gradient of 1:60 for up to nine connected dwelling units.

The pumping station has been located with a 20m separation distance from the nearest dwelling. This complies with Section 5.5 of the Uisce Éireann "Code of Practice for Wastewater Supply", which states that a Type 3 pumping station require a minimum buffer zone of 15m.'

As outlined in the accompanying Preliminary Construction & Environmental Management Plan:

'*In order to facilitate a wastewater discharge from the subject site it is proposed to install a HDPE foul water rising main under the river Boyne. This rising main will be installed by directional drilling*.'

The proposed surface water and foul wastewater drainage plan, as well as the SuDS/soakaway details, rising main details, and overland flood route, are demonstrated in Figures 17-22.

Site-Specific Flood Risk Assessment

The Site-Specific Flood Risk Assessment, was carried out by JBA. In relation to the flood risk of the development area, the report outlines the folllwing:

'The design of the proposed development has ensured that none of the proposed building structures to be constructed on the site will be located inside an NIFM flood zone. The only work that will traverse the NIFM flood zone is the horizontal directional drilling beneath the River Boyne associated with the installation of the 125 mm rising main beneath the river. The Method Statement for this directional drilling has been completed by Dunnes Drilling Limited of Clonmore, Togher, County Louth, and has been included with this application…'

Hydrogeological Assessment

A hydrogeological assessment has been prepared by EurGeol. Dr. Robert T. Meehan for the proposed development, detailing the Land, Soils, Geology, Hydrology and Hydrogeology baseline of the site and outlining the potential impacts of the proposed development. The following impacts are outlined which are directly relevant to this Ecological Impact Assessment:

'LIKELY AND SIGNIFICANT IMPACTS ON LAND, SOILS, GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

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.

The proposed LRD Site is situated adjacent to the River Boyne SAC, as well as a Drinking Water Protected Area abstracting from surface water as the River Boyne is used as a water supply source downstream of Trim Town.

The site is not within a Source Protection Zone for a Public Drinking Water Supply, a Zone of Contribution to a Group Scheme.

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

The not-insignificant depth of overburden at the proposed LRD site will also ensure that access road construction, trenching for electrical cabling, temporary construction compounds and routeway drainage and attenuation (i.e. straw bales and silt fencing / barriers) would have no potential to disrupt groundwater flowpaths downslope. Locally, trenching or drains will typically extend no more than 0.6 m 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 an aquifer that does not illustrate any karst features anywhere in the vicinity of Trim.

…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 in the majority, largely on the pre-existing, in situ subsoil. In only a few cases will cut-and-fill happen where split level houses are proposed to be constructed.

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 a restricted locality in the southeastern 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 no rock-breaking will be required across 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. Bedrock will only be encountered while boring the proposed tunnel for the proposed 125 mm rising main beneath the River Boyne at the southeastern extremity of 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 local to any of the proposed structures on the site. The proposed 125 mm rising main borehole will not pump or dewater the area within and around it, and will drill in the saturated zone, in and beneath the water table. The full procedural and Method Statement for the directional drilling is included in the report by Dunnes Drilling Limited (Dunnes, 2025).

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 that require removal (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; this will be to a maximum depth of approximately 0.75 m where required. No blasting shall be employed in the removal of topsoil or subsoil.

Any topsoil or subsoil stockpiles will likely only store a maximum of 100m3 of topsoil at any one time (depending on the exact sequence of works).

The maximum dimensions of any stockpiles shall be 2 m in height, approximately 5 m deep and approx. 10 m long. On this basis, it is estimated that there should be no more than 2 no. stockpiles of topsoil required.

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 the springs and the River Boyne, 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 infiltrate to ground during construction, as happens currently on the site, and will be manged by the straw bales and silt fences as described above. 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 overcompacted when restoring the site.'

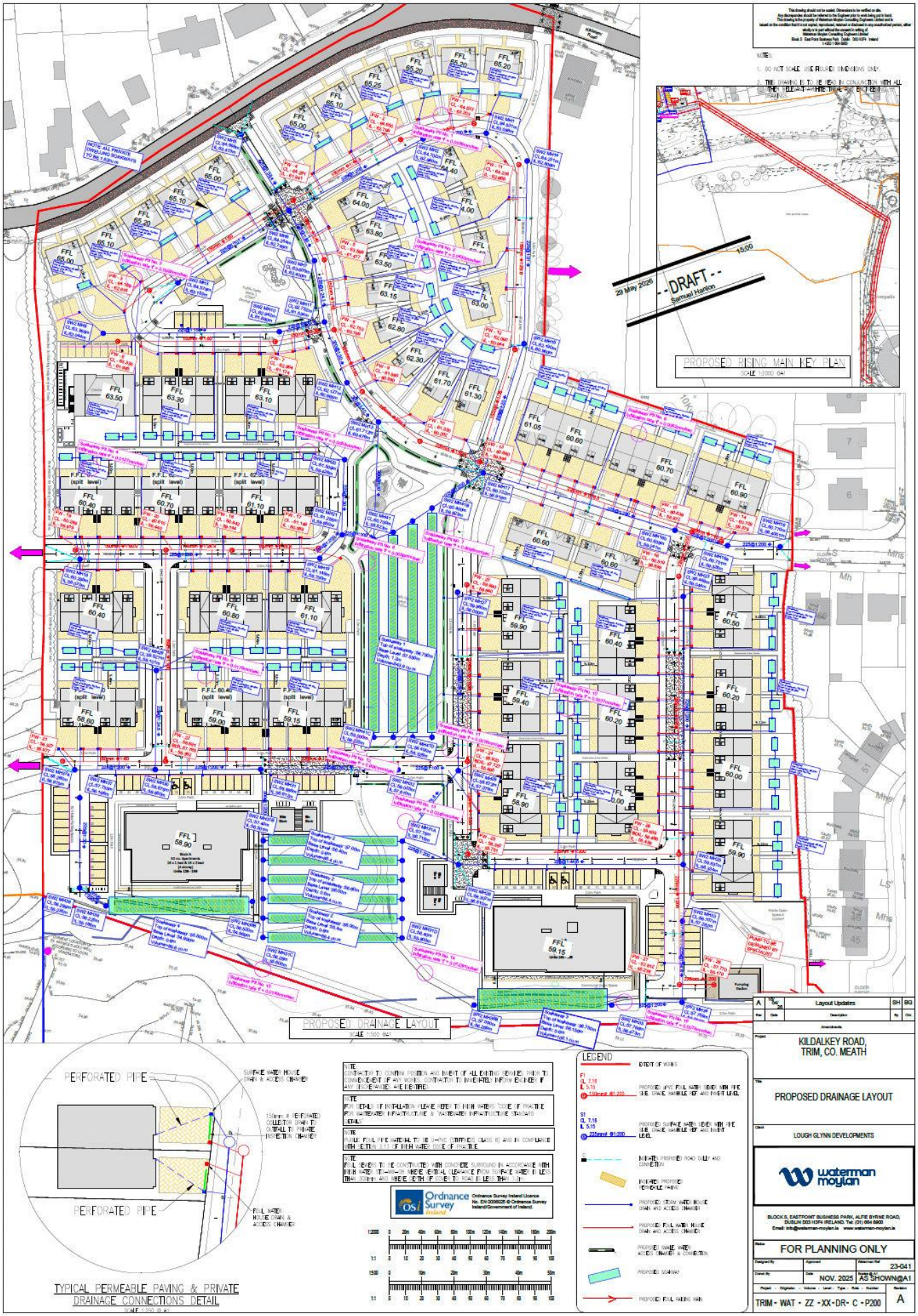


Figure 18. *Proposed drainage layout*

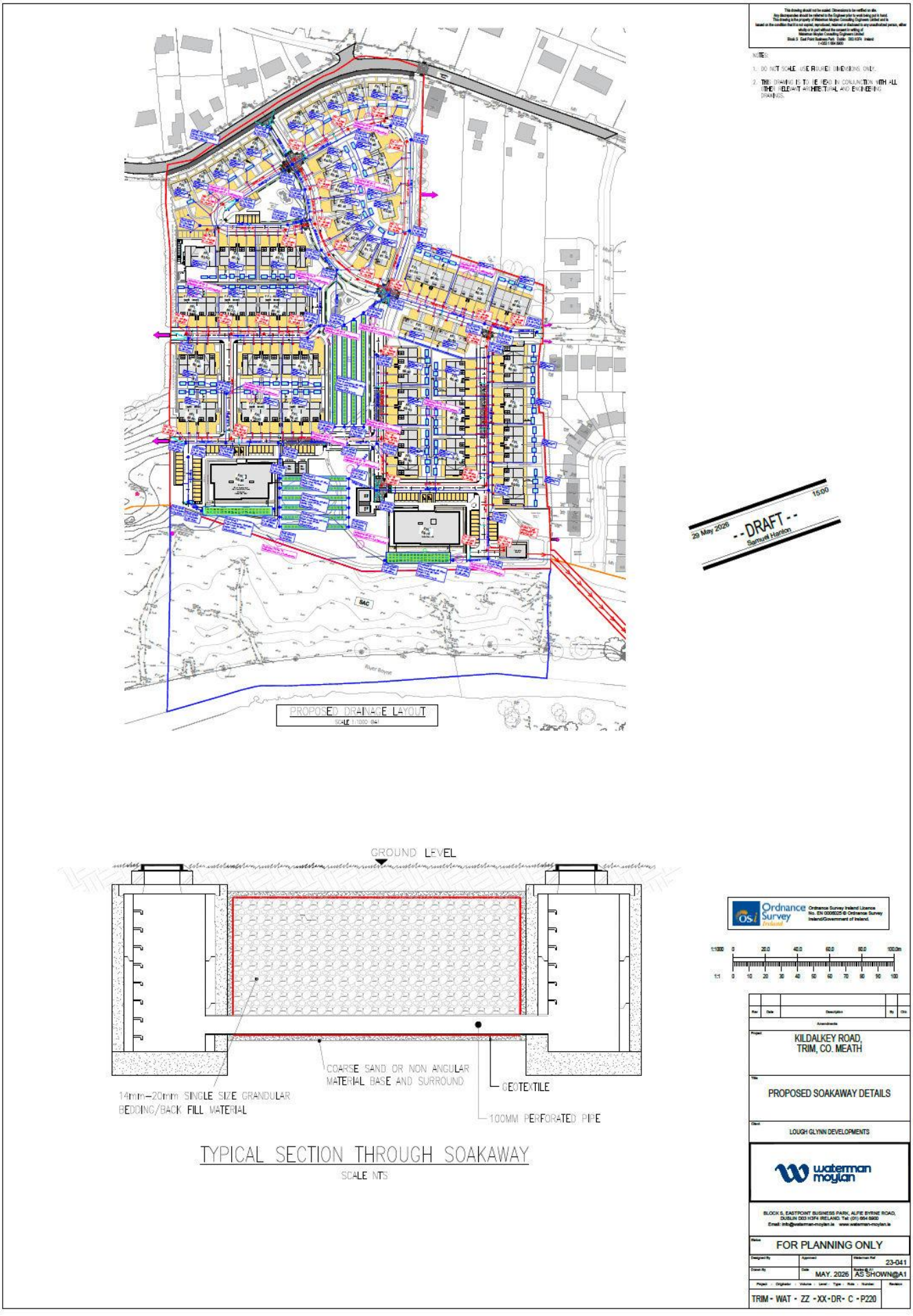


Figure 19. *Proposed soakaway details*

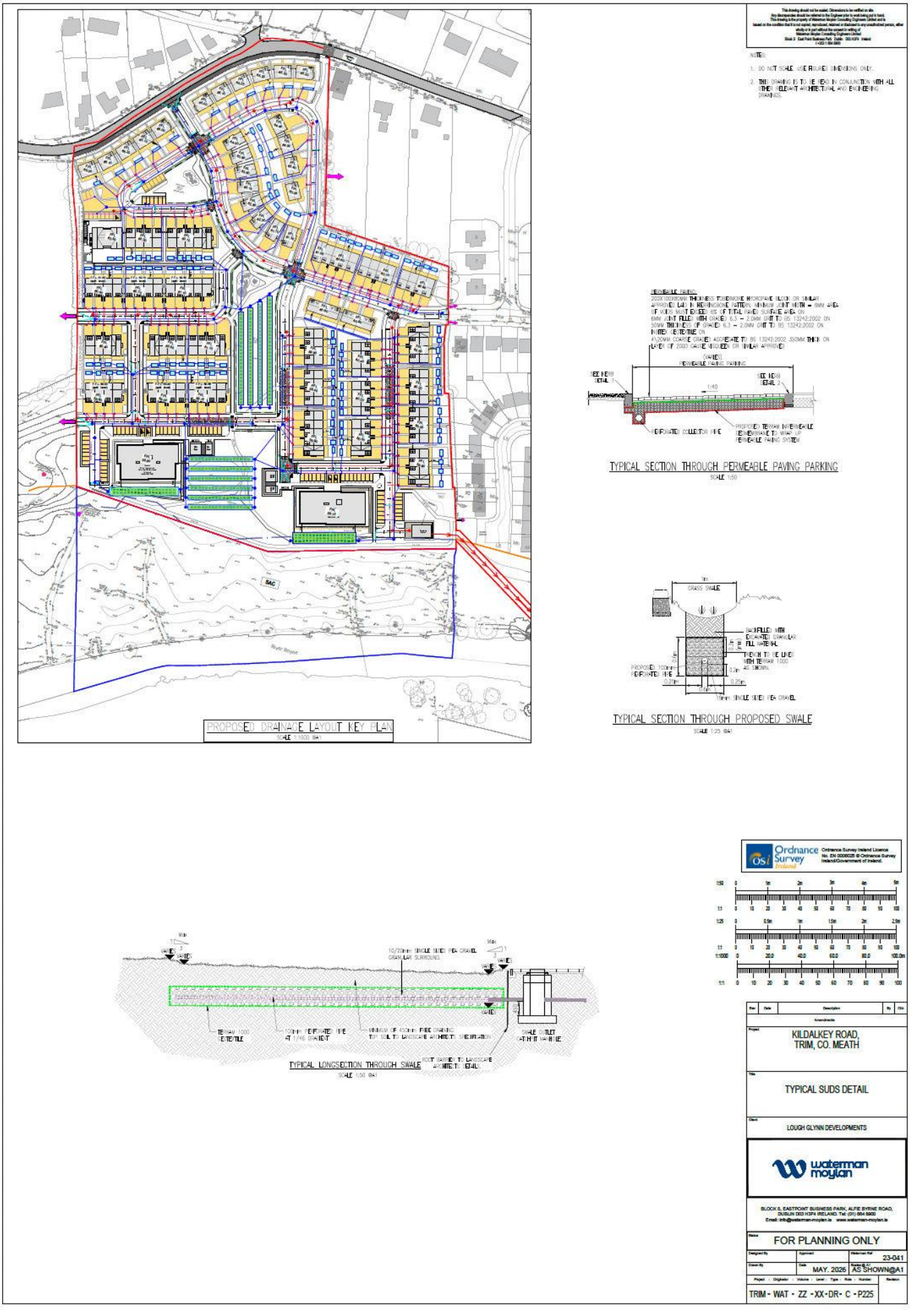


Figure 20. *Typical SuDS layout*

Figure 21. *Proposed rising main general arrangement plan*

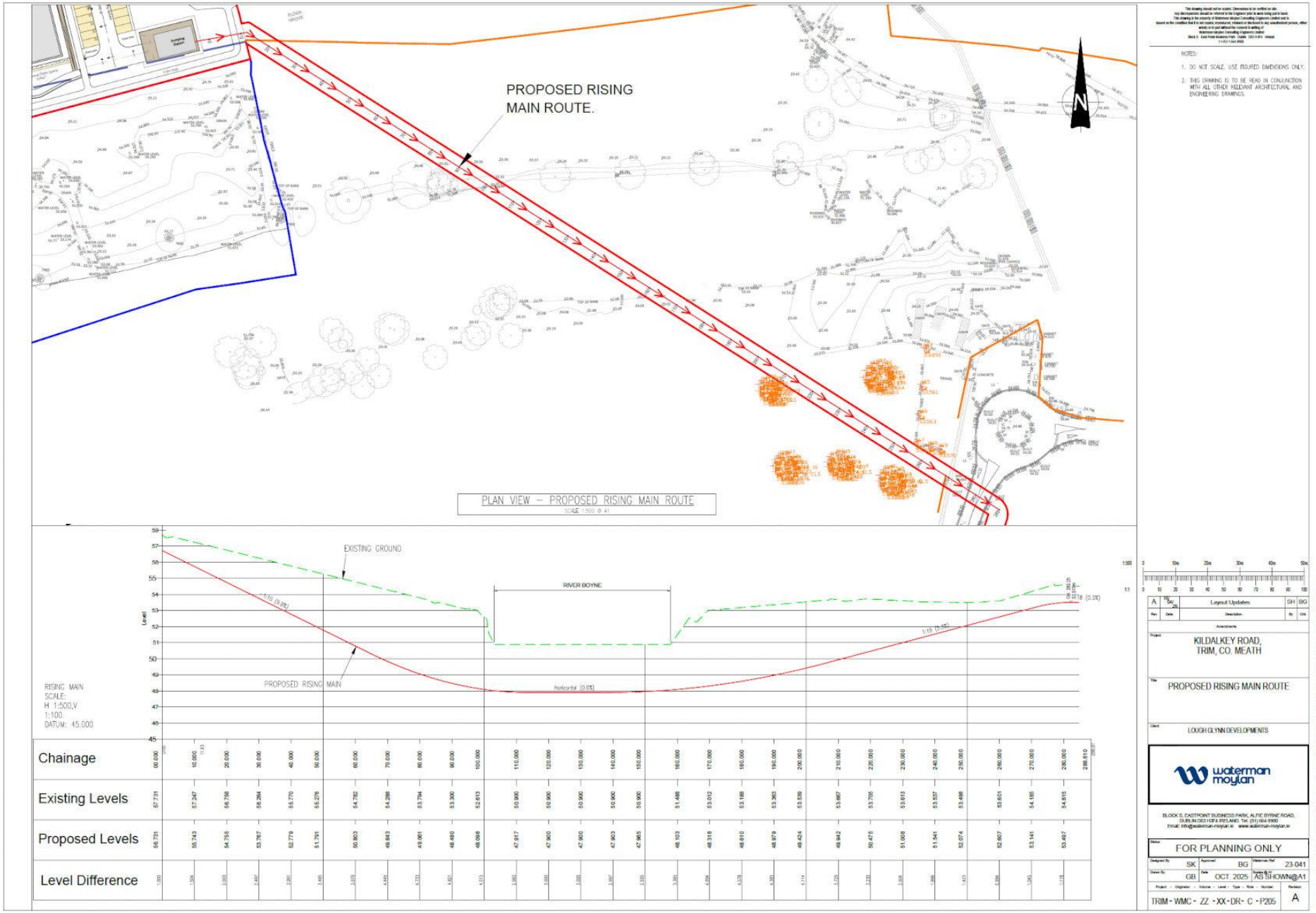


Figure 22. *Proposed rising main route*

Figure 23. *Overland flood route*

Ecological Assessment Methodology

Desk Study

A desk study was undertaken to gather and assess ecological data prior to undertaking fieldwork elements. Sources of datasets and information included:

- The National Parks and Wildlife Service
- National Biological Data Centre
- Satellite, aerial and 6" map imagery
- Bing Maps (ArcGIS)

A provisional desk-based assessment of the potential species and habitats of conservation importance was carried out in April 2025, with the updated site assessment on the 5th May 2026. Altemar assessed the project, the proposed construction methodology and the operation of the proposed development.

Field Survey

A field survey of the proposed development site was carried out by Altemar Ltd. on the 17th September 2025, which included a bat assessment. Twelve wintering bird surveys were carried out at the subject lands from November 2025 to March 2026, aimed at providing information to assist in assessing the potential impact of the proposed development on wintering birds within/over the development area, in particular species listed as Qualifying Interests of nearby SPAs. A mammal survey was carried out during the survey period. The surveys were conducted by Jeff Boyle (BSc.) on the 30th January, 2025, Frank Spellman (MSc.) on the 22nd April, 21st/27th November, 8th December, 2025, Jack Doyle (MSc.) on the 11th/21st February, 3rd/25th March, 4th June, 17th September, 4th November, 2025, Emma Peters (BSc. Environmental Science) on the 25th/30th September 2025, and Luke Dodebier (BSc. Wildlife Biology) on the 16th December 2025, 8th/28th January, 12th February, 18th/30th March 2026. The surveys were carried out in mild dry conditions and covered all the lands within the site outline and the land immediately outside the site. The purpose of the field surveys was to identify habitat types according to the Fossitt (2000) habitat classification and map their extent. In addition, more detailed information on the species composition and structure of habitats, conservation value and other data were gathered.

Survey Limitations

The most recent field survey was carried out on the 30th March 2026. This is within the period for full species assessments of the floral cover in addition to bat surveys. Weather conditions were mild and dry and allowed a bat detector surveys to take place. No limitations are foreseen in relation to the surveys.

Consultation

The National Parks and Wildlife Service (NPWS) were consulted in relation to species and sites of conservation interest. Data of rare and threatened species were acquired from NPWS. The National Biological Data Centre records were consulted for species of conservation significance.

Spatial Scope and Zone of Influence

As outlined in CIEEM (2018) '*The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.*' In line with best practice guidance an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995).

Given the scale of the proposed development, the distance to designated conservation sites and the direct hydrological pathway between numerous designated conservation sites via drilling works under the River Boyne, it is considered that the ZoI of the proposed project includes the site outline, the River Boyne, and the River Boyne and River Blackwater SAC & SPA. In the absence of mitigation, there is the potential for dust, pollution and surface water runoff to enter the River Boyne during construction and operation of the proposed development, with the potential for significant effects on these designated sites. In this case, the potential ZOI extends beyond the site, with the potential for downstream impacts to extend beyond the proposed development area.

Ecological Evaluation Criteria

This section of the EcIA examines the potential causes of impact that could result in likely significant effects to the species and habitats that occur within the ZOI of the proposed development. These impacts could arise during either the construction or operational phases of the proposed development. The following terms are derived from EPA EIAR Guidance (2022) (Tables 1A -F) and are used in the assessment to describe the predicted and potential residual impacts on the ecology by the construction and operation of the proposed development.

Table 1A: Impact description terminology (EPA,2022)

Magnitude of effect (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Table 1B: Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Table 1C: Quality of effects

Quality of Effects	Effect Description
Negative /Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Table 1D: Significance of Effects

Significance of Effect	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Table 1E: Duration and frequency of effects

Duration and Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Table 1F: Describing probability of effects

Describing the Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Results

Proximity to Designated Conservation Sites

Designated sites are presented in Figure 22 (SACs within 15km), Figure 23 (SPAs within 15km), Figure 24 (NHAs within 15km), Figure 25 (pNHAs within 15km), Figure 26 (Ramsar sites within 15km), Figure 27 (Watercourses near the subject site), Figure 28 (SACs and watercourses within 5km of the subject site), Figure 29 (SPAs and watercourses within 5km of the subject site), and Figure 30 (pNHAs and watercourses within 5km of the subject site). The site outline traverses the River Boyne and River Blackwater SAC and SPA, and drilling works are proposed to be undertaken beneath the River Boyne. The nearest NHA is Jamestown Bog (8.3km), and the nearest pNHA is Trim (3.5 km). There are no Ramsar sites within 15km of the proposed site.

In this case, the nearest European sites to the proposed development are within the site outline (River Boyne and River Blackwater SAC & SPA). The proposed development site consists of agricultural lands located in Trim, Co. Meath with the River Boyne traversing the southern site boundary and through the redline boundary (Figure 29). The works will involve intensive HDD works to install a 125mm rising main under the River Boyne through rock for this development. In the absence of mitigation, there is significant potential for impacts on the River Boyne and River Blackwater SAC and SPA. Additionally, given that the site is directly adjacent to (and within) the River Boyne, there is the potential for dust, construction pollutants and contaminated surface water runoff to enter these European sites and potentially cause significant effects.

The distance and details of the conservation sites within 15km and beyond 15km with a hydrological connection to the proposed development site are presented in Tables 2 & 3. The River Boyne traverses the subject site. Given the scale of the proposed development, proposed drilling works and the proximity of River Boyne, out of an abundance of caution, it is considered that the ZoI of the proposed project extends beyond the site outline to include River Boyne and River Blackwater SAC and SPA. In the absence of mitigation, there is the potential for dust, pollution and contaminated surface water runoff to enter the River Boyne, with the potential for downstream impacts on the River Boyne and River Blackwater SAC and SPA, as well as Trim pNHA via direct hydrological pathway (the River Boyne).

***Table 2**. Natura 2000 sites within 15km of the proposed development*

Site Code	NATURA 2000 Site	Distance
Special Areas of Conservation		
IE002299	River Boyne and River Blackwater SAC	0 km
IE002203	Girley (Drewstown) Bog SAC	14.8 km
Special Protection Areas		
IE004232	River Boyne and River Blackwater SPA	0 km

***Table 3**. NHA, pNHA and Ramsar sites within 15km of the subject site*

Status	Site Name	Distance
NHA	Jamestown Bog	8.3 km
NHA	Girley Bog	13.7 km
Proposed NHA	Trim	3.5 km
Proposed NHA	Rathmoylan Esker	7.2 km
Proposed NHA	Royal Canal	13.9 km

Habitats and Species

A site assessment was carried out on the 25th and 30th September 2025 and updated in April 2026. Habitats within the proposed site were classified according to Fossitt (2000) (Figure 33), and species assessments were carried out. It should be noted that a badger sett with multiple entrances is located in the hedgerow to the west of the site, a second badger sett is located in the northern hedgerow to the northwest of the site (outside of the site boundary).

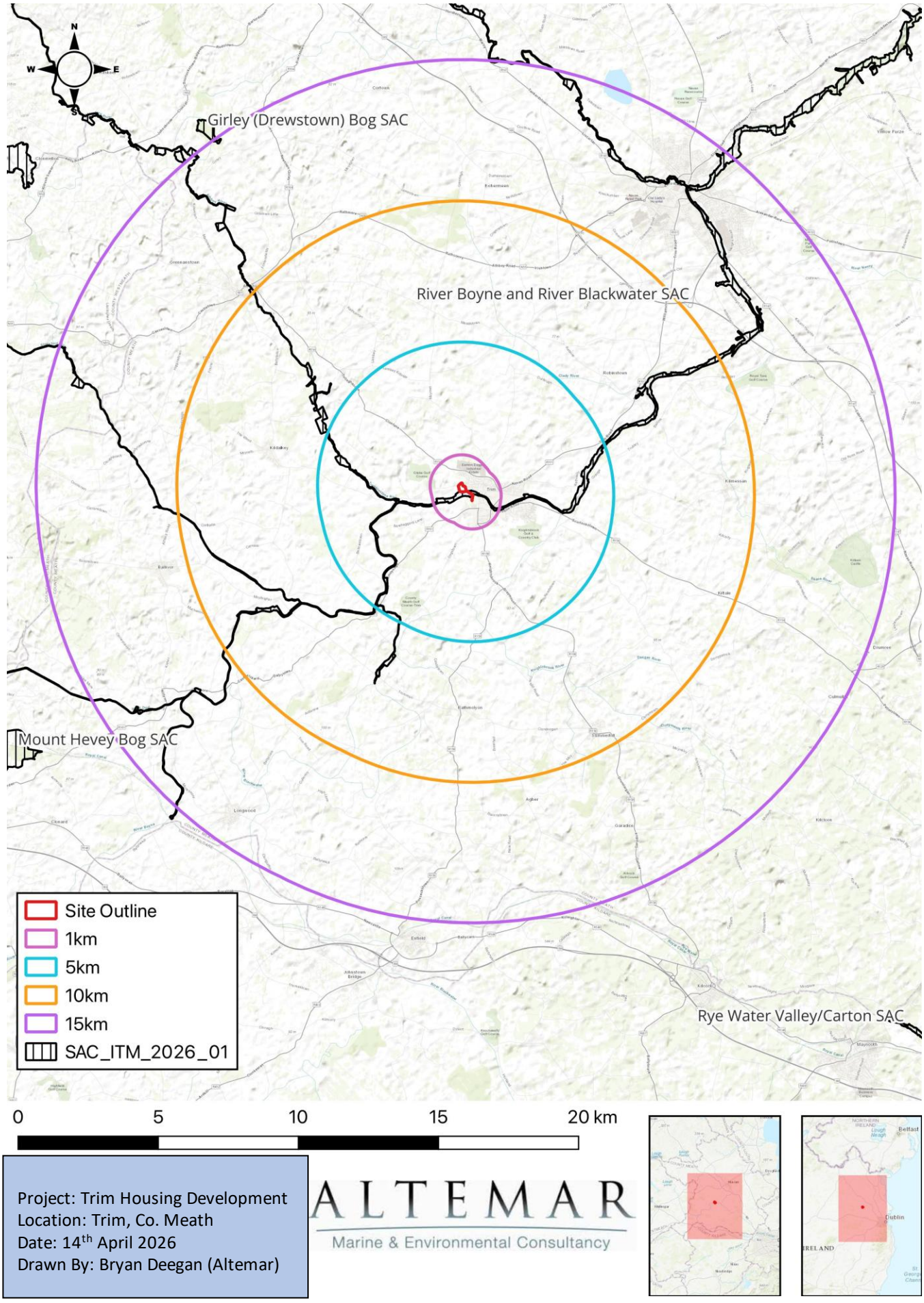


Figure 24. *SACs within 15km of the proposed development*

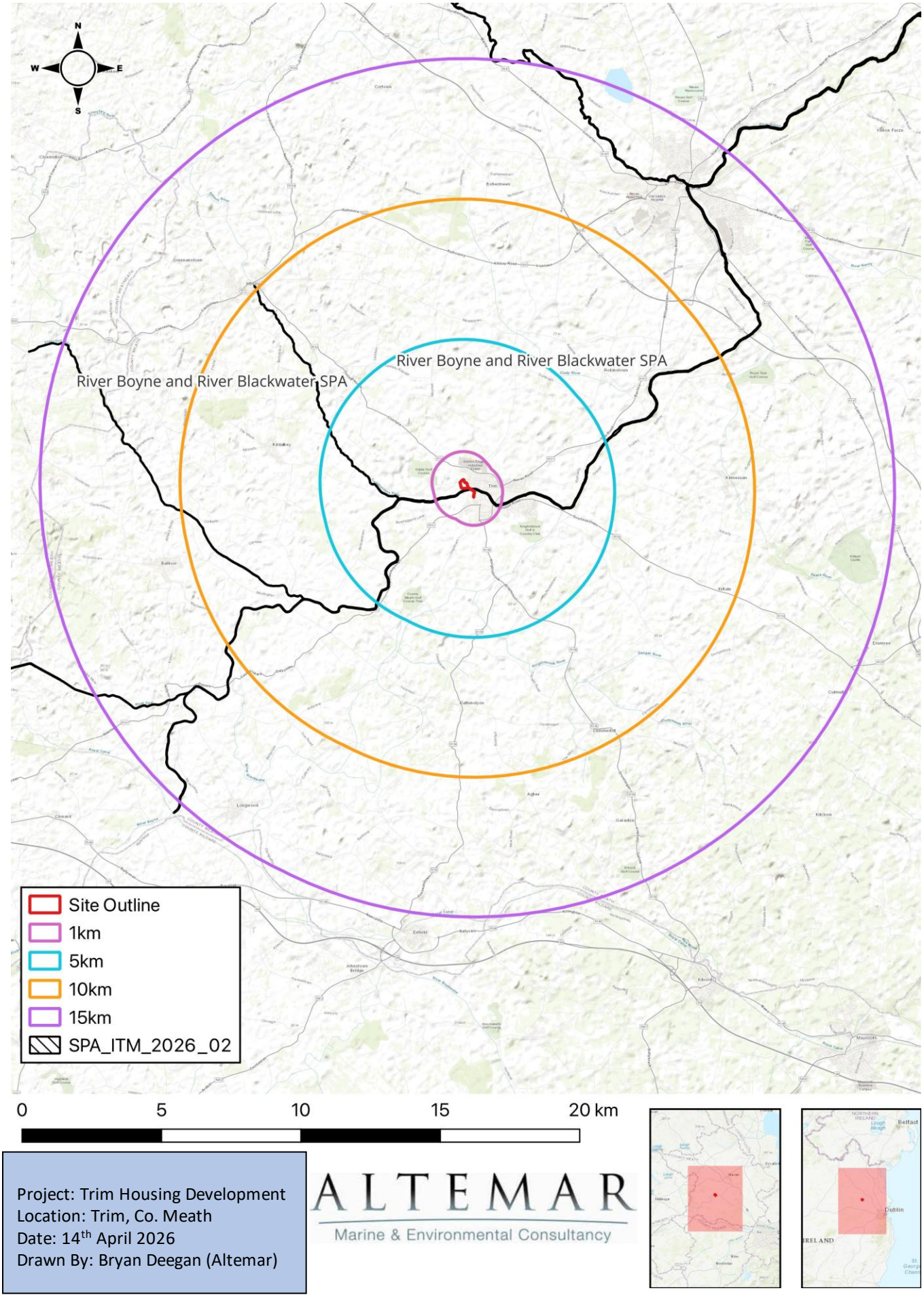


Figure 25. *SPAs within 15km of the proposed development*

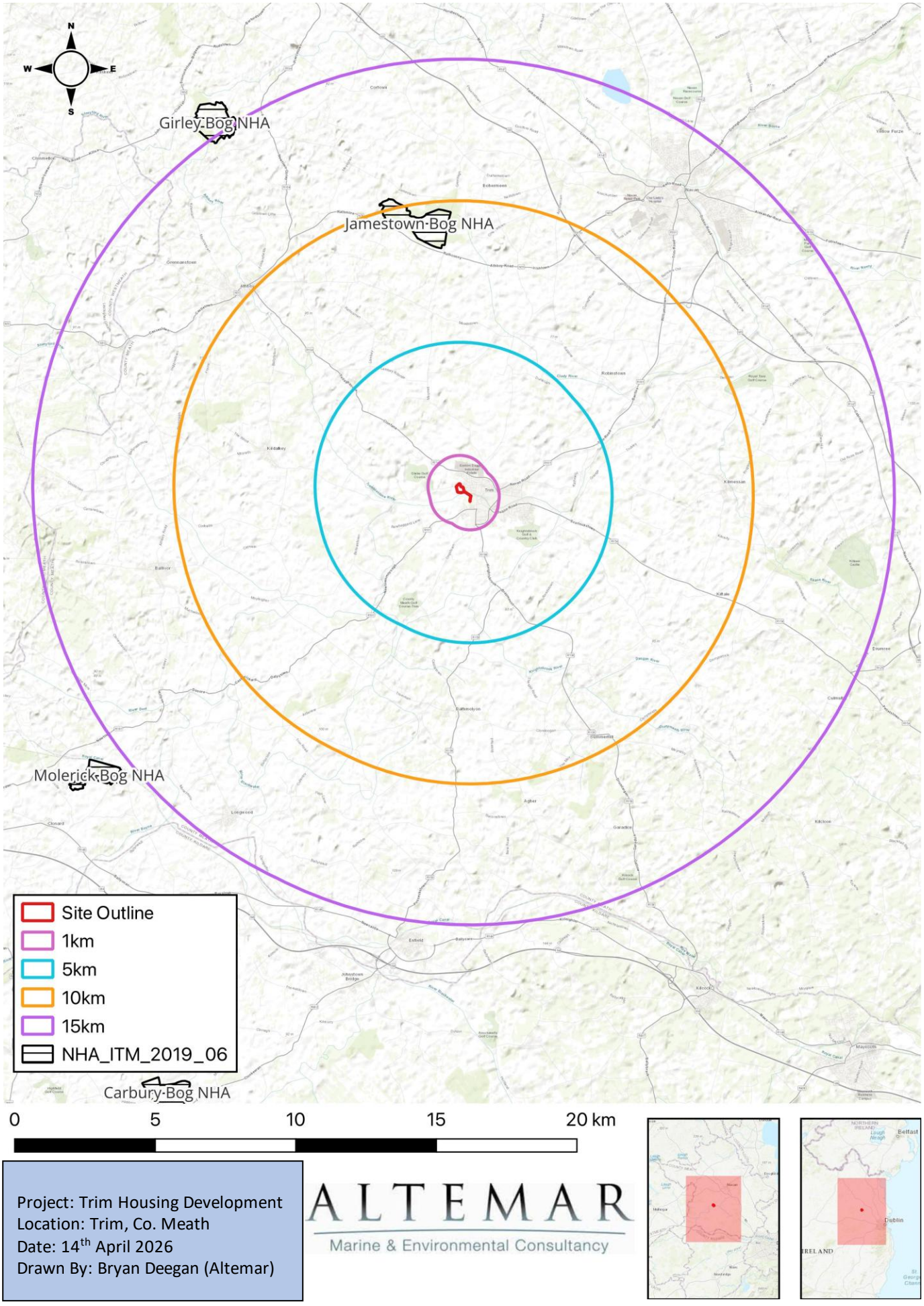


Figure 26. *Natural Heritage Sites (NHA) within 15km of the proposed development*

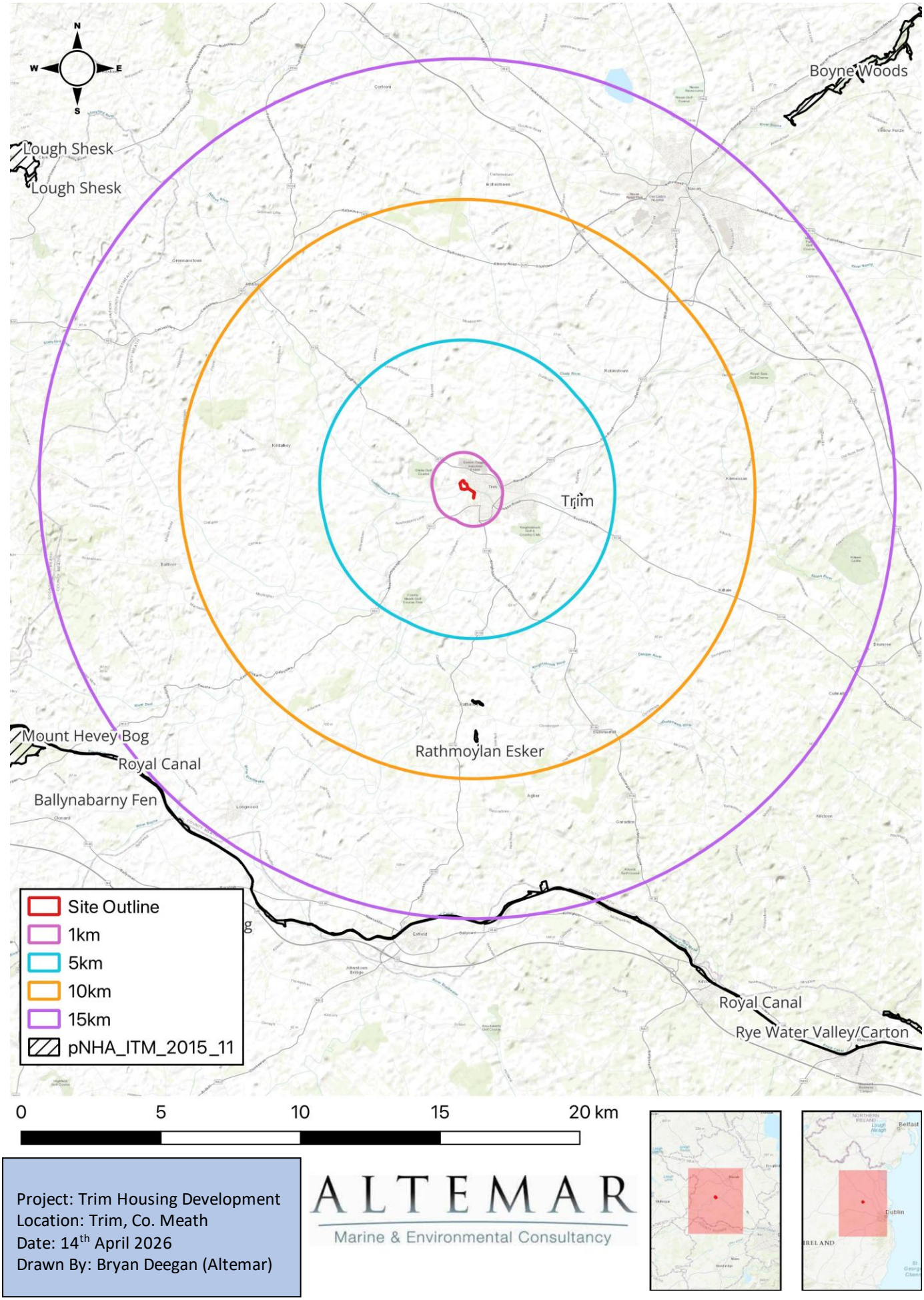
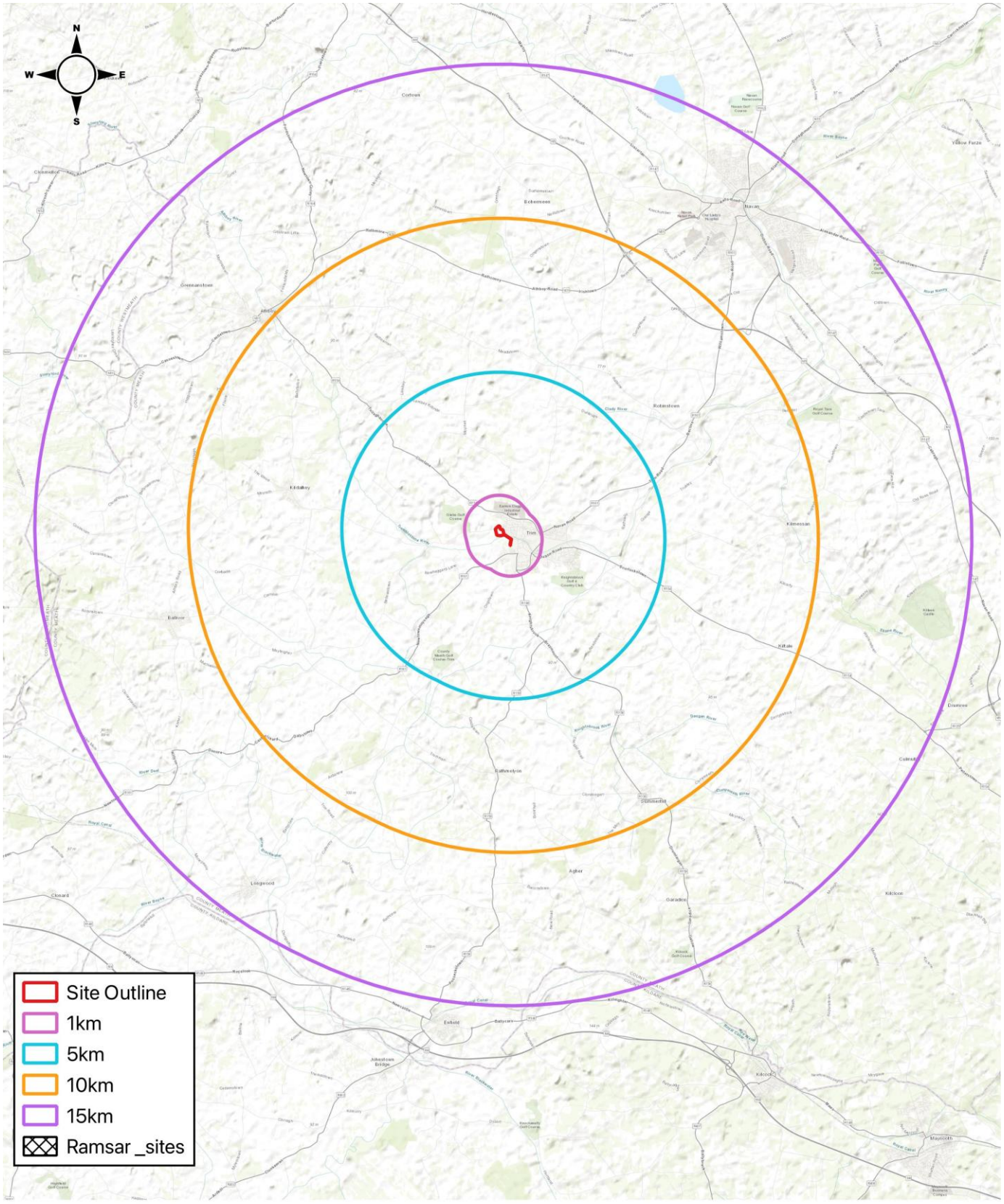


Figure 27. *proposed Natural Heritage Sites (pNHAs) within 15km of the proposed development*



Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

ALTEMAR
Marine & Environmental Consultancy

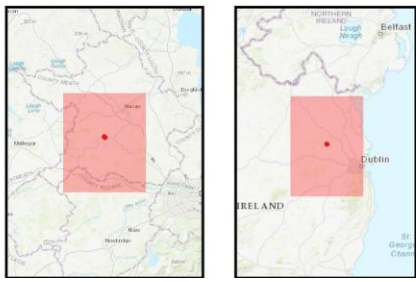


Figure 28. *Ramsar sites (none) within 15km of the proposed development*

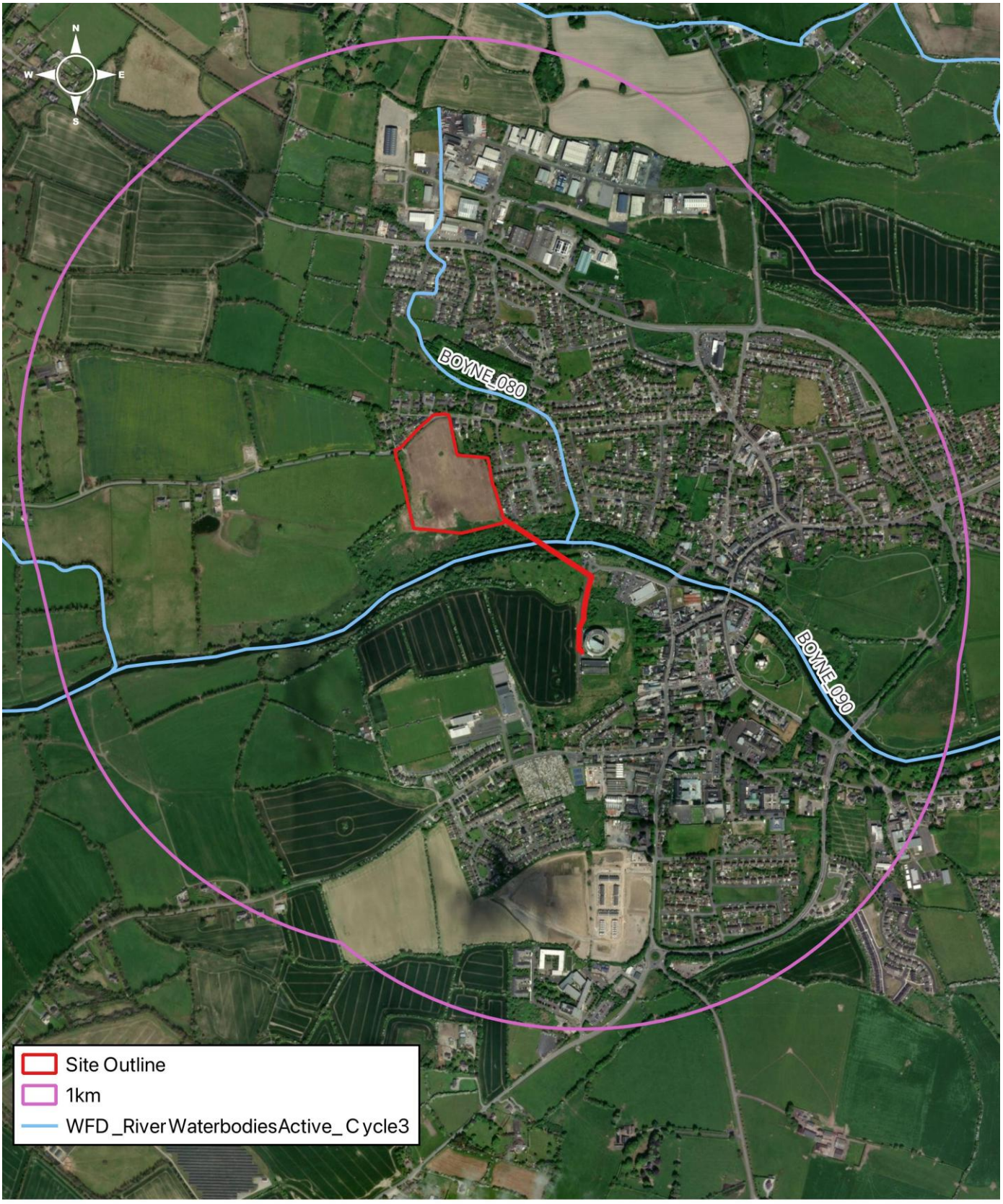
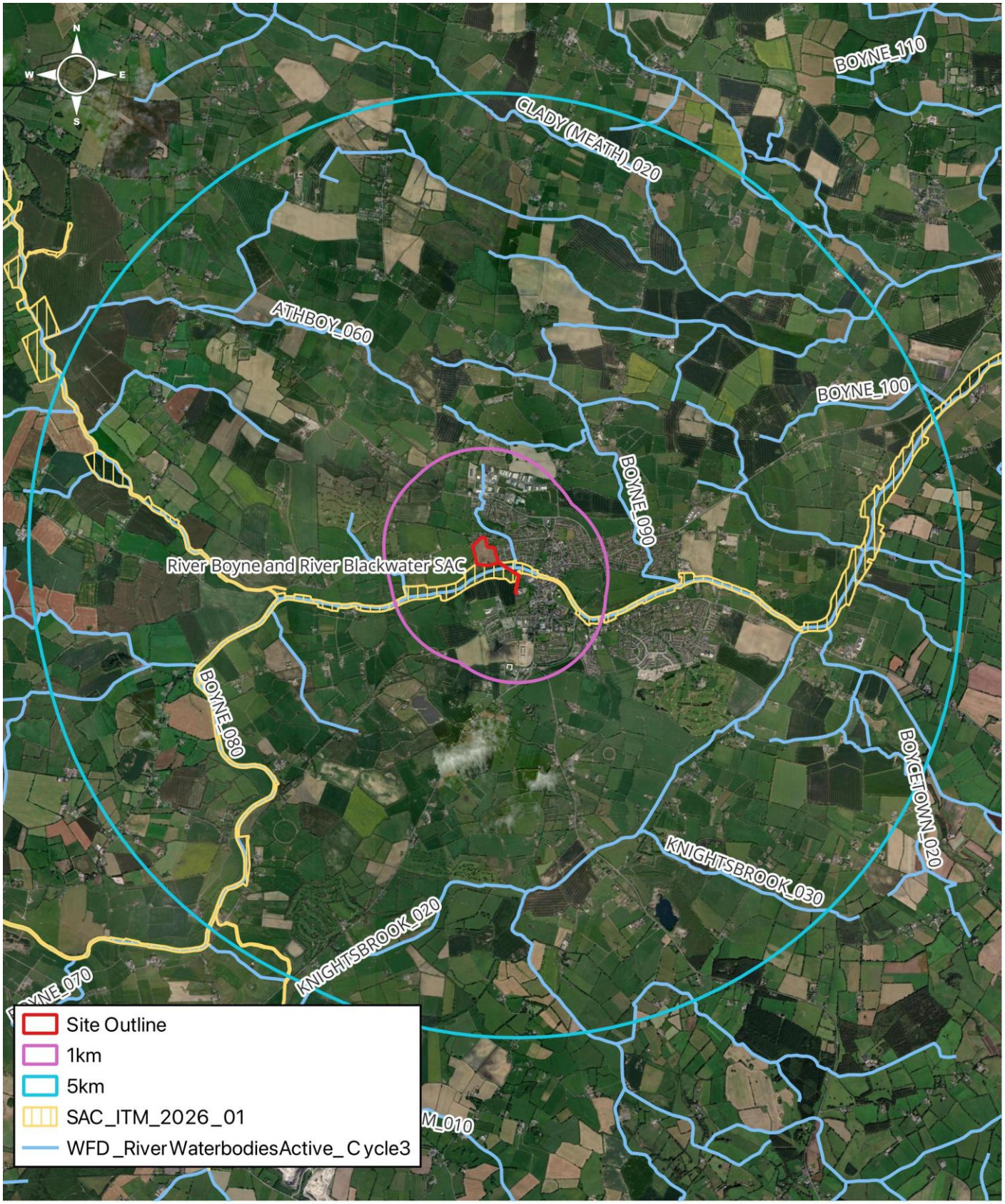


Figure 29. *Watercourses proximate to the subject site*



Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

ALTEMAR
Marine & Environmental Consultancy

Figure 30. *Watercourses and SACs within 5km of the subject site*

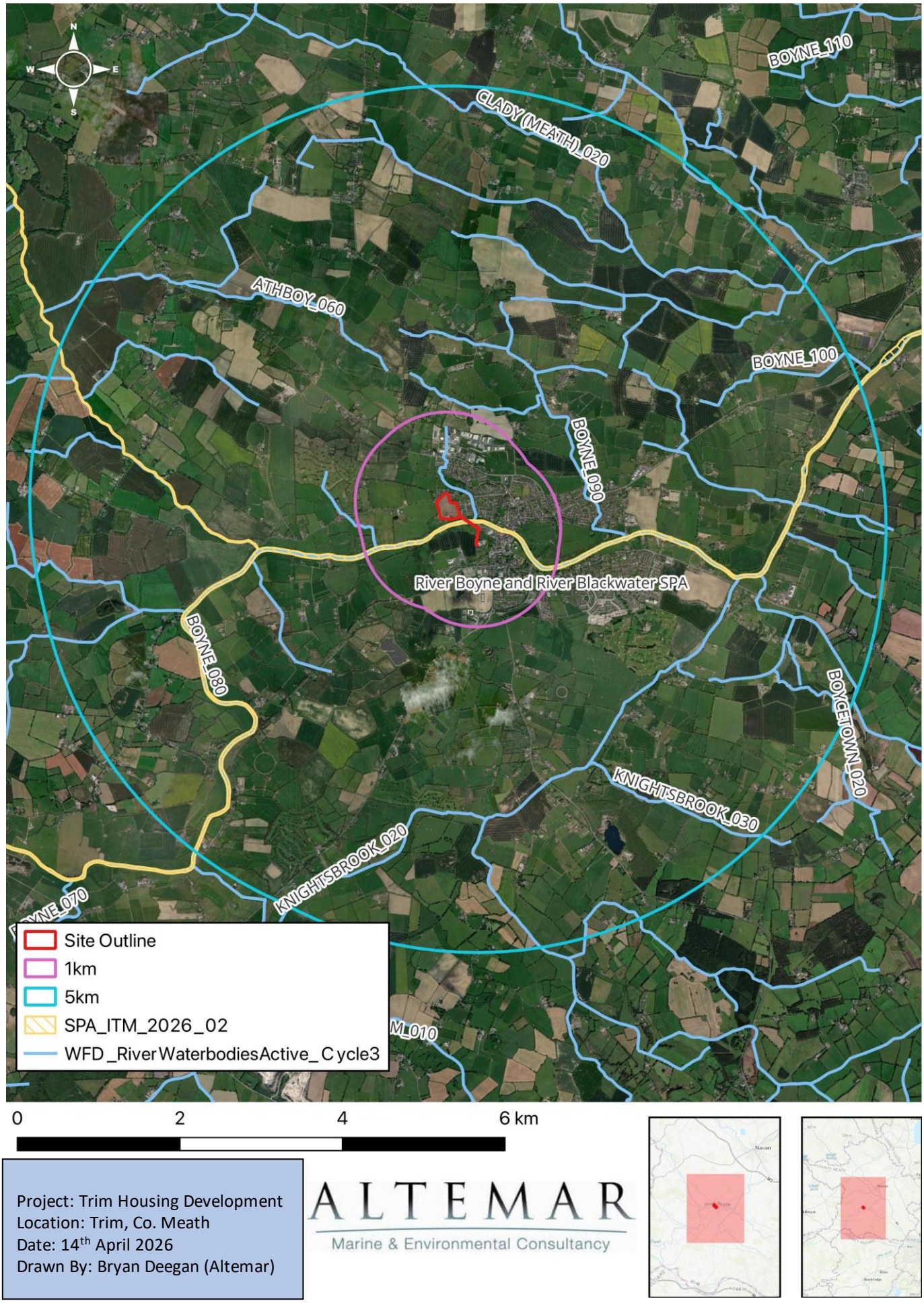
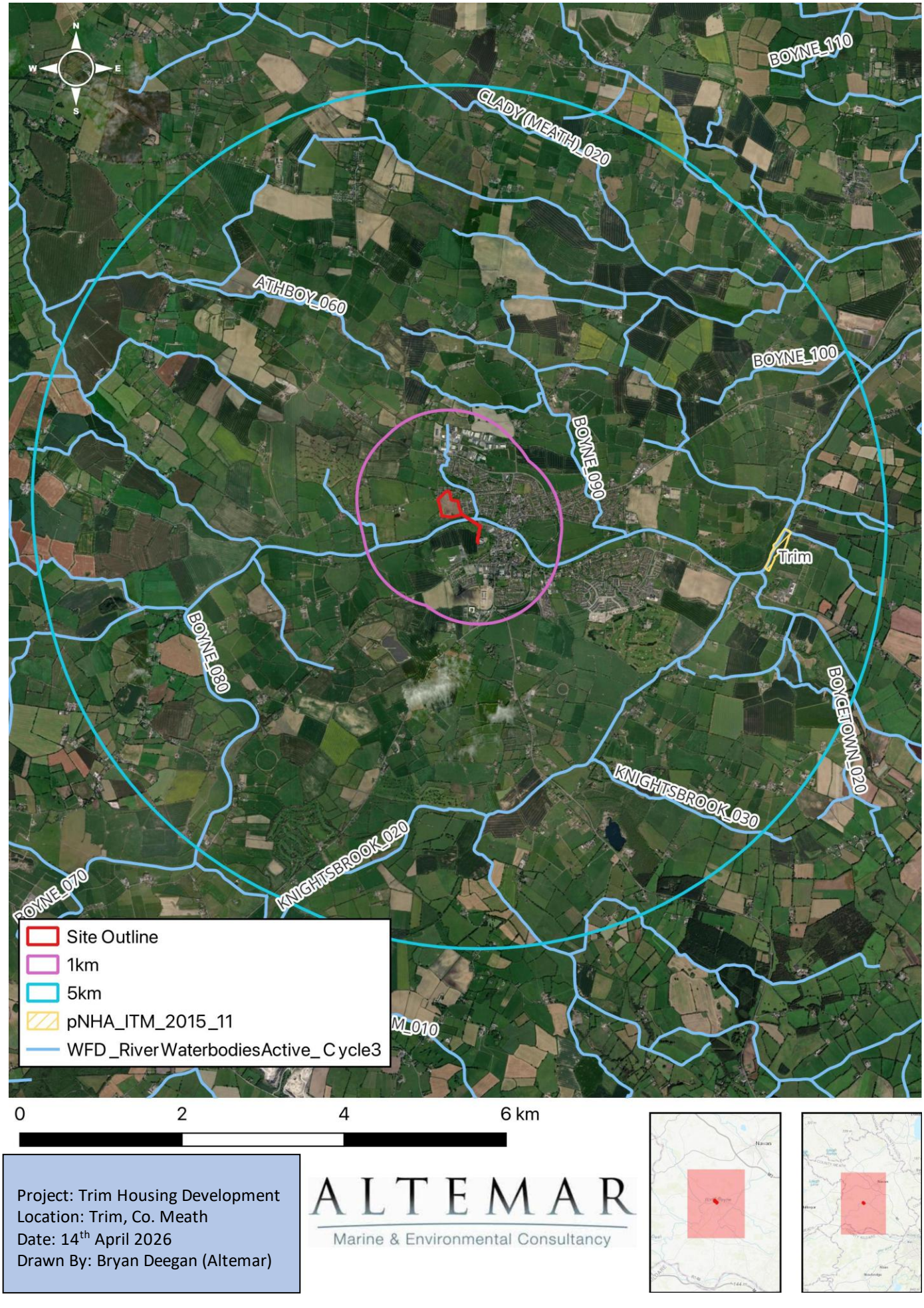


Figure 31. *Watercourses and SPAs within 5km of the subject site*



Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

ALTEMAR
Marine & Environmental Consultancy

Figure 32. *Watercourses and pNHAs near the subject site*

Figure 33. Fossitt (2000) Habitat Map (orange and green crosses denote Badger setts).

As can be seen from Figure 33, the site consists of the following habitats (Fossitt, 2000):

BC3 - Tilled land

The majority of the proposed development site comprised of tilled land. There was no sprouting vegetation at the time of the survey.

***Plate 1**. Tilled field.*

WS1 – Scrub

Patches of brambles (*Rubus fruticosus agg*) scrub were mosaiced throughout the site.

WL2 – Treeline

Treelines lined the east and north boundaries of the site. The tree species included sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*). willow (*Salix sp.*), cypress (*Cupressus spp.*), horse chestnut (*Aesculus hippocastanum*). The hedgerow understory consisted of brambles (*Rubus fruticosus agg*), blackthorn (*Prunus spinosa*), snowberry (*Symphoricarpos albus*), red-osier dogwood (*Cornus sericea*), snowberry (*Symphoricarpos albus*), ivy (*Hedera helix*), Sea-buckthorn (*Hippophae rhamnoides)* (Invasive), French crane's-bill (*Geranium endressii*), cleavers (*Galium aparine*) and nasturtium (*Tropaeolum majus*).

GS4 – Wet Grassland/ FP1 - Calcareous springs

At the south of the site was a wet grassland into calcareous springs habitat. The grassland consisted of vascular plants such as smooth hawksbeard (*Crepis capillaris*), self-seeding willow (*Salix sp.*), ribwort plantain (*Plantago lanceolata*), greater plantain (*Plantago major*), Changing Forget-me-not **(***Myosotis discolor*), black medic (*Medicago lupulina*), hogweed (*Heracleum sphondylium*), nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), common bent grass (*Agrostis capillaris*) and rose-bay willowherb (*Chamaenerion angustifolium*).

The vascular plants found directly around the Tufa formations included meadowsweet (*Filipendula ulmaria*), pendulous sedge (*Carex pendula*), hedge bindweed (*Calystegia sepium*), cocksfoot (*Dactylis glomerata*), yellow flag (*Iris pseudacorus*), common spikerush (*Eleocharis palustris*) and marsh horsetail (*Equisetum palustre*). Bryophyte, liverworts and algae were found around the tufa formations however these were not identified to species level. Historic agricultrual disturbance was noted in parts of this area.

Plate 2. *Tufa formation on roots of vegetation.*

Plate 3. *Tufa formation in roots of vegetation.*

Petrifying Spring Survey and Assessment

Dr Joanne Denyer was commissioned by Loughglynn Developments Limited to undertake detailed plot survey and condition assessment of petrifying spring habitat Kildalkey Road, Trim, Co. Meath. Petrifying springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat. Part of the survey site is located within the River Boyne and River Blackwater SAC [site code 002299]. Whilst there are several examples of Annex I priority petrifying springs recorded from this SAC, they are not currently listed as a Qualifying Interest for the site. However, Petrifying Springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat, the impact on these habitats have been considered in this Ecological Impact Assessment. The extent of these habitats is shown in Figure 17 below:

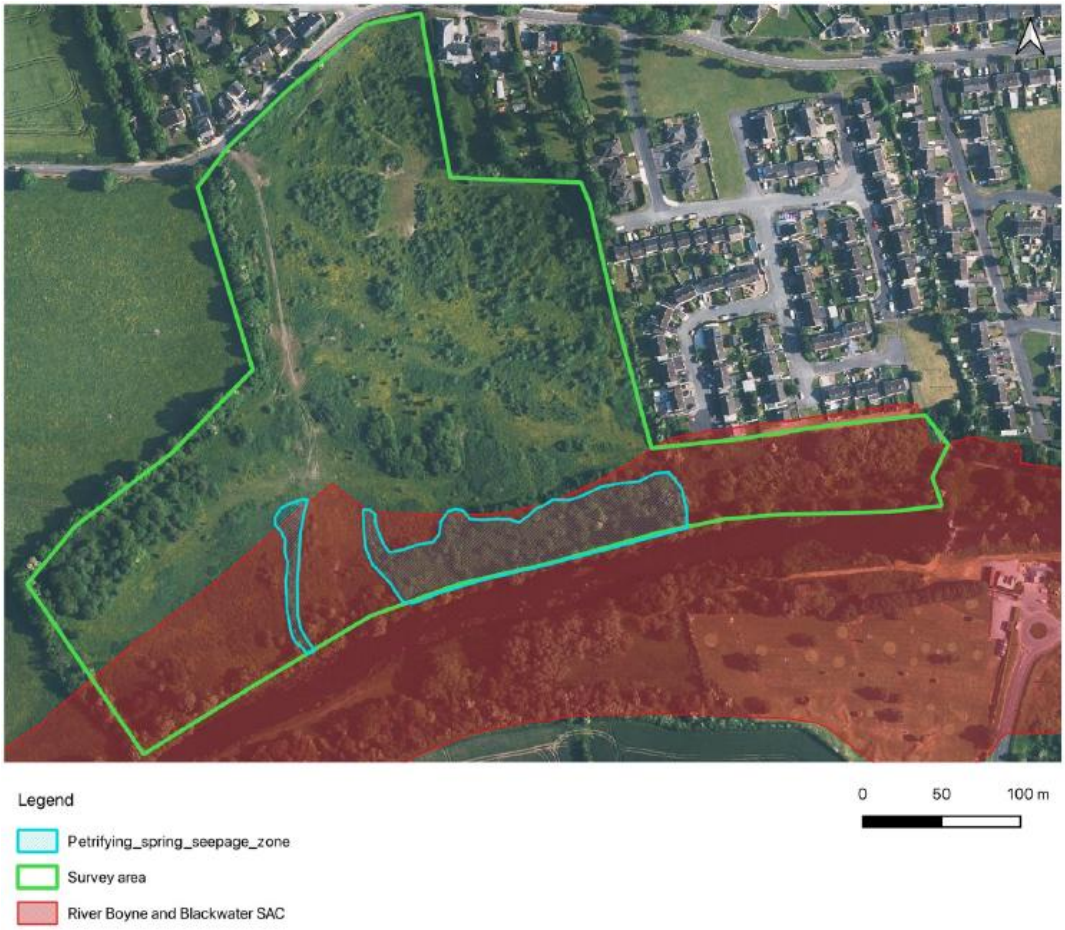


Figure 34. Location of petrifying springs/seepage area within the survey area (Denyer Ecology, 2026)

WN5 – Wet-willow-ash woodland (outside the site boundary)

The woodland to the south of the site along the river Boyne was predominantly alder (*Alnus glutinosa*) and willow species including eared willow (*Salix aurita*), grey willow (*Salix cinerea subsp. oleifolia*) and osier (*Salix viminalis*) with some elder (*Sambucus nigra*), sycamore (*Acer pseudoplatanus*), and hawthorn (*Crataegus monogyna*). Species noted in the herbaceous layer included hawthorn (*Crataegus monogyna*). Species noted in the herbaceous layer included nettle (*Urtica dioica*), red deadnettle (*Lamium purpureum*), herb Robert (*Geranium roberianum*), brambles (*Rubus fruticosus agg*), rose-hip (*Rosa canina* agg.), false oat grass (*Arrhenatherum elatius*), tall fescue (*Schedonorus arundinaceus (Festuca arundinacea)*), bittersweet (*Solanum dulcamara*), blue water speedwell (*Veronica anagallis-aquatica*), water mint (*Mentha aquatica*), water dock (*Rumex hydrolapathum*), pendulous sedge (*Carex pendula*), meadowsweet (*Filipendula ulmaria*), field woundwort (*Stachys arvensis*), marsh woundwort (*Stachys palustris*), hedge woundwort (*Stachys arvensis),* common knapweed (*Centaurea nigra*), bush vetch (*Vicia sepium*), water figwort (*Scrophularia auriculata*), alexanders (*Smyrnium olusatrum),* hogweed (*Heracleum sphondylium*), ivy-leaved speedwell (*Veronica*

hederifolia), sharp-flowered rush (*Juncus acutiflorus*), many horsetail species including marsh horse tail (*Equisetum palustre*), water-cress (*Nasturtium officinale (Rorippa nasturtium-aquaticum)*), jointed rush (*Juncus articulatus*), brookelime (*Veronica beccabunga*), purple loose-strife (*Lythrum salicaria*) and tufted vetch (*Vicia cracca*).

ED3 - Recolonising bare ground

In the areas between the grassland and tilled land was recolonising bare ground. Species noted within this habitat included white clover (*Trifolium repens*), red clover (*Trifolium pratense*), ribwort plantain (*Plantago lanceolata*), greater plantain (*Plantago major*), groundsel (*Senecio vulgaris*), thistles (*Cirsium spp.*), daisy (*Bellis perennis*), self-seeding willow (*Salix sp.*), dandelions (*Taraxacum officinale* agg.), great willowherb (*Epilobium hirsutum*), common ragwort (*Jacobaea vulgaris*), common vetch (*Vicia sativa*), nettle (*Urtica dioica*), broad-leaved docks (*Rumex obtusifolius*), black medic *(Medicago lupulina*),), white clover (*Trifolium repens*), red clover (*Trifolium pratense*) and lesser stitchwort (*Stellaria graminea*).

FW2 – Lowland/depositing river

Along the south border of the site is the River Boyne which flows east. There are four streams onsite that flow south to join with the River Boyne. The proposed HDD works will be carried out under a section of the River Boyne to connect the foul water system.

Plate 5. *River Boyne at south of site*

Plate 6. *On-site Stream*

Discussion of habitats:

The proposed development site is dominated by intensively managed agricultural land comprising tilled land (BC3), which forms the majority of the site. This habitat is of low ecological value due to the absence of vegetation (tilled land) during the survey period and its intensive agricultural management. Areas of recolonising bare ground (ED3) and scattered scrub (WS1) occur throughout the site and provide limited ecological value, supporting common ruderal and early successional plant species. Treelines (WL2) occur along the eastern and northern site boundaries and represent the principal terrestrial linear features within the site. These treelines contain a diverse assemblage of native and non-native tree and shrub species and provide habitat connectivity between the wider landscape and adjacent habitats. The dense understory offers shelter and foraging opportunities for birds, mammals, and invertebrates. The presence of mature trees and structurally diverse vegetation increases the ecological value of these features relative to the surrounding agricultural habitats. The treelines also support two badger setts located immediately outside the red line boundary, including a large active sett to the west and a smaller sett to the northwest, greater than 100m from the site outline. While outside the proposed development footprint, their proximity increases the ecological sensitivity of the site and highlights the importance of maintaining habitat connectivity and avoiding disturbance during construction. The most ecologically significant habitat within the site is the wet grassland (GS4) and associated calcareous spring habitat (FP1) located in the northern section of the site. The habitat supports a diverse assemblage of wetland plant species and contains tufa-forming spring systems. Tufa deposition is evident around vegetation roots and represents a specialised ecological feature associated with calcareous groundwater discharge. The presence of bryophytes, liverworts and algal communities associated with these formations further contributes to the ecological significance of the habitat. Calcareous springs are recognised as habitats of high conservation value due to their rarity and specialised ecological conditions. The habitat provides a transition between terrestrial and aquatic environments and supports local biodiversity through the provision of permanently wet conditions and diverse vegetation structure. To the south of the site, adjacent to the River Boyne, is an area of wet willow-alder-ash woodland (WN5). This habitat supports a diverse canopy and understory structure characteristic of riparian woodland systems. The woodland contains numerous wetland-associated plant species and contributes significantly to local biodiversity through the provision of shelter, nesting habitat, foraging opportunities, and ecological connectivity along the river corridor. The woodland forms part of a wider riparian network associated with the River Boyne and functions as an important ecological corridor for a range of fauna, including birds, mammals, bats, amphibians and invertebrates. The River Boyne (FW2) forms the southern boundary of the site and represents a habitat of high ecological importance at both local and regional scales. In addition to supporting aquatic and riparian biodiversity, the river provides an important ecological corridor through the landscape. Four streams traverse the site and flow southwards into the River Boyne, increasing hydrological connectivity between the site and the wider catchment. These watercourses support habitat diversity and may facilitate movement of aquatic and semi-aquatic species through the landscape.

Overall, the site comprises a mosaic of habitats ranging from low ecological value agricultural land and recolonising bare ground to habitats of higher ecological importance associated with wetland, spring, woodland and riverine environments. The wet grassland/calcareous spring habitat, riparian woodland, River Boyne and associated watercourses represent the most ecologically valuable habitats within and adjoining the site. The treelines also provide important ecological connectivity and support protected species in the immediate vicinity. Consequently, these habitats should be considered key ecological receptors during the design, assessment and implementation of the proposed development.

Flora

The plant species encountered at the various locations on site are detailed above. No rare or plant species of conservation value were noted during the field assessment. Records of rare and threatened species from NBDC and NPWS were examined. No rare or threatened plant species were recorded within the proposed development site.

Invasive species

Walkover assessments of the development site were carried out by Emma Peters on the 25th and 30th September 2025. All areas were examined for Invasive species during the optimal survey season. Two areas of sea buckthorn infestation were identified; one within the site outline along the western boundary treeline , and another area also to the west of the site, located c.50m outside the site boundary. Sea buckthorn is a Third Schedule listed species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011. No other non-native invasive species listed in the third schedule of (SI 477 of 2011) were noted on site. An Invasive Species Management Plan (Appendix IV) has been prepared to outline the extent of the infestation and the measures that will be in place to mitigate the potential impact and prevent spread of the invasive species during works in line with National and international legislation.

It should be noted that Japanese Knotweed was recorded approximately 30m outside the redline (figure 33) and c.345m from the main proposed development area.

Terrestrial Mammals

No otter holts were noted within or proximate to the site outline. An otter survey was carried out along the River Boyne to the south of the site on the 8th December 2025. No otters or signs of otters such as holts or spraint) were recorded within 150m of the proposed development site.

A large badger sett with multiple entrances was found on the western side of the field associated with the field treeline boundary. To the north of this area is another single badger sett in the treeline (see figure 33 above). During winter surveys, a camera trap was utilised to determine the activity of both setts. Both setts were active during the 2025/2026 season.

The larger sett had multiple entrances, each with fresh digging and bedding at the entrances. Latrines were also visible near the setts. The sett was on the western side of a small stream that bordered the survey area, as seen in plate 7. Given the size and activity of this site, it is likely to be a breeding badger sett. A second badger sett with a single entrance was present inside a large tree trunk to the north of the larger sett area. The tree trunk badger sett was set into the survey site boundary (plate 8). This sett was also found to be active throughout the 2025/2026 season, and is considered a satellite sett. Both setts are located at a substantial distance from the site boundary (approximately 180m and 150m respectively).

Plate 7. Large badger sett to the west of the site * entrances- orange arrows.

Plate 8. Single badger sett entrance to the west (northern hedgerow).

Bats

The bat assessment is seen in Appendix II. There were no seasonal or climatic constraints as surveys were undertaken within the active bat season in good weather conditions with surveying temperatures of greater than 10°C. Daubenton's Bat, Common Pipistrelle and Soprano Pipistrelle were noted foraging within and transiting the survey area. No definitive bat roosts were noted on site, and no bats were observed emerging from onsite trees. However, the River Boyne, to the south of the site, is considered an important bat foraging corridor.

Amphibians/Reptiles

The common frog (*Rana temporaria*) was not observed on site. However, there are features within or proximate to the site boundary and, in particular, the stream habitat proximate to the proposed development site that could be important to frog species.

Wintering Birds

Ten wintering bird surveys were carried out during the 2025/2026 wintering bird survey season. As outlined in Appendix I, the wintering bird survey concluded the following:

A total of 22 species were recorded within, above and adjacent to the survey area across five surveys. 15 green, five amber, and two red species of conservation concern were recorded either within, over or immediately adjacent to the survey area boundary. One species listed as a Qualifying Interest of the nearby River Boyne and River Blackwater SPA (Kingfisher). One red-listed species of conservation concern in Ireland, meadow pipit (Anthus pratensis) was recorded foraging proximate to the survey area on two surveys.

The proposed development in Trim is not predicted to significantly reduce available foraging areas for wintering birds, in particular those listed as Qualifying Interests of nearby SPAs. Impacts on wintering bird species moving between foraging and roosting sites are not likely in the absence of mitigation measures. The proposed development is likely to reduce the total foraging area within the survey area for red-listed species recorded during surveys. However, the reduction of foraging area for these species is not considered significant due to the scale of the development in the context of the surrounding areas and habitats available, and as the proposed site layout and landscape plan will continue to facilitate foraging by these species within the site.

Out of an abundance of caution due to the proximity of the River Boyne and River Blackwater SPA, mitigation measures are recommended. Following the full implementation of mitigation measures, no significant impacts on wintering bird species, particularly Qualifying Interests of nearby SPAs, are predicted.'

Five wintering bird surveys were carried out during the 2024/2025 wintering bird survey season. As outlined in Appendix II, the wintering bird survey concluded the following:

A total of 28 species were recorded within, above and adjacent to the survey area across five surveys. 21 green, five amber, and two red species of conservation concern were recorded either within, over or immediately adjacent to the survey area boundary. One species listed as a Qualifying Interest of the nearby River Boyne and River Blackwater SPA (Kingfisher). One red-listed species of conservation concern in Ireland, meadow pipit (*Anthus pratensis*) was recorded within or over the survey area.

The proposed development in Trim is not predicted to significantly reduce available foraging areas for wintering birds, in particular those listed as Qualifying Interests of nearby SPAs. Impacts on wintering bird species moving between foraging and roosting sites are not likely in the absence of mitigation measures. The proposed development is likely to reduce total foraging area within the survey area for red-listed species recorded during surveys. However, the reduction of foraging area for these species is not considered significant due to the scale of the development in the context of the surrounding areas and habitats available, and as the proposed site layout and landscape plan will continue to facilitate foraging by these species within the site. Out of an abundance of caution due to the proximity of the River Boyne and River Blackwater SPA, mitigation measures are recommended. Following the full implementation of mitigation measures, no significant impacts on wintering bird species, particularly Qualifying Interests of nearby SPAs, are predicted.

Breeding Birds

The following species were noted during the 2025 Breeding Bird surveys:

Common Name	BTO	Latin Name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Chiffchaff	CC	*Phylloscopus collybita*	Green
Coot	CO	*Fulica atra*	Amber
Dunnock	D.	*Prunella modularis*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Grey Heron	H.	*Ardea cinerea*	Green
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
House Martin	HM	*Delichon urbicum*	Amber
House Sparrow	HS	*Passer domesticus*	Amber
Jackdaw	JD	*Corvus monedula*	Green
Magpie	MG	*Pica pica*	Green
Mallard	MA	*Anas platyrhynchos*	Amber
Mistle Thrush	M.	*Turdus viscivorus*	Green
Moorhen	MH	*Gallinula chloropus*	Green
Mute Swan	MS	*Cygnus olor*	Amber
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Song Thrush	ST	*Turdus philomelos*	Green
Starling	SG	*Sturnus vulgaris*	Amber
Swallow	SL	*Hirundo rustica*	Amber
Swift	SI	*Apus apus*	Red
Willow Warbler	WW	*Phylloscopus trochilus*	Amber
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green
Confirmed Breeding			
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
House Sparrow	HS	*Passer domesticus*	Amber
Willow Warbler	WW	*Phylloscopus trochilus*	Amber
Wren	WR	*Troglodytes troglodytes*	Green

Historic Records of Biodiversity

The National Biodiversity Data Centre's online viewer was consulted to determine the extent of biodiversity and/or species of interest in the area. First, an assessment of the site-specific area was carried out, which recorded no species of interest in the site area. Following this, a 2km^2 grid (ref no. N75Y) that encompasses the subject site was assessed. Table 4 provides a list of all species recorded in this grid that possess a specific designation, such as Invasive Species or Protected Species.

Table 4. Table of species, NBDC (N75Y)

Species name	Date of last record	Designation
Common Frog *(Rana temporaria)*	01/06/2003	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Little Grebe *(Tachybaptus ruficollis)*	31/12/2011	Protected Species: Wildlife Acts
Mistle Thrush *(Turdus viscivorus)*	31/12/2011	Protected Species: Wildlife Acts
Robin (*Erithacus rubecula)*	31/12/2011	Protected Species: Wildlife Acts
Kingfisher (*Alcedo atthis)*	18/09/2019	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard *(Anas platyrhynchos)*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Snipe *(Gallinago gallinago)*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lapwing *(Vanellus vanellus)*	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Goldcrest *(Regulus regulus)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Greenfinch *(Chloris chloris)*	20/12/2018	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mute Swan *(Cygnus olor)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Sand Martin *(Riparia riparia)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swallow *(Hirundo rustica)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Willow Warbler *(Phylloscopus trochilus)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species name	Date of last record	Designation
Grey Wagtail *(Motacilla cinerea)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Redwing *(Turdus iliacus)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Stock Dove *(Columba oenas)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Swift *(Apus apus)*	07/07/2018	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Yellowhammer *(Emberiza citrinella)*	31/12/2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Sparrow *(Passer domesticus)*	31/12/2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Starling *(Sturnus vulgaris)*	31/12/2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
European Eel *(Anguilla anguilla)*	26/05/2009	Threatened Species: OSPAR Convention || Threatened Species: Critically Endangered
White-clawed Crayfish *(Austropotamobius pallipes)*	08/05/2006	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Butterfly-bush *(Buddleja davidii)*	29/09/2013	Invasive Species: Medium Risk Invasive Species (2013 Report)
Sycamore *(Acer pseudoplatanus)*	29/09/2013	Invasive Species: Medium Risk Invasive Species (2013 Report)
Traveller's-joy *(Clematis vitalba)*	29/09/2013	Invasive Species: Medium Risk Invasive Species (2013 Report)
Three-cornered Garlic *(Allium triquetrum)*	02/04/2024	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: Detailed Risk Assesment || Invasive Species: Medium Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland) || Invasive Species: Detailed Risk Assesment >> Moderate Risk
Greater Knapweed *(Centaurea scabiosa)*	01/09/2017	Threatened Species: Near threatened
Harlequin Ladybird *(Harmonia axyridis)*	21/07/2024	Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Red-tailed (Hill) Cuckoo Bee *(Bombus rupestris)*	31/08/1926	Threatened Species: Endangered
Gypsy Cuckoo Bee *(Bombus bohemicus)*	31/12/1926	Threatened Species: Near threatened
Red-tailed Bumblebee *(Bombus lapidarius)*	19/07/2018	Threatened Species: Near threatened
Buffish Mining Bee *(Andrena nigroaenea)*	02/04/2024	Threatened Species: Vulnerable
Field Cuckoo Bee *(Bombus campestris)*	30/09/1926	Threatened Species: Vulnerable
Grey Squirrel *(Sciurus carolinensis)*	31/12/2007	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 || Invasive Species: Regulation S.I. 477/2011 (Ireland) || Invasive Species: High Risk Invasive Species (2013 Report) || Invasive Species: Regulation S.I. 374/2024 (Ireland)
Hedgehog *(Erinaceus europaeus)*	30/06/2021	Protected Species: Wildlife Acts

Potential Impacts

This report has been prepared to outline the construction and operational phase measures in addition to detailing the potential impacts on sensitive receptors within the Zone of Influence (ZOI).

Construction Impacts

The overall development of the site is likely to have direct negative impacts upon the existing habitats, fauna and flora. Direct negative effects will be manifested in terms of the removal of the site's internal habitats. The removal of these habitats will result in a loss of species and habitats of low biodiversity importance.

Designated Conservation sites within 15km

The main proposed development site area is located proximate to the River Boyne and Blackwater SAC and SPA. It should be noted that the proposed development site could potentially impact on the River Boyne or one of the four on-site streams, leading to silt and pollution entering the River Boyne. Construction phase mitigation measures are required on site, particularly in relation to the protection of the pollution, silt entering the watercourses. There is potential for silt-laden runoff and contamination to enter the watercourses, with potential for downstream impacts on the River Boyne and Blackwater SAC & SPA and Trim pNHA. Other potential impacts relate to dust and groundwater. Additionally, a Source-Pathway Receptor (SPR) risk assessment was undertaken for the construction phase by EurGeol. Dr. Robert T. Meehan, PGeo. within the a Hydrogeological Assessment for the proposed development. It is concluded that in the absence of mitigation, significant effects are likely on the River Boyne and Blackwater SAC & SPA

Habitats

The impact of the development during the construction phase will be a loss of existing habitats and species on-site. It would be expected that the flora and fauna associated with these habitats would also be displaced. Petrifying springs with tufa formation (Annex I habitat) is present proximate to the southern and western site boundary. The main potential impacts during construction on the springs is through direct disturbance and hydrogeological impacts. However, no construction works will occur in the vicinity of the springs and as outlined in the Petrifying Spring Survey and Assessment (Appendix V (Denyer, 2025)), *'There are no predicted significant hydrogeological impacts to the Annex I priority petrifying springs from the proposed development (Section 4.2). This is because no works will be undertaken in the vicinity of the springs, the depths of the groundwater across the site are well below the level of any of the construction activities and the proposed rising main borehole will not pump or dewater the area within and around it (Meehan, 2025). Required hydrogeological mitigation and avoidance measures are detailed in the Hydrogeological assessment (Meehan, 2025).'*

Terrestrial Mammal Species

No protected terrestrial mammals were noted within the site boundary. Two badger setts were noted west of the site outline. Both setts are reasonably distant from the redline (approximately 180m and 150m respectively). Mitigation will be required in order to protect these setts from disturbance during construction. No machinery will be present within 150m of the setts for the full duration of construction works.

No otter holts or signs of otters were noted within the site outline or within 150m of the site. Loss of habitat and habitat fragmentation may affect badgers foraging or transiting through the site. Noise and vibration during construction may impact on otters utilising the adjacent River Boyne.

Impacts: Low adverse / site / Negative Impact / Not significant / short term. Mitigation measures are proposed.

Flora

No protected flora was noted on site. Site clearance will remove the flora species on-site. The Third Schedule invasive Sea buckthorn was recorded within the proposed development site. The removal of soil from the site has the potential to spread sea buckthorn. An Invasive Species Management Plan has been prepared (Appendix IV) to accompany this EcIA.

Potential Impacts in the absence of mitigation: Low adverse / site / Negative Impact / Not Significant / Short term. Mitigation measures are proposed to prevent the spread of invasive species.

Bat Fauna

No confirmed bat roosts will be lost. The development is likely to displace bats from foraging at the site during construction and operation due to increased lighting on-site. The site is adjacent to the River Boyne, which is a

bat foraging corridor used by multiple common species. No trees of bat roosting potential are to be removed as part of the proposal.

Impacts: Minor adverse/ Local / Not significant / short term. Mitigation is needed in the form of a pre-construction bat survey and the control of light spill during construction.

Aquatic Biodiversity

The River Boyne is located south of the development site. On-site streams outfall into the River Boyne. During construction and operation, there is the potential for a hydrological connection to this watercourse via surface water runoff. In the absence of mitigation, there is the potential for silt and contaminated surface water runoff to enter the on-site watercourses and outfall to the River Boyne. Silt and pollution could potentially impact on downstream biodiversity.

Impacts in the absence of mitigation: Moderate adverse / local / Negative Impact /significant effects/ short term. Mitigation is needed in the form of control of silt and petrochemical and dust during construction.

Bird Fauna

Site clearance including the removal of hedgerows and trees could impact on bird nesting. Noise during construction may impact bird species utilising the adjacent River Boyne, including Kingfisher which is a qualifying interest of the River Boyne and Blackwater SPA.

Impacts: Low adverse / Local / Negative Impact / Not significant / short term. Mitigation is needed in the form pre-construction surveys, ecological supervision and measures relating to noise during construction.

Petrifying Springs

The potential impacts on these habitats are outlined by Dr Denyer as follows:

'Petrifying springs can be damaged by direct habitat loss (removal or disturbance of springs) and changes to water quality (e.g. pH, mineral composition and nutrient levels) and quantity (e.g. flow rate). Changes to land-use in the recharge area of the petrifying springs (for instance from creation of hardstanding areas and changes in groundwater flow and direction resulting from landscaping and excavation) can reduce water flow. In addition, surface water run-off into the recharge area can potentially negatively impact petrifying spring water quality. Potential impacts and recommended mitigation measures and monitoring are summarised below.

Direct disturbance

*• The spring/ seepages should be **protected** from any **direct disturbance**. There should be no construction works in the petrifying spring/ seepage zones within the SAC as shown on Figure 3.1.*

*• The spring/ seepages should be **protected from recreational disturbance**/ pressure resulting from the proposed development. Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.'*

Impacts: Low adverse / Local / Negative Impact / Not significant / short term. Mitigation is needed in the form ecological supervision and confining works to site outline.

Operational Impacts

Once developed, the site would be seen as a stable ecological environment. Appropriate measures should be taken to prevent contaminated surface water run-off and silt from entering adjacent habitats. The construction of new drainage networks will have to comply with SUDS and County Council requirements and, as a result, would have a negligible impact on habitats and species surrounding the proposed development site.

Designated Conservation sites within 15km

Once the proposed development is complete and in the operational phase, surface water runoff will discharge to the soakaways located within each of the four catchments on-site, and foul water from the site will be

discharged to the public network via the proposed pumping station and connection beneath the River Boyne. In the absence of mitigation, it is considered that significant impacts on designated conservation sites would be unlikely.

The proposed development includes a sustainable drainage strategy. No mitigation is required to prevent significant effects on designated sites. The development will comply with MCC requirements and the Water Pollution Acts, and standard measures will be in place to prevent downstream impacts.

Impacts: Negligible / International / Neutral Impact / Not significant / Long-term

Habitats

The biodiversity value of the habitats on site will improve as landscaping matures. As identified in the Petrifying Spring Survey and Assessment (Denyer, 2025), potential impacts on petrifying springs during operation include recreational disturbance/pressure during the operational phase. As outlined in Appendix V, '*Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.'* (Denyer, 2025).

Terrestrial mammal species

No protected terrestrial mammals were noted within the site boundary. Two badger setts were noted west of the site outline. Post-construction, badger foraging is expected to persist. Loss of habitat and habitat fragmentation may affect some common mammalian species. Potential impacts relating to increased human presence in the vicinity of the River Boyne may impact on Otter inhabiting the River Boyne.

Impacts: Low adverse / site / Negative Impact / Not significant / short term.

Flora

No protected flora was noted on site. Landscaping will increase flora diversity and remove invasive species on site.

Potential Impacts in the absence of mitigation: Neutral / site / Not significant / long-term

Bat Fauna

Lighting in the centre/southern portion of the site is within bat lighting guidelines (2700ºK). Bat foraging (post-construction) would be expected to continue on site. Light spill will be contained to the site along the southern, western and eastern boundaries ensuring the dark riparian corridor adjacent to the site remains suitable for bat foraging and open areas will remain unlit. Ensuring lighting is done sensitively, and in line with the proposed lighting plan and outlined mitigation measures, the proposed development is not deemed to have any significant effect on local bat populations. The potential for collision risk and impact on flight paths in relation to bats is considered low due to the limited level of bat activity on site, and the buildings would be deemed to be clearly visible to bats. Bat foraging would be expected to continue on-site, albeit at a lower level, until landscaping matures.

Effects: Low adverse / International / Negative Impact / Not significant / long term. Mitigation is required in relation to the provision of ecological supervision during the landscaping stage to ensure bat foraging corridors are developed and that lighting installed is as per the proposed lighting strategy.

Aquatic Biodiversity

There are watercourses located within the subject site, which outfall to the proximate River Boyne. In the absence of mitigation, there is the potential for silt and contaminated surface water runoff from the subject site to enter the watercourses and the River Boyne during operation. Silt and pollution could potentially impact on downstream biodiversity.

Impacts in the absence of mitigation: Minor adverse / local / Negative Impact /significant effects/ short term.
Mitigation is needed in the form of control of silt and petrochemicals in line with standard measures.

Bird Fauna

The proposed development will change the local environment as new structures are to be erected. The buildings are comprised of solid materials, consisting of a solid material on the exterior, which includes sections of concrete and glass. These buildings would be clearly visible to bird species and would not pose a significant

collision risk. However, the presence of buildings on site and landscaping may provide additional nesting and foraging potential for garden bird species.

Impacts: Low adverse / site / Negative Impact / Not significant / long term.

Petrifying Springs

An assessment of potential hydrogeological impacts on petrifying springs within the site from the proposed LRD and required design and mitigation features to avoid impacts are detailed in Meehan (2025) '*Hydrogeological assessment for proposed Large Scale Residential Development (LRD), by Loughglynn Developments Limited, at a site on the Kildalkey road, Trim, County Meath –Land, soils, geology, hydrology and hydrogeology*.'

This states that no works will be undertaken in the vicinity of the springs, that the depths of the groundwater across the site are well below the level of any of the construction activities (e.g. foundations and other excavations into the subsurface on the site) and the proposed rising main borehole will not pump or dewater the area within and around it (Section 9.2 of the Hydrogeological assessment). Required mitigation and avoidance measures are detailed.

The hydrogeological assessment concludes:

'*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 design of the proposed LRD Project has maintained the existing hydrological and hydrogeological regime on the site in as much as possible.*

This means that all SUDS measures will discharge as diffusely as possible and at as shallow a depth as possible, using individual shallow soakaways for each house individually and wide, expansive, shallow soakaways for the road network.

This will mean no significant effects on groundwater levels and / or flows, and / or surface water, will occur as a result of the proposed LRD Project.'

Mitigation measures are proposed to ensure no significant effects are likely on the Petrifying springs with tufa formation (Cratoneurion) [7220] habitat.

Impacts: Low adverse / site / Negative Impact / Not significant / long term.

Mitigation Measures & Monitoring

Standard construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZoI), biodiversity, and local biodiversity within / proximate to the subject site are outlined in Table 6.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
Surface water drainage network On-site Streams River Boyne River Boyne and River Blackwater SAC & SPA Downstream pNHAs (Trim)	• Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic and bird fauna. • Disturbance.	**Construction Phase** **Habitat degradation as a result of hydrological & hydrogeological impacts (on the River Boyne and River Blackwater SAC/SPA)** **Construction & Environmental Management Plan** Waterman Moylan Consulting Engineers have prepared a CMP for the proposed development. The following measures designed to limit hydrological impacts on the River Boyne are outlined in this document, which will be implemented: ***'Site Specific Environmental Risk – River Boyne*** *Construction runoff is heavily laden with silt especially when topsoil has been stripped and heavy rainfall occurs. The River Boyne and ditches within the site are particularly susceptible to pollution from surface water runoff with high silt content. Works within or adjacent to the watercourse/ditches will also give rise to risk of pollution. In this regard it is not intended to carry out any works within the SAC or adjacent/in the River Boyne* *Sediment control plans will be implemented on site to mitigate against the risks of working in proximity of the River Boyne or ditches which provide a flow path to the river.* *Sediment basins and interception drains/traps will be installed before any major site grading takes place. Silt fences will be installed along the southern boundary of the site and adjacent ditches that ultimately drain to the river in order to keep sediment contained on site at appropriate locations to be determined on site by the Project Ecologist prior to any works commencing.* *The main run-off interception drains/traps with outlet protection measures together with silt fencing will be installed prior to the works commencing and will be used to convey stormwater run-off through the development site and to protect existing watercourses in the event of a breach.* *During periods of heavy rainfall or other extreme weather events, additional inspections of sediment control measures, silt fencing, diversion drains, settlement ponds and drainage infrastructure will be undertaken by the Contractor. Any damaged or ineffective measures will be repaired or replaced immediately to ensure continued protection of the River Boyne, adjoining watercourses and surrounding environmental receptors from sediment-laden runoff and potential pollution* *Sediment control measures which will be implemented on site are set out below. The type and location of the measures to be implemented will be determined on site by the Project Ecologist prior to the works commencing.* ***Sediment Control Measures*** • *Straw Bales* *Straw bales will be placed at the base of a slope to act as a sediment barrier. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance are necessary to ensure their performance.* • *Silt Fencing*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		A silt fence is made of a woven synthetic material, geotextile and acts to filter run-off. Silt fencing will be placed as a temporary barrier along the contour at the base of a disturbed area. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter will be considered. • *Diversion Drains* *Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. They can have straw bales inserted along the ditch to reduce flow and assist in removing sediment. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.* • *Silt Traps/Settlement Ponds* *Silt Traps will be placed at the lower parts of the site and prior to discharge to the natural outfalls from the site. These are generally bunded areas with a high-level outlet which create a pond behind the barrier. Sediment settles within the pond to reduce the silt in the runoff. Silt traps area deemed temporary and proper installation and regular maintenance is needed to ensure their performance.* ***Site Specific Environmental Risk - Groundwater Protection*** *The excavations for the proposed foundations, percolation areas, drainage pipes, pumping station, water supply, and utilities may impact the ground water in the site.* *The site investigation did not identify the presence of a high-water table. It is therefore anticipated that there should be little or no impact upon the groundwater. However, in the event that a high-water table is encountered then an appropriate dewatering scheme to keep the excavations free from water will be implemented. Specialist contractors in dewatering will provide expert advice on the dewatering and treatment in order to ensure the quality of water leaving site is high.* *Typically improvements to the quality of the discharge of surface water from deep excavations are achieved through the provision of settlement ponds/tanks. Settlement ponds/tanks will be maintained and regularly monitored visually for hydrocarbon sheen and suspended solids.* *Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of Meath County Council before discharge back to the surrounding surface water drainage system.'* **Altemar Ltd have also produced a CEMP which outlines additional measures as follows:** <u>Contamination of watercourses</u> • Appointment of an ecologist to oversee enabling works and the implementation of mitigation measures outlined. • Staging of project to reduce risks to watercourses from contamination

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. • Any discharges to the surface water system during construction must be discussed with the ecologist, undergo desilting and petrochemical interception and have twice daily turbidity monitoring. • Local watercourses and drains will be protected from dust, silt and contaminated surface water throughout the works. • Local silt traps established throughout site as discussed with the ecologist. • Mitigation measures on site include dust control, stockpiling away from watercourse and drains • Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or watercourses, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the streams. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • During the construction works silt traps will be put in place in the vicinity of all runoff channels the streams to prevent sediment entering the surface water drainage network. • Planting in the vicinity of the stream crossings should be put in place as soon as possible to allow biodiversity corridors to establish. • On-site inspections will be carried out by project ecologist during enabling works and until drainage connection is complete. • Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • No entry of solids or concrete to the associated drainage network during the connection of pipework • The program for the felling of trees will be carried out in consultation with the project ecologist and arborist. The ecologist will be present for the felling of trees within 10m of watercourses. <u>Aquatic Biodiversity</u>

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Environmental risks due to construction and operation of the proposed development do potentially occur, particularly in relation runoff from steep site and/or drains that could lead to the watercourses. This could not only result in negative impacts on instream biodiversity, also with the watercourses acting as a vector, carry pollutants and impact beyond the site boundary and into the River Boyne. The following mitigation measures are to be implemented during construction: • Given the proximity to the River Boyne, a robust silt barrier fence would be placed along the streams within the redline. This would passively remove silt from the runoff. • As back up to the barrier, there would be a sump pump with a float switch at the lowest point of the fence. The sump would be in a 60cm diameter vertical pipe placed uphill of the fence, the top of the pipe would be 40 cm above the ground level at the silt curtain. Water would only enter it in extreme weather if water is building up behind the silt fence. The outlet of the pump leads to a large silt bag that would need to be downstream of the curtain and maintained. • Inspection of the integrity of the silt fence will be a requirement of the daily on site checklist and twice daily during periods of heavy rain. Repairs if required are to be made as a matter of urgency. Spare fencing is to be retained on site in a location that is easily accessible. • IFI are to be notified immediately of breaches in the silt fence that have resulted in silt laden runoff entering the watercourses. • Water from trenches and excavations will not flow directly into drains or watercourses without settlement interception. Vigilance will be required due to the proximity of the stream. Any petrochemical spills are to be cleaned up immediately. • All pavement construction within 20m of watercourses is required to take place during dry weather. This minimises the risk to watercourses and contamination of runoff. All associated plant to be cleaned and washed down in a controlled environment and at a designated location greater than 30m from a watercourse/drain leading to a watercourse. • Drip trays placed below all small plant. Spill kits will be present on all working sites to clean up spillages. A record of all spillages will be kept and monitored. Generators and small plant not be used within 10m of watercourses. • All mobile plant to be refuelled in a central refuelling area in the contractor's compound where a spillage containment sump will be constructed within the refuelling area. All collected fuel will be disposed offsite under license. A record of all spillages will be kept and monitored. • On roads and car park areas and saw cutting, coring and grooving operations will be supported by the use of suction sweepers/cleaning equipment to immediately collect any detritus generated by these works. The silt barrier is to remain in place during all construction works. • Stockpiling of loose materials will be kept to a minimum of 40m from watercourses and drains. In the event that stockpiles are required, they will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. Damping down of stockpiles will take pace in dry windy weather to prevent wind blown movement of fines. • Fuel, oil and chemical storage will be sited within a bunded area. The bund must be able to take the volume of the largest container plus 10% and be located at least 10m away from drains, ditches, excavations and other locations where it may

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		cause pollution. Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • No foul water will be discharged on site, unless through nominated and secure sewer connection. It will not be discharged to drains or watercourses. **Dunnes Drilling (the contractor assigned to carry out the HDD works under the River Boyne) have prepared a Method Statement which outlines the mitigation that will be in place during the drilling works as follows:** ***'ENVIRONMENTAL ASSESSMENTS AND CONTROLS*** *All personnel shall be briefed of the environmental procedure requirements as per The Client's information received which includes constraints associated with the works. All works shall be conducted in accordance with Dunnes Drilling management systems, associated plans and guidance information.* *An SPA shall be completed by the site supervisor, this will include environmental considerations. The findings of the assessment shall be brought to the attention of all personnel who may be affected by the operational processes.* *Any mud, dirt or construction materials associated with Dunnes Drilling activities shall be cleaned up from the area at the earliest opportunity and the area returned to its previous condition.* *If there is any suspect that the ground may be contaminated, then the work should cease immediately. The area shall be cordoned off and reported immediately to The Client.* *Segregation techniques shall be established so material may either be recycled or removed to a licensed waste treatment facility.* *Copies of waste carrier licenses shall be obtained, and consignment / transfer notes collected when waste materials are removed from the project area. The consignment / transfer notes shall be retained for designated timescales as per legislative requirements.* *Spill kits to be positioned at the workface. All stationary plant will be bunded.* *During the works, any nearby watercourse will be monitored for any changes in colour or signs of bentonite frack out. Should any pollution of any nature be identified the works will be stopped immediately and The Client will be notified.* ***FAILURE MODES AND FRAC OUT INTRODUCTION*** *The purpose of this section is to establish procedures for addressing potential impacts associated with a "frac out" of drilling fluid during the horizontal directional drill (HDD) process. The term "frac out" is used to describe an inadvertent release of drilling fluid resulting from the fluid escaping from an underground HDD borehole and rising to the surface.* *The HDD installation technique is susceptible to difficulties caused by subsurface ground conditions. This document establishes the criteria by which Dunnes Drilling will determine when a proposed HDD is unsuccessful.*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Dunnes Drilling will provide on-site inspection during the HDD process to monitor the progress on the drill and to maintain daily progress reports. ***HDD PROCESS*** *The HDD process generally includes three distinct phases beginning with the drilling of a pilot hole from the entry point on one side of the HDD along a designed profile to an exit point at the surface on the other side of the HDD. The second phase entails the reaming of the pilot hole to a diameter large enough to accept the cable ducts to be installed. Finally, the cable ducts are pulled into place within the enlarged hole.* ***DRILLING FLUID*** *The HDD process involves use of a drilling fluid (also referred to as drilling mud) made up primarily of water and bentonite (if required), with pH values between 8 and 10. Bentonite is a naturally occurring, non-toxic, inert substance and is frequently used for drilling potable water wells. Therefore, the environmental impacts of an inadvertent release of drilling fluid in a watercourse is a temporary increase in local turbidity until the drilling fluid dissipates with the current or is settled.* *The primary purpose of drilling fluid is to remove the cuttings from the borehole, stabilize the borehole and act as a coolant and lubricant during the drilling process. The water and clay drilling fluid consists of 1 to 5 percent active clays and from 0 to 40 percent inert solids with the rest being water. The primary active clay component is bentonite. The drilling fluid is first* *prepared in the mixing tank with both new and clean recycled drilling fluid. The fluid is pumped at 40 to 100 gallon per minute rates through the center of the drill pipe to the cutters. Return flow is through the annulus created between the wall of the boring and the drill pipe.* *The cuttings are then carried to either the entry or exit pit, depending on a combination of elevation difference and drilling/hole opening direction. A reduction or loss of drilling fluid returns does not necessarily indicate that these fluids are being released to the environment through fractures. The loss of returns may occur because of lower pressures and volumes, thereby allowing gravity and friction to overcome the ability of the fluid to return to the bore site. As previously described, drilling fluid will likely be absorbed by the formation or drawn down into fractures within the formation.* *Within the boundaries of the worksites drill fluid would be controlled through the use of pits at the crossing entry and exit points and typical fluid handling equipment such as Selwood pumps. Drill fluid is released regularly on the drill rigs as part of normal operations when sections of drill pipe are separated. The worksite will be graded such that fluid released on the rig will flow into the fluid pit in front of the rig.* *….* ***FRAC OUT PREVENTION*** *The risk of a frac out in a sensitive area can be mitigated through profile design and through implementation of specific measures throughout the installation process. Dunnes Drilling operatives are responsible for execution of the HDD operation, including actions for detecting and controlling drilling fluid seepage. Dunnes Drilling will closely supervise the progress of the HDD with onsite inspections.*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		PROFILE DESIGN *The HDD profile is designed to minimize the potential for the release of drilling fluid in sensitive areas. The type of subsurface material and the depth of cover material are factors considered in developing the profile of an HDD crossing. Cohesive soils, such as clays, dense sands, and competent rock are considered ideal materials for containment of drill fluid.* *In the vicinity of the entry and exit points of the crossing the depth of cover will be minimal. It is probable and expected that frac outs will occur in these segments of the crossing. The crossings are designed such that these segments will be in upland areas.* ***PREVENTATIVE MEASURES IMPLEMENTED DURING INSTALLATION*** *Key preventative measures implemented during installation are geared toward keeping the drill fluid contained in the borehole and preventing its escape to surrounding ground formations. This is accomplished through monitoring and management of drill fluid pressures and drill fluid volumes.* *DRILL FLUID PRESSURE MONITORING AND MANAGEMENT* *Drill fluid pressures are affected by several factors. A description of some of these factors and how they can be managed follows.* • *Drill fluid density. Greater drill fluid densities result in greater downhole pressures. A large component of drill fluid density is the concentration of cuttings in the fluid. By controlling drilling and hole opening penetration rates and maximising the effectiveness of drill fluid recycling equipment drill fluid densities can be kept below acceptable limits.* • *Drill fluid viscosity. Greater drill fluid viscosities result in greater downhole pressures. However, greater viscosities also help seal off fissures and other escape paths into the surrounding formation from the HDD borehole. Similarly increased viscosity improves the cuttings carrying capability of the drill fluid. Drill fluid viscosity must be carefully managed to obtain a balance between these conflicting requirements.* • *Borehole cleanliness. Cuttings tend to settle out of the flow of drill fluid in the annular space around the drill pipe string. Accumulations of cuttings or cutting beds restrict the flow of drill fluid through the annular space. This results in an increase in the pressure required to maintain flow. Careful management of drill fluid properties and the regular use of borehole swabbing techniques will keep the borehole free of cuttings beds and their associated pressure increases.* • *The drill fluid pressures in the borehole will vary throughout the installation processes. They will change with the depth of cover, the distance drilled, and the borehole diameter. However, changes in pressure should be gradual and can to a large extent be predicted. Rapid or unexpected changes in pressure are indicators of potential problems downhole. It is critical that drill fluid pressures be monitored and throughout the pilot hole process, when pressures are the highest.* • *Measured pressure approximately equal to predicted pressure. This is an indication that conditions are normal and the driller will be allowed to proceed with the pilot hole drilling.*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• *Measured pressure greater than predicted pressure. This is an indication that the annular space behind the drill bit is becoming plugged with cuttings or that the concentration of cuttings in the drill fluid returns is too high resulting in excess drill fluid density. The driller will be required to implement measures to clean the annular space and or reduce the concentration of cuttings. This typically involves "swabbing" the borehole by slowly retracting the drilling assembly while pumping clean drill fluid into the bore to flush out cuttings and replace the cuttings laden fluid with clean, less dense fluid. The composition of the drill fluid pumped into the bore may also be modified to improve its cuttings carrying capacity.* • *Measured pressure less than predicted pressure. If the measured pressure is significantly less than the predicted pressure this is normally an indication that some of the drill fluid is escaping from the borehole. It is extremely important to note that having fluid escape from the borehole is not necessarily an indication that a frac out has occurred or is about to occur. It is quite normal to have a significant amount of fluid lost to the surrounding formation without a frac out occurring. Nevertheless, if the measured pressure is less than the predicted pressure, and in particular if this is the result of a sudden drop in pressure, Eco Drill will implement measures to reduce or eliminate the loss of drill fluid from the borehole. One measure that may be implemented is the use of Lost Circulation Materials (LCM) to plug a fissure in the formation. The use of additives to improve the sealing properties of the drill fluid is another measure.* ***FRAC OUT MANAGEMENT*** *Management of frac outs is key to minimizing the environmental impact of the HDD crossings and ensuring their successful completion. Managing frac outs requires that appropriate equipment is available, that the frac outs are detected in a timely manner, and that appropriate procedures are used to minimize the volume of fluid released and its environmental impact.* ***RESPONSE EQUIPMENT*** *Equipment for containing, controlling and cleaning up any drill fluid released during a frac out will be kept on site throughout the installation process. Heavy equipment not specifically designated for control and clean-up of drill fluid such as excavators and Vac Tanker will also be available on site.* *Frac out containment machinery and equipment to be provided by client. The following list identifies some materials and equipment that will be maintained at the HDD site in sufficient quantities to help ensure containment of frac outs of drilling fluid:* • *Excavator* • *Shovels, brushes and buckets* • *Silt fencing* • *On-Call vacuum tanker and skips with an approved waste disposal site* ***MONITORING AND DETECTION***

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		An obvious key to the timely detection of a frac out is monitoring of the surface above the HDD crossing for drill fluid. Dunnes Drilling will employ an operative to visually monitor the ground above the HDD crossing for frac outs. He will be supplemented by information from the rig operator as described above, namely pressure monitoring and volume monitoring. *The monitoring operative will survey the site along the HDD centreline. The monitor will be in constant radio contact with the rig operator who will keep them informed of the position of the downhole tool.* *The rig operator will also keep the monitor informed of the drill fluid pressures and mud volume balance and will provide his professional opinion of level of risk of a frac out occurring at any given time. Armed with this information the monitor will be able to decide if monitoring a difficult area, such as a water course is warranted. It will also allow them to allocate their resources in the most effective manner.* *The identification of a potential frac out prior to it occurring is dependent upon the skill and experience of the people involved. Similarly, the operatives who will supervise monitoring and mitigation efforts will also be experienced in this type of work.* ***CORRECTIVE ACTION FOR FRAC OUTS*** *If a frac out occurs, The Client will be immediately notified. Dunnes Drilling will suspend forward progress of the drilling operations if excessive loss of mud circulation is noted and conduct a detailed examination of the drill path and surrounding area for evidence of a release to the surface.* *The HDD equipment may continue to operate during this period. It is important to initially maintain operations since soils such as sands, gravels, and some clays do not have the frictional characteristics necessary to maintain a void or hole from a drill. The weight or load from the soils has enough downward pressure to cause the hole to collapse. Shutting down the drilling operation further jeopardizes the success of the drill and it may not be possible to regain circulation. The weight of the settled soils may impede removal of the drill stem. The necessary torque to start the drill head rotating again, in the collapsed soils, may be more than the stress of the pipe can bear; in which case the drill stem and head will twist apart. The pieces may have to be abandoned in place and the process started again, without an assurance that the second attempt will have greater success. Once the clean-up response has started, the drilling activities will immediately resume. After the drilling fluid seepage has been contained. Dunnes Drilling will make every effort to determine why the seepage occurred. Once the cause of the seepage has been determined, measures will be enacted to control the factors causing the seepage and to minimize the chance of recurrence.* ***MINIMIZATION OF VOLUME RELEASED*** *The first action required when a frac out is detected is to minimize the volume of drill fluid that is released. This will be done by immediately halting pumping of drill fluid downhole. Pumping will not resume until the situation is assessed and, if possible, the fluid release is contained and controlled. As it is probable that the frac out will resume as soon as fluid pumping starts again containment and control measures will have to be able to contend with a further release of fluid. Normally the frac out stops of its own accord when the drilling assembly progresses a short distance ahead of the release point.* *The risk of failure of the HDD installation increases dramatically as the duration over which pumping is halted increases. Hence, actions will be taken quickly in order that pumping may resume as quickly as possible.*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		CONTAINMENT AND CONTROL OF DRILL FLUID RELEASED *The types of measures implemented to contain the fluid released will depend on the type of area in which the release occurs.* *Surface release* *If an inadvertent release of drilling fluid is observed aboveground, the following measures will be implemented:* • *Immediately notify The Client.* • *Attempt to regain returns. Trip drill pipe and downhole tools back toward the direction of flow until returns through the drilled hole return to the entry/exit pit. Correct the bentonite properties, if necessary, and start drilling back in the same hole to see if the seepage continues. By swabbing the tool through the hole, this may remove any build-up of cuttings that created the inadvertent release. If the fracture is mitigated and controlled, resume HDD activities.* • *Evaluate the release to determine if containment structures are necessary. If containment structures are necessary. If the volume of the release is too small for containment measures to be practical, the area will be allowed to dry. This applies to surface releases only. The containment structures i.e. local excavation, subject to permit, will be made around the affected area to prevent flow of the drilling fluid.* • *If there is a threat to a sensitive resource or to public health and safety, HDD activities will be suspended immediately.* ***WATERCOURSE*** *The HDD profile is designed in order to minimize the potential for an inadvertent release into a watercourse. Frac outs in watercourses are rare due to the provision of adequate depth of cover. However, if an inadvertent release is observed in a watercourse, the following measures will be implemented* *Temporarily suspend forward progress and immediately notify The Client. Dunnes Drilling operatives will monitor the extent of the drilling fluid plume and observe if the release results in distressed or dying fish.* *Water samples may be required to be collected at both upstream and downstream locations from any plume associated with an inadvertent release of drilling fluid for any further* *Attempt to regain returns. Trip drill pipe and downhole tools back toward the direction of flow until returns through the drilled hole return to the entry/exit pit. Correct the bentonite properties, if necessary, and start drilling back in the same hole to see if the seepage continues. By swabbing the tool through the hole, this may remove any build-up of cuttings that may have contributed to creating the inadvertent release. If the fracture is mitigated and controlled, resume HDD activities.* *Implementation of containment and control measures is most difficult in watercourses.* *The effectiveness of the measures implemented to limit the release of drill fluid will be closely monitored. If the measures are not effective and if the environmental impact of the release is deemed unacceptable the HDD installation will be abandoned. Another attempt using a modified profile or at an alternate location may be made.* ***ADDITIONAL CONTROL MEASURES***

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		A determination will be made of the cause of the frac out. If it is determined that downhole pressures are excessive then measures to reduce them will be implemented. These measures are described above and include swabbing the hole and or modifying the drill fluid properties. *DRILL FLUID CLEAN UP* *Measures to clean up drill fluid released by a frac out will be by use of suction tankers.'* **Additionally, the following mitigation has been outlined in the associated Hydrogeological Assessment by Dr. Robert T. Meehan (2025):** **Impact:** Contamination of Soil, Subsoil and Bedrock by Leakages and Spillages of Hydrocarbons or Chemicals in the proposed LRD Site Construction **Mitigation:** • 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. **Impact:** Earthworks (Removal of Vegetation Cover, Excavations and 'Cut-and-Fill') Resulting in Suspended Solids Entrainment in Surface Waters (Proposed Project) **Mitigation by avoidance:** • 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,

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Avoid the entry of suspended sediment from the construction phase surface system into watercourses, achieved in part by utilising sediment control systems such as straw bales and silt fences, and not implementing any alteration to the infiltration regime by avoiding the use of settlement ponds and drainage channels, and allowing percolation across the entire site towards the vegetation of the buffer zone. **Mitigation by Design:** • Source controls: • Straw bales and silt fences / barriers, 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: • Erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, non-channel baffles, silt bags, silt fences, sedimats, filter fabrics, sediment traps, or other similar/equivalent or appropriate systems. Full avoidance of treatment systems such as 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 sediment control system will be prepared in advance of commencement of any works. Regular inspections of all installed structures 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, or any other sediment control features that may decrease the effectiveness of the 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 the River Boyne and the springs / streamlets on the site, and specifically following heavy rainfall events (as per the CEMP included with this LRD application). **Impact:** Potential Release of Hydrocarbons During Construction and Storage (Proposed Project) **Mitigation:** • 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 4 x 4 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;

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• 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 control 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. **Impact:** Groundwater and Surface Water Contamination from Waste Water Disposal (Proposed Project) **Mitigation:** It is proposed to manage waste water from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all waste water being tankered off site by permitted waste collector to waste water treatment plants. It is not proposed to treat waste water onsite. **Impact:** Potential Hydrological Effects on Designated Sites (Proposed Project) **Mitigation:** • The proposed mitigation measures which will include 25 m buffer zones for avoidance of sensitive hydrological features (streams and rivers); • Pre-construction drainage control measures; • Robust sediment control measures 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 (as outlined above) **Impact:** Effects of Construction Works on the WFD Status of Downstream Waterbodies (Proposed Project) **Mitigation:** Comprehensive surface water mitigation and sediment controls are outlined above. Hydrocarbons from vehicles within the site confines will pass through the site interceptor system 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. **Habitat loss and fragmentation (on the River Boyne and River Blackwater SAC/SPA)** HDD works and associated construction activity will take place within the River Boyne and River Blackwater SAC/SPA. The following measures will be in place to reduce the potential for significant effects via habitat loss and fragmentation: **Footprint Loss & Habitat Destruction**

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **Micro-Siting Pits:** Place the HDD launch and reception compounds entirely outside the most sensitive areas. Set them back behind existing hedgerows or fields to minimize direct clearing within the SAC/SPA. • **Physical Demarcation:** Install structural claddings or exclusionary fencing along the precise edge of the working footprint before work begins. This stops construction vehicles from straying into unpermitted parts of the SAC/SPA. • **Soil Segregation:** Strip, separate, and store the topsoil and subsoil from the compound footprint locally. Cover and protect these bunds to retain the native seed bank. • **Progressive Re-seeding:** Reinstate the launch and reception pits immediately after drilling finishes. Use locally sourced, native river-bank seed mixes and tree species (like Alder and Willow) to restore the habitat buffer. **Ecological & Structural Fragmentation** Fragmentation along a river corridor involves creating physical, visual, and behavioural barriers that cut off species movement. • **Dark Movement Corridors:** Establish strict "No-Light Zones" directed at the river and riparian strip. Use directional, baffled LED lights on the housing site facing away from the SAC/SPA to allow Otters and Kingfishers to commute safely at night. • **Retaining Safe Stepping Stones:** If a hedgerow or treeline must be cut to allow machinery access, bridge the gap at night using temporary artificial trellises or brushwood bundles to maintain visual and physical connectivity for bats and birds. • **Acoustic Hoarding:** Erect temporary acoustic barriers (like specialized acoustic quilts or dense timber hoarding) around the HDD rig. This stops loud machinery noises from creating a "behavioural wall" that blocks Otters from moving up or down the river. • **Seasonal Working Windows**: Do not create a barrier during high-traffic ecological seasons. Stop all drilling during the Atlantic Salmon migration and spawning run (October to April) and peak Kingfisher nesting periods to avoid disrupting population links. **Sub-Surface Fragmentation & Hydrogeology** The borehole itself can create a pathway for groundwater loss, which fragments wetland habitats by lowering the water table. The below measures will be implemented in addition to the full suite of measures as outlined in the Method Statement by Dunnes Drilling: • **Bentonite Grouting:** Seal the outer annular space of the installed pipe using specialized grout to prevent the borehole from acting as a permanent land drain that diverts groundwater away from the river. • **Clay Bund Interceptors:** Install low-permeability clay plugs along the pipeline trench within the housing site boundaries. This stops water from tracking along the newly dug pipe path and dry-draining local wet soils. **Disturbance and displacement impacts via lighting, noise, vibration and human presence (on the River Boyne and River Blackwater SAC/SPA)** **Otter – River Boyne and River Blackwater SAC**

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Appointment of Ecological Clerk of Works A suitably qualified Ecological Clerk of Works (ECoW) will be appointed at the outset of the construction works to ensure that all environmental and ecological commitments are adhered to throughout the project. The ECoW will be specifically responsible for overseeing the correct implementation of all protective measures for European sites as detailed in this Natura Impact Statement (NIS). The ECoW will provide guidance on the required mitigations to the Project Team, and in particular the Site Manager. The Site Manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below. While the Ecological Clerk of Works (ECoW) oversees ecological and environmental compliance, they are not solely responsible. All project staff, including the appointed contractor(s) environmental personnel, share the responsibility for ensuring that environmental best practices are adhered to. The appointed contractor(s) staff must work together to maintain high environmental standards and mitigate impacts, thereby ensuring the success of the project's environmental commitments. The EcoW will be in place on site for the full duration of the HDD works including HDD setup. The EcoW will have supervision experience of at least 5 HDD drills. The ECoW will monitor works practices with targeted efforts and attendance at site at project start up to ensure mitigation measures and best practice measures are in place. The ECoW will also be present onsite to monitor excavation and dewatering operations during the project construction phase. The frequency of the ECoW's attendance on site will be dictated by the nature of the works. It is recommended that a weekly site visit be completed during the construction visit, but this may need to be more frequent during specific works practices such as deep excavations or dewatering. The ECoW will be fully appraised of all of the mitigation measures included in the project EcIA and NIS. The appointed ECoW will be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM), or equivalent, and will have at least 5 years consultancy experience, with commensurate experience in the role of ECoW for work on similar construction projects. The appointed Ecologist or environmental scientist will have the authority to stop works or temporarily halt or delay ongoing works where further consideration or on-site improvements of mitigation may be necessary. **Surveys for the Presence of Otters** • Preconstruction surveys for otters will be carried out along the River Boyne in the area to the south of the site given the time between the original surveys and site clearance and construction works commencing on site. • If otters or evidence of otters is found during pre-construction surveys, an otter management plan will be developed by the appointed ecologist. No works will commence until this plan is developed and further mitigation is implemented to ensure no impacts on otters. • The construction corridor will be marked out prior to the commencement of construction.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• All mitigation measures as outlined within the accompanying CEMP and elsewhere within the EcIA and NIS in relation to protection of surface waters will be implemented in full. **<u>Kingfisher – River Boyne and River Blackwater SPA</u>** **In addition to the appointment of an EcOW, the following measures will be in place for the protection of Kingfisher:** **Visual & Acoustic Buffers (The 100m Zone)** • **Establish a Disturbance Buffer:** Ensure that heavy drilling machinery, generators, and the primary HDD launch/reception pits are physically set back as far as possible—ideally more than 100m from identified nesting banks. • **Acoustic Screen Hoarding:** Erect 3-metre-high, high-density timber or acoustic blanket hoarding around the HDD drilling rig. This physical barrier blocks the line-of-sight and absorbs engine noise, preventing the birds from abandoning nearby territories. • **Muffled Generators:** Use only ultra-silent, enclosed, and baffled generators for the continuous pumping operations required during the HDD pull-back phase. **Seasonal Restrictions & Pre-Construction Surveys** • **The Breeding Window Blackout:** Ban all high-vibration HDD drilling and heavy excavation within the SPA boundaries during the peak Kingfisher breeding season, which runs from **March 1st to August 31st**. • **Pre-Construction Checks:** Retain an experienced project ornithologist to conduct specialized Kingfisher surveys along a 300m stretch upstream and downstream of the HDD crossing point 2–3 weeks before any work begins. If an active nesting burrow is found, works must halt until the chicks have fully fledged. **Protecting Foraging Clarity & Prey Dynamics** • **Zero-Turbidity Controls:** Implement the highest standard of surface water protection. Runoff from the housing development site must pass through a multi-stage settlement system (e.g., silt traps, flocculant pods, or hydrocarbon interceptors) before any clean water is discharged. Turbid, muddy runoff prevents Kingfishers from hunting. • **Frac-Out Interception:** If a bentonite blowout occurs, it will instantly cloud the river and coat fish spawning gravels. Your Frac-Out Contingency Plan must include immediate automated pressure shut-offs to prevent visibility loss in the Kingfisher's hunting territory. **Preserving and Reinstating Hunting Perches** • **Perch Preservation:** Kingfishers rely on low-hanging branches over the water to hunt. Map and fence off all overhanging riparian trees within your site boundary using strict root protection zones.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **Temporary/Artificial Perches:** If minor bankside tree trimming is unavoidable to safely complete the HDD setup, install temporary wooden posts or branches over the river nearby to serve as substitute hunting perches during the construction window. **Light Pollution Control** Kingfishers are strictly diurnal (daytime) hunters and rely on specific light cycles. Artificial light spilling onto the river disrupts their behaviour and exposes sleeping birds to nocturnal predators. • **Zero-Spill LED Lighting:** All construction and security lighting on the housing site must use highly directional, baffled LED luminaires. • **Asymmetric Beam Angles:** Light fixtures must be tilted downwards and fitted with cowls or shields to ensure 0 lux spill onto the SPA river channel and riparian banks. • **Night-Time Blackout:** No artificial lighting is permitted within the SPA boundary between dusk and dawn. This ensures the natural dark corridor of the River Boyne is fully preserved. **Construction Noise Reduction** Sudden or sustained loud noises from the HDD rig, excavators, and generators will disrupt Kingfisher communication and territory defence. • **Strict Decibel Limits:** Ambient noise levels at the edge of the active SPA boundary must not exceed **55 dB** during daytime hours. • **No-Honk Policy:** Heavy machinery and delivery trucks must be fitted with broadband "white noise" reversing alarms instead of high-pitched beepers. General vehicle horn blowing must be strictly prohibited on-site. • **Acoustic Enclosures:** The HDD power pack and mud-mixing pumps must sit inside localized acoustic booths or wraps to dull low-frequency engine drone. **Sub-Surface Vibration Mitigation** Heavy vibrations travel efficiently through water and riverbanks, which can cause soft, sandy Kingfisher nesting burrows to collapse structurally. • **Continuous Vibration Monitoring:** Install seismic monitoring geophones on the riverbanks adjacent to the HDD route. • **Peak Particle Velocity (PPV) Thresholds:** Ground vibrations must be kept below 2.0 mm/s PPV at the riverbank to guarantee nest burrow stability. If a threshold is breached, an automated SMS alert must instantly trigger a stop-work order until drilling pressures or methods are adjusted.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **No Impact Piling:** If trench sheet shoring is required for the launch and reception pits, it must be installed using silent, hydraulic "press-in" methods rather than drop-hammer or vibratory piling hammer methods. **Human Presence & Visual Disturbance** The physical movement of workers, high-visibility jackets, and vehicles can easily scare a Kingfisher away from its hunting perch or nest. • **Visual Screening Fencing:** Install a continuous, 2.4-metre-high solid timber hoarding fence along the entire landward edge of the SPA boundary before any ground is broken. This completely cuts off the line-of-sight between human activity on the housing site and the river corridor. • **Restricted Access Zones:** The riparian zone outside the immediate, fenced HDD corridor must be designated an **Ecological Exclusion Zone**. No workers, personal vehicles, or material storage are allowed inside this zone. • **Eco-Induction (Toolbox Talks):** Every contractor and site worker must undergo a mandatory ecological induction before entering the site. This training covers the legal protection of the Kingfisher, boundary restrictions, and the strict penalties for entering exclusion zones. **Habitat degradation as a result of air quality impacts (on the River Boyne and River Blackwater SAC/SPA)** **As outlined in the CEMP by Waterman Moylan, the following measures will be in place:** • The use of hardcore access route to work front; • A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers. • Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary. • High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods. • Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary. • Vehicle and wheel washing facilities can be provided at site exit(s) where practicable. If necessary vehicles can be washed down before exiting the site. • Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the demolition. • Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up. • Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns. • Internal combustion plant should not be left running unnecessarily. • Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions. • Where possible fixed plant such as generators should be located away from residential areas. • The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily. • The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries. • Material handling areas should be clean, tidy and free from dust. • Vehicle loading should be dampened down and drop heights for material to be kept to a minimum. • Drop heights for chutes / skips should be kept to a minimum. • Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary. • Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc. • Stockpiles were necessary, should be sheeted or watered down. • Methods and equipment should be in place for immediate clean-up of spillages of dusty material. • No burning of materials will be permitted on site. • Earthworks excavations should be kept damp where necessary and where reasonably practicable. • Cutting on site should be avoided where possible by using pre-fabrication methods to facilitate any temporary works that may be required to enable the demolition. • Equipment and techniques for cutting / grinding / drilling / sawing etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed. • Prior to commencement, the main contractor should identify the demolition operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the main contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged. • The main contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled. • Demolition works to incorporate water spray to reduce dust. Habitat degradation as a result of the introduction and/or spread of invasive species (River Boyne and River Blackwater SAC/SPA) **Biosecurity and Invasive Species Management**

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		General Procedures for Construction Biosecurity of both plant and animal species will be employed pre and post works and will form part of the Appointed Contractor's CEMP. The biosecurity protocols will include: • Implement Check–Clean–Dry procedures for all plant, equipment and PPE before entering and leaving site. • Restrict machinery movement and use designated access routes to protect the riparian zones. • Identify and demarcate any invasive species areas to prevent disturbance. • Inspect, segregate and appropriately manage excavated soils to avoid spread of invasive plant material. • Follow IFI field work protocol for field survey work (2010) aquatic biosecurity protocols for all works near watercourses • Deliver toolbox talks to all personnel on invasive species awareness and biosecurity requirements. • Maintain ongoing environmental supervision to ensure compliance and address issues promptly. Specific Procedures for Construction • All existing areas containing Japanese knotweed & Sea Buckthorn will be marked with tape/fenced to create a 7m exclusion zone. • No machinery/personnel will be permitted to enter the invasives exclusion zone without prior consultation and supervision by a qualified ecologist or invasive species specialist. • All measures outlined in the Invasive Species Management Plan (Appendix IV) will be adhered to. • A pre-construction assessment for invasive species will be carried out prior to construction and an updated Invasive Species Management Plan provided. Protection of Petrifying Springs with Tufa formation (*cratoneurion*) [7220] Petrifying springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat and are present on site. While it is not a qualifying interest of any European site within the ZOI of the proposed development, potential impacts on this habitat were considered in the Appropriate Assessment Screening & Natura Impact Statement, but effects on this habitat are not considered relevant to the assessment of adverse effects on the integrity of the European site, as the River Boyne and River Blackwater SAC & SPA conservation objectives do not relate to this species. Considering this, the following measures will be in place as outlined in Dr Joanne Denyer's Petrifying Spring Survey and Assessment: ***'Direct disturbance*** *• The spring/ seepages should be **protected** from any **direct disturbance**. There should be no construction works in the petrifying spring/ seepage zones within the SAC.* *• The spring/ seepages should be **protected from recreational disturbance**/ pressure resulting from the proposed development. Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank*

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.' **Hydrogeological Impacts** An assessment of potential hydrogeological impacts on petrifying springs within the site from the proposed LRD and required design and mitigation features to avoid impacts are detailed in Meehan (2025) '*Hydrogeological assessment for proposed Large Scale Residential Development (LRD), by Loughglynn Developments Limited, at a site on the Kildalkey road, Trim, County Meath – Land, soils, geology, hydrology and hydrogeology*.' This states that no works will be undertaken in the vicinity of the springs, that the depths of the groundwater across the site are well below the level of any of the construction activities (e.g. foundations and other excavations into the subsurface on the site) and the proposed rising main borehole will not pump or dewater the area within and around it (Section 9.2 of the Hydrogeological assessment). Required mitigation and avoidance measures are detailed (as outlined above). The hydrogeological assessment concludes: *'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 design of the proposed LRD Project has maintained the existing hydrological and hydrogeological regime on the site in as much as possible.* *This means that all SUDS measures will discharge as diffusely as possible and at as shallow a depth as possible, using individual shallow soakaways for each house individually and wide, expansive, shallow soakaways for the road network.* *This will mean no significant effects on groundwater levels and / or flows, and / or surface water, will occur as a result of the proposed LRD Project.'* **Monitoring** • All survey and monitoring of the petrifying springs (pre- during and post-construction) must be undertaken by an **experienced petrifying spring ecologist.** • The petrifying springs must be surveyed **pre-construction** to provide an updated baseline from the 2025 surveys. As the vegetation was disturbed in 2024/ 2025 the petrifying spring vegetation is recovering and is likely to change in the next 1-2 years. The pre-construction surveys must be undertaken within 12 months of construction works starting.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• The petrifying springs must be monitored annually **during construction**. This will include a repeat of the detailed baseline plots at least once and annual walk-over surveys. • The petrifying springs must be monitored **post construction**, once the site is operational) to assess any impact from recreational access. This should be undertaken one year after operation commences and then every two years for a minimum of five years in total. If there is any disturbance to the petrifying springs, then access to the petrifying springs must be reviewed. Therefore, it was concluded that '*There are no predicted significant hydrogeological impacts to the Annex I priority petrifying springs from the proposed development. This is because no works will be undertaken in the vicinity of the springs, the depths of the groundwater across the site are well below the level of any of the construction activities and the proposed rising main borehole will not pump or dewater the area within and around it (Meehan, 2025).'* **<u>Operational Phase</u>** • Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's hydrocarbon interceptors 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. All drainage systems will be inspected to ensure compliance with Water Pollution Acts. • A project ecologist will be appointed to oversee completion of all landscape and drainage works. • Monitoring and post-construction surveys of petrifying springs habitat. Impacts on the River Boyne and River Blackwater which may arise from increased human presence during operation can be limited as follows: • **Eco-Defensive Planting:** Install a wide (3–5 metre), continuous buffer zone along the lower edge of the housing estate. Plant this densely with native, thorny species like Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), and Holly (*Ilex aquifolium*). This forms an impassable natural barrier to humans and dogs. • **Anti-Climb Boundary Fencing:** Erect a high-quality, 2-metre-high weld-mesh or timber palisade fence on the development side of the thorny buffer. This must be a permanent structure maintained by the estate management company to block the creation of informal "desire lines" or trails down to the water. • **Educational Interpretation Boards:** Install high-quality, weather-resistant signs at key open space viewpoints overlooking the valley. These boards should highlight the ecological importance of the River Boyne's Kingfishers and Otters, explaining that keeping a distance preserves their habitats.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **Homeowner Welcome Packs:** Work with the developer to include an "Ecological Awareness Leaflet" in the welcome pack for every new homeowner. This booklet details the sensitivity of the adjacent SAC/SPA, rules on pet management, and the ban on dumping garden waste over the boundary fence. • **Buffer Zones as "No-Go" Areas:** Designate the slope between the houses and the SAC/SPA boundary as a low-intervention biodiversity zone with no footpaths, lighting, or benches. • A line of native canopy trees will act as a permanent visual screen, ensuring that human movement and vehicle headlights on the high ground do not startle birds or otters below (as shown in the landscape plan).
Aquatic biodiversity	• Death/injury • Disturbance	Environmental risks due to construction and operation of the proposed development do potentially occur, particularly in relation runoff from steep site and/or drains that could lead to the watercourses. This could not only result in negative impacts on instream biodiversity, also with the watercourses acting as a vector, carry pollutants and impact beyond the site boundary and into the River Boyne. The following mitigation measures are to be implemented during construction: 1) Given the proximity to the River Boyne, a robust silt barrier fence would be placed along the streams within the redline. This would passively remove silt from the runoff. 2) As back up to the barrier, there would be a sump pump with a float switch at the lowest point of the fence. The sump would be in a 60cm diameter vertical pipe placed uphill of the fence, the top of the pipe would be 40 cm above the ground level at the silt curtain. Water would only enter it in extreme weather if water is building up behind the silt fence. The outlet of the pump leads to a large silt bag that would need to be downstream of the curtain and maintained. 3) Inspection of the integrity of the silt fence will be a requirement of the daily on site checklist and twice daily during periods of heavy rain. Repairs if required are to be made as a matter of urgency. Spare fencing is to be retained on site in a location that is easily accessible. 4) IFI are to be notified immediately of breaches in the silt fence that have resulted in silt laden runoff entering the watercourses. 5) Water from trenches and excavations will not flow directly into drains or watercourses without settlement interception. Vigilance will be required due to the proximity of the stream. Any petrochemical spills are to be cleaned up immediately. 6) All pavement construction within 20m of watercourses is required to take place during dry weather. This minimises the risk to watercourses and contamination of runoff. All associated plant to be cleaned and washed down in a controlled environment and at a designated location greater than 30m from a watercourse/drain leading to a watercourse. 7) Drip trays placed below all small plant. Spill kits will be present on all working sites to clean up spillages. A record of all spillages will be kept and monitored. Generators and small plant not be used within 10m of watercourses. 8) All mobile plant to be refuelled in a central refuelling area in the contractor's compound where a spillage containment sump will be constructed within the refuelling area. All collected fuel will be disposed offsite under license. A record of all spillages will be kept and monitored.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		9) On roads and car park areas and saw cutting, coring and grooving operations will be supported by the use of suction sweepers/cleaning equipment to immediately collect any detritus generated by these works. The silt barrier is to remain in place during all construction works. 10) Stockpiling of loose materials will be kept to a minimum of 40m from watercourses and drains. In the event that stockpiles are required, they will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. Damping down of stockpiles will take pace in dry windy weather to prevent wind blown movement of fines. 11) Fuel, oil and chemical storage will be sited within a bunded area. The bund must be able to take the volume of the largest container plus 10% and be located at least 10m away from drains, ditches, excavations and other locations where it may cause pollution. Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. 12) No foul water will be discharged on site, unless through nominated and secure sewer connection. It will not be discharged to drains or watercourses.
Birds (National Protection)	• Destruction and/or disturbance to nests.	• Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present. • Site clearance will take place outside of bird nesting season (March-August). • 10 bird boxes will be placed on site in consulation with the project ecologist. • No kingfishere were found proximate to teh site. A pre-construction survey of Kingfisher will be carried out. If kingfisher are found to be nesting within 50m of the works NPWS will be contacted and appropriate mitigation put in place. • During the construction phase, lights should be incorporated onto cranes illuminating their entirety on a 24/7 basis to reduce collision risk to birds from cranes and other relevant equipment/structures. • The construction corridor will be marked out prior to the commencement of construction. • All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ER. • Lighting during construction should not spill outside the proposed development. • An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation, including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas, including birds will not be impacted.
Bats (international Protection)	• Removal roosting/foraging habitat. • Lighting Impacts	As outlined in Appendix II of the accompanying EcIA, the following mitigation measures will be implemented to protect local bat population as a result of the installation of artificial lighting associated with the construction and are based on guidelines from Bat Conservation Ireland's "Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers" : • Lighting at all construction stages should be done sensitively on site with no direct lighting of hedgerows and treelines. • A post-construction bat survey and light spill assessment will be carried out to ensure compliance with the lighting plan.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• A pre-construction bat roosting inspection will be carried out onsite, prior to the commencement of works. A derogation license will be applied for from NPWS if bats are found during the future inspection. All works will be carried out in compliance with NPWS conditions if bats or bat roosts are found during pre-commencement inspections. The proposed lighting in the centre of the site is within bat lighting guidelines (2700°K). As outlined in the proposed lighting strategy: '*Optics/ shields/ cowls shall be installed where necessary, in consideration of wildlife (e.g. bats) and to prevent unnecessary up lighting or illumination of nearby trees, buildings, etc'*.
Mammals (badgers & otters)	• Injury/death • Disturbance	• A pre-construction survey will be carried out for terrestrial mammals of conservation importance. If terrestrial mammals of conservation importance are noted on site NPWS will be consulted in relation to removal and the appropriate permissions obtained. • Lighting at all stages will be done sensitively on site in compliance with the lighting plan and with no direct lighting of treelines/hedgerows, southern/south-western fields, or the River Boyne. • A post construction light spill assessment will be carried out to ensure compliance with the lighting plan. In relation to badgers, of which a two setts have been noted in the fields adjacent to the south-west of the site, the following mitigation measures will be followed: **Badger Mitigation Measures for the Development** 1. **Badger-proof Fencing** o Erect 2 m high badger proof dug in, chain-link fencing around sensitive areas, including the south western boundary of the site, as well as along the southern site boundary, which runs along the River Boyne and Blackwater SAC and SPA, to prevent human disturbance while allowing badger access via gates or openings. 2. **Habitat Connectivity / Corridors** o Create and maintain a corridor through the south-west of the site to allow badgers free movement between the setts and the southern fields/riparian area of the River Boyne for foraging. 3. **Sensitive Lighting** 4. Avoid artificial lighting near setts and along movement corridors. Use low-level, directional lighting where necessary to minimise disturbance to nocturnal activity. 5. **Pre-Commencement Mammal Surveys** 6. Conduct updated mammal surveys immediately prior to any construction works to confirm sett usage, detect new setts, and inform final mitigation measures. 7. **Site Supervision and Controls** o All works near setts should be supervised by a licensed ecologist. Implement working buffers around setts and restrict heavy machinery to designated areas. o Provide contractor training on badger protection and site working protocols.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		8. **Habitat Retention and Enhancement** ○ Retain existing treelines and hedgerows where feasible. Enhance habitat around the badger foraging corridor with appropriate shrub planting. ○ Ensure foraging areas remain accessible from the setts. 9. **Monitoring** ○ Monitor the setts with trail cameras and field inspections during the construction phase and for a period after works to confirm ongoing badger use and welfare. **Badger Corridor – Specification and Fencing Requirements** 1. Provide a continuous badger corridor connecting the fields to the south west of the site to the riparian area of the River Boyne to the south of the site, ensuring an unobstructed movement route. 2. The entrance/gap at either end of the corridor must be a minimum of 600 mm wide to allow badger passage. 3. Install TII-standard badger-proof fencing along both sides of the corridor to guide animals safely and prevent access to construction areas. 4. Fencing to consist of 1.8 m high plastic-coated chain-link mesh, 50 mm × 50 mm mesh size, gauge 2.43/3.15, to IS EN 10223. 5. Mesh height above ground to be 1300 mm, mounted on 2100 mm × 150 mm × 75 mm posts. 6. Mesh to be buried (ESH) to a minimum depth of 200 mm, then bent outward at 90° to run 300 mm away from the fence line to prevent burrowing beneath. 7. Bottom of posts set in 475 mm × 200 mm ST2 concrete, with concrete extending 75 mm below the post base and terminating 300 mm from ground surface. 8. Fix one line wire to the field side of posts as close to ground level as possible, compliant with I.S. 435 Part 1, Clause 4.4.4. 9. Secure chain-link mesh to rails with 4 staples per linear metre on the top rail and 1 staple per metre on lower rails (galvanised 30 mm × 3.75 mm). 10. Tie mesh to line wire using 2 mm galvanised tying wire or approved galvanised hog rings at 4 ties per metre, compliant with BS 1722. 11. All fencing to comply with I.S. 435 and erection to follow Clause 2.5 unless otherwise specified. 12. Each fence run (including branches/spurs) must start and end with a post, with additional posts at junctions and corners. 13. Where rock prevents full excavation depth, posts may be set minimum 500 mm deep in ST2 concrete, subject to engineer approval. 14. Timber preservation to follow TII categories: ○ Type A: CCA treated (IS 435 / EN 599-1/2) ○ Type B: Creosote treated (IS 435) 15. Maintain corridor ground conditions free of obstacles (no stockpiling, materials, or machinery). 16. Avoid lighting within the corridor; where unavoidable, use low-lux, fully shielded lighting to prevent disturbance. 17. The corridor to be monitored by a qualified ecologist during construction to ensure functionality.

Table 6. Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Surveys for the Presence of Otters • Preconstruction surveys for otters will be carried out along the River Boyne in the area to the south of the site given the time between the original surveys and site clearance and construction works commencing on site. • If otters or evidence of otters is found during pre-construction surveys, an otter management plan will be developed by the appointed ecologist. No works will commence until this plan is developed and further mitigation is implemented to ensure no impacts on otters. • The construction corridor will be marked out prior to the commencement of construction. • All mitigation measures as outlined within the accompanying CEMP and elsewhere within the EcIA and NIS in relation to protection of surface waters will be implemented in full. **Noise & Vibration** The measures addressing noise and vibration outlined above and in the accompanying CEMP, will be followed to minimise disturbance on the badger setts, local badger population and otters utilising the adjacent River Boyne.

Cumulative Impacts

The following is a list of planning applications near the subject site as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal[1],:

Table 7. Cumulative impacts considered

Ref. No.	Address	Proposal
2560882	At a site of c. 2.65 hectares bounded by 'The Belfry' to the north the rear of dwellings on the Kildalkey Road to the south Talbot Court/Butterstream Gardens to the east and agricultural lands to the west at Athboy Road , Trim , Co. Meath.	The development will consist of: (A) The construction of 85 no. residential dwellings comprising: 73 no. houses (6 no. 2 bedroom dwellings, 64 no. 3 bedroom dwellings and 3 no. 4 bedroom houses [all 2 storey]) and 12 no. apartments/duplex apartments in 1 no. 3 storey building (comprising 6 no. ground floor 1-bedroom apartments and 6 no. 3-bedroom duplex units above - all apartments/duplex units to include terrace/private amenity space); (B) Vehicular/pedestrian access from the Athboy Road (R154) via internal roads within 'The Belfry' to include associated works, along with temporary construction access from the adjoining agricultural lands to the west from the Athboy Road; (C) The provision of 161 no. surface resident car parking spaces (including visitor/EV) as well as bicycle storage for apartments (24 no. in 2 no. single storey structures) and terraced houses in secure shelters to their front curtilage (totalling 90 no. spaces); internal road and shared surface networks including pedestrian paths; (D) Provision of c. 0.491 ha of public open space centrally within the site to integrate with the existing open space to the north (to include associated works) within the Belfry as well as the provision of an outdoor play area and landscaped planting; (E) Provision of foul and surface water drainage (attenuation areas) as well as bin stores; public lighting and all associated landscaping and boundary treatment works, site development and infrastructural works, ESB substations, and all ancillary works necessary to facilitate the development. A Natura Impact Statement has been prepared and will be submitted to the planning authority with the application. Significant Further Information/Revised Plans submitted on this application
221176	Emmet Street , Trim , Co. Meath	permission for amendments to permitted application reference no. 211907, which amended planning application reference TA t 90634 (ABP-306550-20) which amended planning application reference TT/800019. Planning application reference no. 219907 had granted permission for a three-storey apartment building containing 12 no. apartments, which amended a previously approved apartment block under planning references TA190634 (ABP-306550 20) and TT/800019, at Emmet Street, Trim, Co. Meath. The proposed amendments include 1) the revised location of Stairwell Window. 2) alterations of Window Type 2, change of dimension from 3350mm to 2530mm wide to facilitate boiler and Flue position. 3) the inclusion of a Lift Shaft to Provide the Necessary 3450mm Height between the Finished 2nd Floor level and the underside of the Lift Eye Beam for Health and Safety Purposes. 4) a change to the North Facing Fa.-;ade, change from stone effect cladding to Painted Render. 5) the inclusion of a Roof AOV - TGD Part 8. 6) the inclusion of approx. 48 PV Panels in adherence to TGO Part L & BER and 7) all necessary ancillary and site works. The Site is within the curtilage of the Old Town Wall (a Protected Structure under the provision of the Part IV of the Planning and Development Regulations 2001)
25145	Charterschool Land , Manorlands 2nd Divions & Commons Td 7th Division , Trim Co. Meath	EXTENSION OF DURATION OF PLANNING PERMISSION SHD307507-20 - the development will consist of the following: • 320 no. dwellings comprising: o 136 no. houses comprising 10 no. 2-bed, 105 no. 3-bed and 21 no. 4-bed; o 120 no. apartments within 4 no. 3-5 storey blocks comprising 11 no. studio, 30 no. 1-bed, 71 no. 2-bed and 8 no. 3-bed; o 64 no. duplex apartments within 8 no. 3-storey blocks comprising 32 no. 2-Bed and 32 no. 3-Bed. o All units with associated private gardens/ balconies/ terraces to the north/ south/ east/ west elevations. • A creche and community centre (total floor area c.739 sq.m). • 563 no. car parking spaces, 188 no. secure/covered bike

[1] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de

Ref. No.	Address	Proposal
		parking areas and communal bin stores for apartments/duplexes. • Vehicular and pedestrian accesses from Summerhill Road (R158) with associated upgrades including new cycleways and footpaths. • All other site works, landscaping, boundary treatments, ESB substation/switchrooms, plant and services provision required to facilitate the development. The application contains a statement setting out how the proposal will be consistent with the objectives of the Meath County Council Development Plan 2013-2019 and Trim Development Plan 2014-2020. The application contains a statement indicating why permission should be granted for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act, 2000, as amended, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land.
2460132	Crowpark (1st Division) , Kildalkey Road , Trim Co.Meath	the development will consist of the construction of a storey and a half style dwelling with a car port, a detached domestic garage, a domestic wastewater disposal system, new site entrance and all associated site works. Significant Further Information / Revised Plans submitted on this application.
2560546	Manorland , 2nd Division , Trim Co. Meath C15 HF30	Retention Permission is being sought for the domestic extensions constructed to the rear and side of existing dwelling along with the attic conversion for use as home office and study. Retention is also being sought for 2 No. buildings that accommodate workshops and a garage
2460076	Mercy Convent , Emmet Street , Townparks South Trim Co.Meath C15 WD62	the development will consist of the change of use from residential convent to tourism accommodation in ten apartment suites, removal of modern toilet and bathroom block, reconfiguration, refurbishments, repairs and alterations to the internal layout. The ten apartment suites will be available for short term let, which will include, at times, letting out the convent as a whole, including the chapel. The development will include new storage areas, bike store and plant room in existing sheds, new canopy to the rear entrance, changes to the elevations, changes to the site layout, connection to all public services and all associated site works. The Convent is a protected structure, ref: 91275, and is located within the Trim historical architectural conservation area and the Trim zone of archaeological potential. Trees to be protected are located within the convent site
2660137	Trim Castle Hotel , Castle Street , Trim Co Meath	the development will consist of: Alterations to the first floor of the existing hotel to provide for additional bedrooms which will consist of: (i) change of use of restaurant area at 1st floor level to provide for 7 no. en-suite bedrooms; (ii) change to internal layout to provide for associated corridors, internal doors and necessary alterations. There are no external changes proposed; and (iv) all other associated engineering works, drainage, landscaping, lighting, and ancillary works necessary to facilitate the development

As a result of the assessment carried out in relation to the above projects and supporting documentation, it is concluded that no significant effects on European sites will be seen as a result of the proposed development alone or in combination with other projects.

No significant effects are likely from in-combination effects.

Residual Impacts and Conclusion

The construction and operational mitigation proposed for the development satisfactorily addresses the mitigation of potential effects on the terrestrial, mammalian, avian and aquatic sensitive receptors through the application of the standard construction and operational phase controls outlined in this report. No significant effects on biodiversity are likely. Residual effects on biodiversity are considered to be: Low adverse / site / Negative Impact / Not significant / short term.

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ALTEMAR
Marine & Environmental Consultancy

2025/2026 Wintering Bird Assessment for a proposed housing development at Kildalkey Road, Trim, Co. Meath.

8th June 2026

Prepared by: Bryan Deegan of Altemar Ltd.
On behalf of: Loughglynn Developments Limited

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Document Control Sheet			
Client	Loughglynn Developments Limited		
Project	Wintering Bird Assessment for a proposed housing development at Kildalkey Road, Trim, Co. Meath.		
Report	Wintering Bird Assessment		
Date	8th June 2026		
Version	Author	Reviewed	Date
Final	Bryan Deegan		8th June 2026

Summary

Structure/features:	The proposed development area consists mainly of a tilled field, recolonising bare ground, bare ground and some treelines and woodland. The River Boyne is located within the site outline, as well as four on-site streams which flow to join the River Boyne.
Location:	Trim, Co. Meath.
Bird species present:	Blackbird, Blackcap, Blue Tit, Buzzard, Chaffinch, Chiffchaff, Cormorant, Dunnock, Great Tit, Herring Gull, Hooded Crow, House Sparrow, Kingfisher, Meadow Pipit, Robin, Rook, Song Thrush, Snipe, Starling, Woodpigeon, Wren
Proposed work:	Residential development.
Surveys by:	Frank Spellman & Luke Dodebier
Survey dates:	21st November, 27th November, 8th December, 16th December 2025, 8th January, 28th January, 2nd February, 18th March, 28th March, 30th March 2026.

Figure 1. *Wintering bird survey areas.*

Figure 2. *Wintering bird survey location.*

Competency of assessor

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments.

This report has been prepared by Luke Dodebier and reviewed by Bryan Deegan, both of Alemar Ltd.

Bryan Deegan (MCIEEM, BSc Applied Marine Biology, MSc Environmental Science)

Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 32 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently lead project ecologist for Project Pembroke and was contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

Frank Spellman (BSc Zoology, MSc (Ind) Zoology).

Frank has extensive experience in carrying out a wide range of fauna surveys as both a sub-contractor and employee for environmental consultancies and organisations in Ireland and the US. These include both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, breeding/wintering bird surveys, and freshwater ecology surveys. Frank has been lead ornithologist on numerous development projects within Ireland carrying out full wintering bird and breeding bird assessments.

Luke Dodebier (BSc Wildlife Biology).

Luke holds a BSc (Hons.) in Wildlife Biology and has 4 years' experience in ecological consultancy. Luke has worked on a large variety of projects, from large-scale renewable projects to small-scale residential projects and has seen them to completion. Luke is a skilled terrestrial ecologist experienced in Bird, mammal and flora surveying as well as associated reporting in AA, NIS and EcIA.

Legislative context

The Wildlife Act 1976 protects wild birds in Ireland. Based on this legislation it is an offence to wilfully interfere with or destroy wild birds and their nests and eggs (other than the wild species mentioned in the Third Schedule of this Act). Under this legislation it is an offence for any person who "*wilfully takes or removes the eggs or nest of a protected wild bird otherwise than under and in accordance with such a licence, wilfully destroys, injures or mutilates the eggs or nest of a protected wild bird, wilfully disturbs a protected wild bird on or near a nest containing eggs or unflown young.*"

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

Council Directive 2009/147/EC 2010 on the conservation of wild birds provides for the conservation of wild birds by, among other things, classifying important ornithological sites as Special Protection Areas. The Directive relates to the conservation of all species of naturally occurring birds in the wild state, their eggs, nests and habitats in the European territory of the Member States. The Directive prohibits in particular:

- deliberate killing or capture by any method;
- deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- taking their eggs in the wild and keeping these eggs even if empty;
- deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- keeping birds of species the hunting and capture of which is prohibited.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule:

- deliberately captures or kills any specimen of these species in the wild,
- deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
- deliberately takes or destroys eggs of those species from the wild,
- damages or destroys a breeding site or resting place of such an animal, or
- keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.

Wintering bird surveys

This report presents the methodology and results of 10 visits to Trim by Frank Spellman and Luke Dodebier from November to March 2025.

Survey methodology

Wintering bird surveys were carried out during the wintering bird season in Trim in order to gather baseline data to assist in assessing the potential impacts on wintering birds from future proposed developments on the site, in particular those listed as Qualifying Interests of SPAs within 15 km and other amber/red-listed birds of conservation concern in Ireland (BoCCI). Potential impacts on wintering bird species include disturbance, destruction of foraging areas, destruction of roosting areas and collision risk during construction and operation (cranes, buildings etc.). These wintering bird surveys were carried out based on the BTO Common Bird Census (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) and I-WeBS Counter Manual: Guidelines for Irish Wetland Bird Survey counters (BWI & NPWS), following CIEEM guidelines.

A 15-minute settlement period was given following arrival to allow resumption of bird activity after any possible disturbance caused by arrival to the site. Various features such as grassland, scrub, waterlogged areas, recolonising bare ground, bare ground, and treeline were present within the survey area. A roving transect survey around the perimeter was carried out on each occasion, providing clear views of all areas within and over that survey area. A vantage point in the east provided unobstructed views across the survey area (Figure 3). Flight lines, large flights, foraging, perching, bathing and any other observed behaviour by wintering bird species and other species observed within, over and immediately adjacent to the survey area were recorded. Each survey was carried out by a single surveyor. A pair of binoculars were used by the surveyor to identify and count birds at distance.

Care was taken not to double count any observations. Surveys were initiated at varying times (morning/midday/afternoon) to account for fluxes in bird activity and birds transiting to/from foraging and roosting areas. Local temperatures varied from 2 – 16^{o}C. Winds varied from 1 – 2 on the Beaufort scale. Weather conditions were favourable on all occasions.

Peak counts for the survey area were compared to 1% national and international population sizes of relevant species for which data was available. Foraging areas, flight paths, large flights and other observations were mapped according to field sheet records.

Survey results/discussion

Habitats of wintering bird potential

A desk and ground level wintering bird habitat assessment were carried and used to examine the structures, features and vegetation on site that could provide wintering bird habitat. Potential features associated with foraging/roosting include agricultural fields, improved/amenity grassland, scrub, watercourses and drainage ditches, estuaries and intertidal zones. All open areas, vegetated areas, built areas and water-holding features within and immediately adjacent to the site were assessed for wintering bird potential.

Habitat of foraging value for wintering birds was limited throughout the site. The site consisted mainly of grassland across uneven topography (old soil heaps, previous reprofiling etc.), recolonising bare ground and bare ground. Small areas of consistently waterlogged areas were present in the centre of the site with some rushes, but with no significant vegetation/reed cover. Structures were present to the north, west and east of the site that could provide breeding habitat for gull species, but not within the site. The site is in close proximity (< 1 km) from River Boyne and River Blackwater SPA, and so there is a high potential for Qualifying Interests of this SPA to utilise and/or fly over the site.

Figure 3. *Survey area and vantage points.*

Wintering bird activity survey

A total of 22 species were recorded within, above and immediately adjacent to the survey area across 10 surveys (see Appendix 1a for individual observations of target species). Fifteen green, five amber, and two red bird species of conservation concern in Ireland (BoCCI) were recorded either within, over and immediately adjacent to the survey area. Details regarding the status, behaviour and abundances of species recorded on/over/adjacent to the site relevant to the conservation interests of Special Protected Areas (SPAs) and red listed BoCCI are discussed below.

Kingfisher (amber BoCCI) was observed in flight (Figure 4). One Kingfisher observation was made on one occasion (18th March 2026). Peak count was two individuals. This species was observed flying adjacent to the survey area on only one occasion. Despite no foraging behaviour being observed throughout the site visits, it should be noted that the species likely finds abundant foraging habitats within the River Boyne and River Blackwater SPA as opposed to the large open field in which the majority of the redline encompasses.. This species is a Qualifying interest for the adjacent River Boyne and River Blackwater SPA.

Meadow pipit (red BoCCI) was observed foraging southwest of the site on two occasions (21st November 2025 and 8th December 2025) (Figure 5) in shrubs. Peak count was two individuals. This species is not listed as a Qualifying Interest of any SPAs within 15 km of the subject site.

Snipe (red BoCCI) was observed during two surveys (28th January and 18th March 2026), in flight and foraging, respectively (Figures 4 & 5). Peak count was six individuals. Suitable foraging habitat for this species is present within the site outline, and foraging was observed. More suitable and highly abundant foraging habitat, in the form of the River Boyne and River Blackwater SPA, is present south of the majority of the works. However, it should be noted that foraging was observed in the arable lands within the site outline, and, additionally, a portion of the works will interfere with potential foraging areas in the SPA. This species is not listed as a Qualifying Interest of any SPAs within 15 km of the subject site.

Table 1. *Species recorded within, above and/or immediately adjacent to the survey*

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Buzzard	BZ	*Buteo buteo*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Chiffchaff	CC	*Phylloscopus collybita*	Green
Cormorant	CA	*Phalacrocorax carbo*	Amber
Dunnock	D.	*Prunella modularis*	Green
Goldfinch	GO	*Carduelis carduelis*	Green
Great Tit	GT	*Parus major*	Green
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
House Sparrow	HS	*Passer domesticus*	Amber
Kingfisher	KF	*Alcedo atthis*	Amber
Meadow Pipit	MP	*Anthus pratensis*	Red
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Song Thrush	ST	*Turdus philomelos*	Green
Snipe	SN	*Gallinago gallinago*	Red
Starling	SG	*Sturnus vulgaris*	Amber
Wren	WR	*Troglodytes troglodytes*	Green
Woodpigeon	WP	*Columba palumbus*	Green

Table 2. *Peak counts of bird species recorded within, above and/or immediately adjacent to the survey area.*

Species	Peak count (2024/25)	1% national	1% international
Blackbird	5		
Blackcap	1		
Blue Tit	8		
Buzzard	1		
Chaffinch	1		
Chiffchaff	1		
Cormorant	1	1200	
Dunnock	1		
Great Tit	2		
Herring Gull	2		
Hooded Crow	2		
House Sparrow	15		
Kingfisher	1		
Meadow Pipit	2		
Robin	5		
Rook	10		
Song Thrush	3		
Snipe	6		>1,000,000
Starling	12		
Woodpigeon	15		
Wren	5		

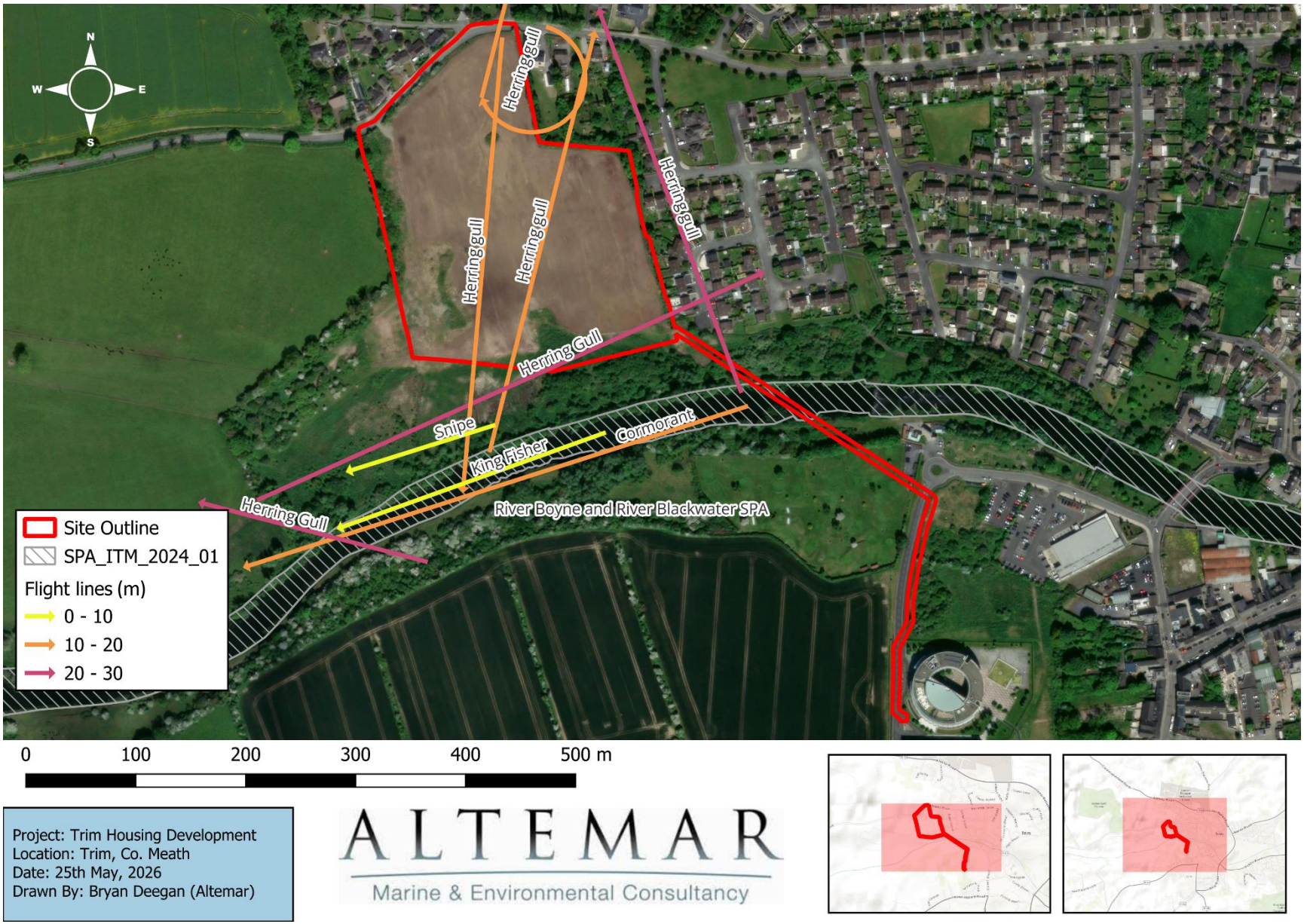

Figure 4. *Flight observations of BoCCI species within, over and immediately adjacent to the survey area.*

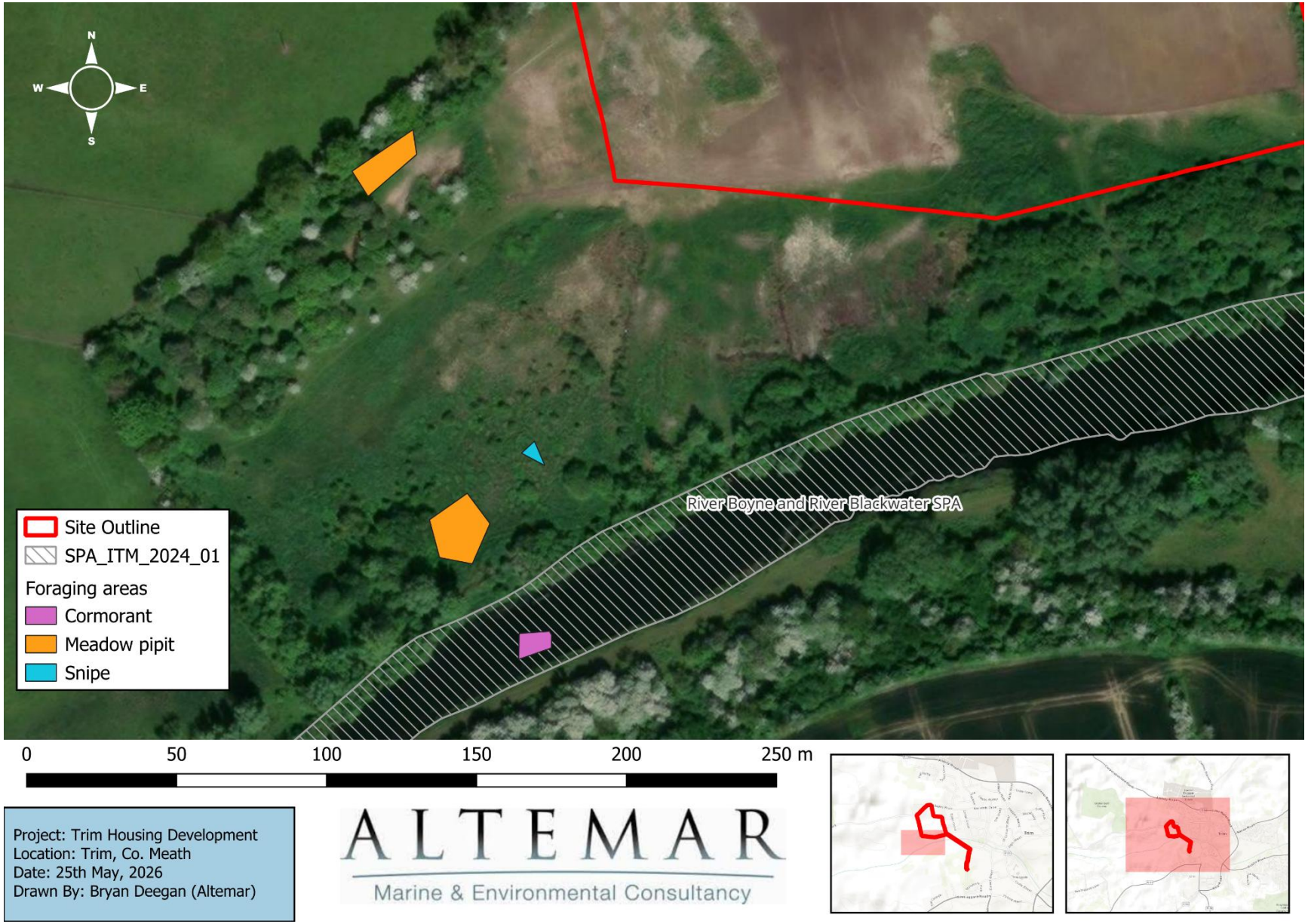

Figure 5. *Foraging observations of BoCCI observed within, over and immediately adjacent to the survey area.*

Wintering bird assessment findings

Review of local bird records

The review of existing bird records (sourced from NBDC Database) within a 2 km^2 grid (Reference grids N75Y) encompassing the study area reveals that 47 known bird species have previously been observed and recorded locally (*Table 3*).

Table 3: *NBDC bird records within 2 km^2 (grids N75Y)*

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Blackbird *(Turdus merula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Blackcap *(Sylvia atricapilla)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Blue Tit *(Cyanistes caeruleus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Bullfinch *(Pyrrhula pyrrhula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Chaffinch *(Fringilla coelebs)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Chiffchaff *(Phylloscopus collybita)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Coal Tit *(Periparus ater)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Collared Dove *(Streptopelia decaocto)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Dipper *(Cinclus cinclus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Dunnock *(Prunella modularis)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Fieldfare *(Turdus pilaris)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Goldcrest *(Regulus regulus)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Goldfinch *(Carduelis carduelis)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Great Tit *(Parus major)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Greenfinch *(Chloris chloris)*	2	20/12/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Heron *(Ardea cinerea)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Grey Wagtail *(Motacilla cinerea)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Hooded Crow *(Corvus cornix)*	2	31/12/2011	Bird Atlas 2007 - 2011	
House Sparrow *(Passer domesticus)*	2	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Jackdaw *(Coloeus monedula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Kingfisher *(Alcedo atthis)*	6	18/09/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Lapwing *(Vanellus vanellus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lesser Redpoll *(Acanthis cabaret)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Little Grebe *(Tachybaptus ruficollis)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Magpie *(Pica pica)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Mallard *(Anas platyrhynchos)*	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mistle Thrush *(Turdus viscivorus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Moorhen *(Gallinula chloropus)*	5	31/12/2011	Bird Atlas 2007 - 2011	
Mute Swan *(Cygnus olor)*	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Pied Wagtail *(Motacilla alba)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Raven *(Corvus corax)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Redwing *(Turdus iliacus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Reed Bunting *(Emberiza schoeniclus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Robin *(Erithacus rubecula)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Rook *(Corvus frugilegus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Sand Martin *(Riparia riparia)*	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Sedge Warbler *(Acrocephalus schoenobaenus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Snipe *(Gallinago gallinago)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Song Thrush *(Turdus philomelos)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Starling *(Sturnus vulgaris)*	2	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Dove *(Columba oenas)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Swallow *(Hirundo rustica)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swift *(Apus apus)*	4	07/07/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Willow Warbler *(Phylloscopus trochilus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Woodpigeon (*Columba palumbus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Wren *(Troglodytes troglodytes)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Yellowhammer *(Emberiza citrinella)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

National Summary

Species	Trend (%) National - 5 Year	National - 12 Year	National - 23 Year	Long Term Trend
Scaup	-33.6	-82.9	-89.2	Large Decline
Pochard	-19.8	-60.4	-79.1	
Goldeneye	-32.5	-39.0	-66.9	
Lapwing	-6.5	-45.1	-63.9	
Grey Plover	-21.9	-42.8	-58.8	
Golden Plover	-17.5	-58.0	-54.1	
Dunlin	5.9	-21.2	-45.2	Moderate Decline
Curlew	-9.4	-23.7	-43.1	
Turnstone	-33.6	-46.0	-23.7	Intermediate Decline
Coot	-10.1	1.1	-23.2	
Mallard	-11.3	-19.7	-19.1	
Wigeon	0.9	-17.0	-18.2	
Tufted Duck	-20.7	-28.9	-17.9	
Red-breasted Merganser	-12.9	5.2	-14.7	
Pintail	-0.8	-6.0	-13.7	
Great Crested Grebe	-39.5	-6.1	-10.8	
Shoveler	23.0	-21.3	-10.8	
Knot	0.0	-12.2	-9.8	
Bar-tailed Godwit	-32.6	-13.9	-5.1	
Ringed Plover	-4.3	-26.8	-1.1	
Grey Heron	1.0	-4.9	6.6	Stable or Increasing
Redshank	-14.0	-28.4	6.7	
Shelduck	6.3	-0.8	9.3	
Oystercatcher	-17.5	-31.1	10.8	
Mute Swan	4.6	9.6	13.8	
Teal	1.8	5.7	19.4	
Purple Sandpiper	-36.4	-37.6	23.5	
Gadwall	-26.5	4.3	24.4	
Little Grebe	6.1	16.7	38.2	
Greenshank	0.9	7.3	41.0	
Cormorant	38.5	8.4	42.9	
Sanderling	-23.8	-11.1	84.6	
Black-tailed Godwit	22.5	25.0	92.3	
Light-bellied Brent Goose	-11.2	1.2	93.3	
Little Egret	34.6	61.5	483.3	

Figure 6. *I-WeBS National Trends Report.*

Historical Surveys

I-WeBS

I-WeBS National and Site Trends Report 1994/95 – 2019/20 report presents national and site-specific trends of wetland birds in Ireland. This report was used to assess the trends of species recorded during wintering bird surveys at Trim in winter of 2025/26. The survey area is proximate to River Boyne (OV301) I-WeBS site.

No species were observed during surveys that are listed on River Boyne's Site Summary.

The national wetland bird trend summary (Figure 6) provides long-term population trends for wintering species in Ireland. Trends for total and individual species nationally and the River Boyne are included in Appendix 1a, 1b and 1c of this report.

Mitigation

The proposed site is of low importance to the local wintering bird population. However, there is the potential for minor negative impacts by the development during construction phase through collision risks to species transiting to and from foraging and roosting areas along the River Boyne corridor. Out of an abundance of caution, the following mitigation measures relevant to birds should be implemented to minimise any potential negative impact on biodiversity:

1. During the construction phase, lights should be incorporated onto cranes illuminating their entirety on a 24/7 basis to reduce collision risk to birds from cranes and other relevant equipment/structures.
2. The construction corridor will be marked out prior to the commencement of construction.
3. All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ER.
4. Lighting during construction should not spill outside the proposed development.
5. An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation, including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas, including birds will not be impacted.
6. The effectiveness of the proposed mitigation will be monitored throughout the construction period.
7. All elements of the CEMP and other mitigation measures outlined in the accompanying NIS/EcIA will be adhered to.

Conclusion

This report aims to build on the baseline data and provide information to assist in assessing the potential impact of proposed developments at Trim, Co. Meath, on wintering birds within/over/adjacent to the development area. This report presents the methodology and results of 10 visits to this location by Altemar Ltd. from November 2025 to March 2026.

A total of 22 species were recorded within, above and adjacent to the survey area across five surveys. 15 green, five amber, and two red species of conservation concern were recorded either within, over or immediately adjacent to the survey area boundary. One species listed as a Qualifying Interest of the nearby River Boyne and River Blackwater SPA (Kingfisher). One red-listed species of conservation concern in Ireland, meadow pipit (*Anthus pratensis*) was recorded foraging proximate to the survey area on two surveys.

The proposed development in Trim is not predicted to significantly reduce available foraging areas for wintering birds, in particular those listed as Qualifying Interests of nearby SPAs. Impacts on wintering bird species moving between foraging and roosting sites are not likely in the absence of mitigation measures. The proposed development is likely to reduce the total foraging area within the survey area for red-listed species recorded during surveys. However, the reduction of foraging area for these species is not considered significant due to the scale of the development in the context of the surrounding areas and habitats available, and as the proposed site layout and landscape plan will continue to facilitate foraging by these species within the site.

Out of an abundance of caution due to the proximity of the River Boyne and River Blackwater SPA, mitigation measures are recommended. Following the full implementation of mitigation measures, no significant impacts on wintering bird species, particularly Qualifying Interests of nearby SPAs, are predicted.

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Appendix I

Appendix 1a – Individual survey observations of target species.

Date	Species	No.	Behaviour	Height (m)	Details
2025-11-21	Meadow pipit	1	Foraging	--	Foraging in grassland/scrub
2025-12-08	Herring gull	1	Flight path	30	North flight to east of survey area.
2025-12-08	Herring gull	2	Foraging	--	Foraging on scrub/saplings along west boundary of site
2025-12-08	Meadow pipit	2	Flight path	20	North flight across survey area.
2025-12-16	Cormorant	1	Flight path	15	Flying from east to west along river
2025-12-16	Herring Gull	1	Flight path	25	Flying across site from west to east
2026-01-08	Herring gull	1	Flight path	15	Flying in a circle heading north
2026-01-28	Herring gull	2	Flight path	15	Flying from north to south
2026-03-18	Snipe	1	Flight path	3	Flushed from long grass
2026-03-18	King Fisher	1	Flight path	1	Flew west along edge of river
2026-03-30	Herring Gull	1	Flight path	25	Flying from south to north west

Appendix 1b – I-WeBS Trends for River Boyne (site code OV301).

Site Summary

	Trend (%)			
Species	River Boyne - 5 Year	River Boyne - 12 Year	River Boyne - 23 Year	Long Term Trend
Teal	-99.1	-79.2	-85.2	Large Decline
Mallard	-8.2	-19.8	0.0	Stable or Increasing
Lapwing	-73.1	18.4	22.0	
Curlew	8.5	-11.1	28.0	
Wigeon	-7.6	621.9	1343.8	

Appendix 1c – I-WeBS Site Summary Table for OV301 River Boyne.

"Peak counts for each species in each of the most recent 10 seasons are presented. Please note:

- *The mean is based only on available survey data from the most recent 5-season period, i.e. for the period 2016/17 - 2020/21, using I-WeBS core counts.*
- *Blank columns indicate seasons when no counts were carried out, while blank cells show that a species was absent, where other counts are in the same column.*
- *Counts that are poor quality are excluded from these tables, with the exception of known underestimates of individual species.*
- *Where peak counts were recorded outside the midwinter period (Nov, Dec, Jan) these are marked with an asterisk (*). This may indicate that higher numbers occurred during passage periods, or may be due to a lack of counts in the midwinter months.*
- *The 'Peak Months' column indicates the months when the highest number of peak counts were recorded."*

Species	1% national	1% international	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Mean	Peak Months
Mute Swan	90	100	32	16	4*	7*	12	7*	3*	2	4*	2	4	Dec
Whooper Swan	150	340	9*	10*	27*	32*	27	11*		6*	51*	41*	22	Feb
Greylag Goose	35	980										1*	0	Mar
Shelduck	100	2500			2*	1							0	Jan, Feb
Wigeon	560	14000	128*	243*	89*	184*	296	300*	220*	250*	100*		174	Feb, Mar
Teal	360	5000	82	103	108	103*	64*		1				0	Feb, Dec
Mallard	280	53000	47	56*	120	125*	79	105	96	60	86	8*	71	Jan
Goosander				1*									0	Feb
Little Grebe	20	4700		1*	3*	1*	3	4*	1*	2*	3		2	Jan, Feb, Oct, Nov
Cormorant	110	1200	3	1*	2	2*	3*	3	4*	1*	4		2	Nov, Dec
Little Egret	20	1100	2	1*	2*	1	4*	1*	2		2	1*	1	Dec
Grey Heron	25	5000	2	2*	2*	1*		2*	2*	1*	1	2*	2	Oct
Water Rail						1*							0	Jan, Feb
Moorhen			3*	1*	4*	17*	6*	2*	2	2*	2	1*	2	Sep, Oct
Oystercatcher	610	8200	1*										0	Feb
Golden Plover	920	9300	600	1800*	300	300*	30		300	270*	26*		119	Feb, Dec
Lapwing	850	72300	550	667*	430	250	429	50*	350*	77	110		117	Jan, Dec
Snipe					1	19*	25*	14*	7	13	8		8	Feb
Curlew	350	7600	272*	175	73	156	307	195*	250*	85	228	125*	177	Jan
Redshank	240	2400			7	25	107*	13	36	10	15		15	Jan, Dec
Green Sandpiper				1*							1		0	Feb, Dec
Common Sandpiper					1*								0	Oct
Black-headed Gull			61*	21	60	68	106	8	120*	120	250		100	Jan, Dec
Common Gull					99		20		1*		1*		0	Jan
Lesser Black-backed Gull									22	3		3*	6	Nov
Herring Gull					3*			1*					0	Mar, Sep
Great Black-backed Gull							1		2	1	1		1	Jan
Mediterranean Gull			5										0	Jan

ALTEMAR
Marine & Environmental Consultancy

2025 Wintering Bird Assessment for a proposed housing development at Kildalkey Road, Trim, Co. Meath.

15th June 2026

Prepared by: Bryan Deegan of Altemar Ltd.
On behalf of: Loughglynn Developments

Document Control Sheet			
Client	Loughglynn Developments		
Project	Wintering Bird Assessment for a proposed housing development at Kildalkey Road, Trim, Co. Meath.		
Report	Wintering Bird Assessment		
Date	15th June 2026		
Version	Author	Reviewed	Date
Final	Bryan Deegan		15th June 2026

Summary

Structure/features:	The proposed development area consists mainly of a tilled field, recolonising bare ground, bare ground and some treelines and woodland. The River Boyne is located within the site outline, as well as four on-site streams which flow to join the River Boyne.
Location:	Trim, Co. Meath.
Bird species present:	Blackbird, Bullfinch, Blue Tit, Buzzard, Carrion Crow, Chaffinch, Cormorant, Dunnock, Feral Pigeon, Golden Pheasant, Goldfinch, Great Tit, Grey Heron, Hooded Crow, Herring Gull, Jackdaw, Kingfisher, Little Egret, Long-tailed Tit, Mallard, Magpie, Marsh Tit, Meadow Pipit, Robin, Rook, Snipe, Song Thrush, Starling, Wheater, Woodpigeon
Proposed work:	Residential development.
Surveys by:	Jeff Boyle & Jack Doyle
Survey dates:	30th January, 11th February, 21st February, 3rd March, and 25th March 2025.

Figure 1. *Wintering bird survey areas.*

Figure 2. *Wintering bird survey location.*

Competency of assessor

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments.

This report has been prepared by Jack Doyle and reviewed by Bryan Deegan, both of Alemar Ltd.

Bryan Deegan (MCIEEM, BSc Applied Marine Biology, MSc Environmental Science)

Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 30 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently lead project ecologist for Project Pembroke and was contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

Jack Doyle (MSc Sustainable Environments) carried out the fieldwork elements of this Wintering Bird Assessment. Jack is an experienced environmental project manager, joining Altemar in March 2021. Jack has led and carried out a wide range of flora and fauna surveys across Ireland and produced ecological assessments on residential, commercial, and infrastructure projects. Jack is skilled in breeding & wintering ornithological surveys, roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, and habitat identification.

Jeff Boyle (BSc Environmental Management) also carried out the fieldwork elements of this Wintering Bird Assessment. Jeff is skilled in bat detection through static detector surveys, dusk emergence, and dawn re-entry surveys. He is also experienced in habitat assessment and has undertaken flora/invasive species surveys and breeding/wintering bird surveys to produce numerous ecological assessments on a range of residential, industrial, and commercial projects.

Legislative context

The Wildlife Act 1976 protects wild birds in Ireland. Based on this legislation it is an offence to wilfully interfere with or destroy wild birds and their nests and eggs (other than the wild species mentioned in the Third Schedule of this Act). Under this legislation it is an offence for any person who "*wilfully takes or removes the eggs or nest of a protected wild bird otherwise than under and in accordance with such a licence, wilfully destroys, injures or mutilates the eggs or nest of a protected wild bird, wilfully disturbs a protected wild bird on or near a nest containing eggs or unflown young.*"

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

Council Directive 2009/147/EC 2010 on the conservation of wild birds provides for the conservation of wild birds by, among other things, classifying important ornithological sites as Special Protection Areas. The Directive relates to the conservation of all species of naturally occurring birds in the wild state, their eggs, nests and habitats in the European territory of the Member States. The Directive prohibits in particular:

- deliberate killing or capture by any method;
- deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- taking their eggs in the wild and keeping these eggs even if empty;
- deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- keeping birds of species the hunting and capture of which is prohibited.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule:

- deliberately captures or kills any specimen of these species in the wild,
- deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
- deliberately takes or destroys eggs of those species from the wild,
- damages or destroys a breeding site or resting place of such an animal, or
- keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.

Wintering bird surveys

This report presents the methodology and results of 5 visits to Trim by Jeff Boyle & Jack Doyle from January to March 2025.

Survey methodology

Wintering bird surveys were carried out during the wintering bird season at Trim in order to gather baseline data to assist in assessing the potential impacts on wintering birds from future proposed developments on the site, in particular those listed as Qualifying Interests of SPAs within 15 km and other amber/red-listed birds of conservation concern in Ireland (BoCCI). Potential impacts on wintering bird species include disturbance, destruction of foraging areas, destruction of roosting areas and collision risk during construction and operation (cranes, buildings etc.). These wintering bird surveys were carried out based on the BTO Common Bird Census (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) and I-WeBS Counter Manual: Guidelines for Irish Wetland Bird Survey counters (BWI & NPWS), following CIEEM guidelines.

A 15-minute settlement period was given following arrival to allow resumption of bird activity after any possible disturbance caused by arrival to the site. Various features such as grassland, scrub, waterlogged areas, recolonising bare ground, bare ground, and treeline were present within the survey area. A roving transect survey around the perimeter was carried out on each occasion, providing clear views of all areas within and over that survey area. A vantage point in the east provided unobstructed views across the survey area (Figure 3). Flight lines, large flights, foraging, perching, bathing and any other observed behaviour by wintering bird species and other species observed within, over and immediately adjacent to the survey area were recorded. Each survey was carried out by a single surveyor. A pair of binoculars were used by the surveyor to identify and count birds at distance. Care was taken not to double count any observations. Surveys were initiated at varying times (morning/midday/afternoon) to account for fluxes in bird activity and birds transiting to/from foraging and roosting areas. Local temperatures varied from 3 – 12°C. Winds varied from 1 – 3 on the Beaufort scale. Weather conditions were favourable on all occasions. Peak counts for the survey area were compared to 1% national and international population sizes of relevant species for which data was available. Foraging areas, flight paths, large flights and other observations were mapped according to field sheet records.

Survey results/discussion

Habitats of wintering bird potential

A desk and ground level wintering bird habitat assessment were carried and used to examine the structures, features and vegetation on site that could provide wintering bird habitat. Potential features associated with foraging/roosting include agricultural fields, improved/ammenity grassland, scrub, watercourses and drainage ditches, estuaries and intertidal zones. All open areas, vegetated areas, built areas and water-holding features within and immediately adjacent to the site were assessed for wintering bird potential.

Habitat of foraging value for wintering birds was limited throughout the site. The site consisted mainly of grassland across uneven topography (old soil heaps, previous reprofiling etc.), recolonising bare ground and bare ground. Small areas of consistently waterlogged areas were present in the centre of the site with some rushes, but with no significant vegetation/reed cover. Structures were present to the north, west and east of the site that could provide breeding habitat for gull species, but not within the site. The site is in close proximity (< 1 km) from River Boyne and River Blackwater SPA, and so there is a high potential for Qualifying Interests of this SPA to utilise and/or fly over the site.

Figure 3. *Survey area and vantage points.*

Wintering bird activity survey

A total of 28 species were recorded within, above and immediately adjacent to the survey area across 5 surveys (see Appendix 1a for individual observations of target species). 21 green, five amber, and two red bird species of conservation concern in Ireland (BoCCI) were recorded either within, over and immediately adjacent to the survey area. Details regarding the status, behaviour and abundances of species recorded on/over/adjacent to the site relevant to the conservation interests of Special Protected Areas (SPAs) and red listed BoCCI are discussed below.

Kingfisher (amber BoCCI) was observed in flight (Figure 4). One Kingfisher observation was made on one occasion (25th March 2025). Peak count was one individual. This species was observed flying adjacent to the survey area on only one occasion. Despite no foraging behaviour being observed throughout the site visits, it should be noted that the species likely finds abundant foraging habitats within the River Boyne and River Blackwater SPA as opposed to the large open field in which the majority of the redline encompasses. This species is a Qualifying interest for the nearby River Boyne and River Blackwater SPA.

Meadow pipit (red BoCCI) was observed foraging throughout much of the site on one occasion(21st February 2025) (Figure 4) in shrubs. Peak count was one individual. This species is not listed as a Qualifying Interest of any SPAs within 15 km of the subject site.

Snipe (red BoCCI) was observed during one survey (21st February 2025) in flight (Figure 4). Peak count was one individual. Suitable foraging habitat for this species is present within the site outline and foraging was observed. More suitable and highly abundant foraging habitat in the form of the River Boyne and River Blackwater SPA as is present south of the majority of the works. However, it should be noted foraging was observed in the arable lands of the redline. This species is not listed as a Qualifying Interest of any SPAs within 15 km of the subject site.

Table 1. *Species recorded within, above and/or immediately adjacent to the survey*

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Bullfinch	BF	*Pyrrhula pyrrhula*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Buzzard	BZ	*Buteo buteo*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Cormorant	CA	*Phalacrocorax carbo*	Amber
Dunnock	D.	*Prunella modularis*	Green
Feral Pigeon	FP	*Columba livia f. domestica*	Green
Goldfinch	GO	*Carduelis carduelis*	Green
Great Tit	GT	*Parus major*	Green
Greenfinch	GR	*Chloris chloris*	Amber
Grey Heron	H.	*Ardea cinerea*	Green
Hooded Crow	HC	*Corvus cornix*	Green
Herring Gull	HG	*Larus argentatus*	Amber
Jackdaw	JD	*Corvus monedula*	Green
Kingfisher	KF	*Alcedo atthis*	Amber
Little Egret	ET	*Egretta garzetta*	Green
Long-tailed Tit	LT	*Aegithalus caudatus*	Green
Mallard	MA	*Anas platyrhynchos*	Amber
Magpie	MG	*Pica pica*	Green
Marsh Tit	MT	*Poecile palustris*	Green
Meadow Pipit	MP	*Anthus pratensis*	Red

Common name	BTO	Latin name	BoCCI
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Snipe	SN	*Gallinago gallinago*	Red
Song Thrush	ST	*Turdus philomelos*	Green
Wheater	W.	*Oenanthe oenanthe*	Green
Woodpigeon	WP	*Columba palumbus*	Green

Table 2. *Peak counts of bird species recorded within, above and/or immediately adjacent to the survey area.*

Species	Peak count (2024/25)	1% national	1% international
Blackbird	12		
Bullfinch	2		
Blue Tit	2		
Buzzard	1		
Chaffinch	1		
Cormorant	1	1200	
Dunnock	5		
Feral Pigeon	1		
Goldfinch	6		
Great Tit	2		
Greenfinch	1		
Grey Heron	1	5000	
Hooded Crow	4		
Herring Gull	31		
Jackdaw	2		
Kingfisher	1		
Little Egret	1	1100	
Long-tailed Tit	3		
Mallard	2	53000	>1,000,000
Magpie	13		
Marsh Tit	2		
Meadow Pipit	1		
Robin	3		
Rook	15		
Snipe	3		>1,000,000
Song Thrush	1		
Wheater	1		
Woodpigeon	4		

Figure 4. *Flight observations and foraging of wintering birds, SPA conservation interests, and red BoCCI species.*

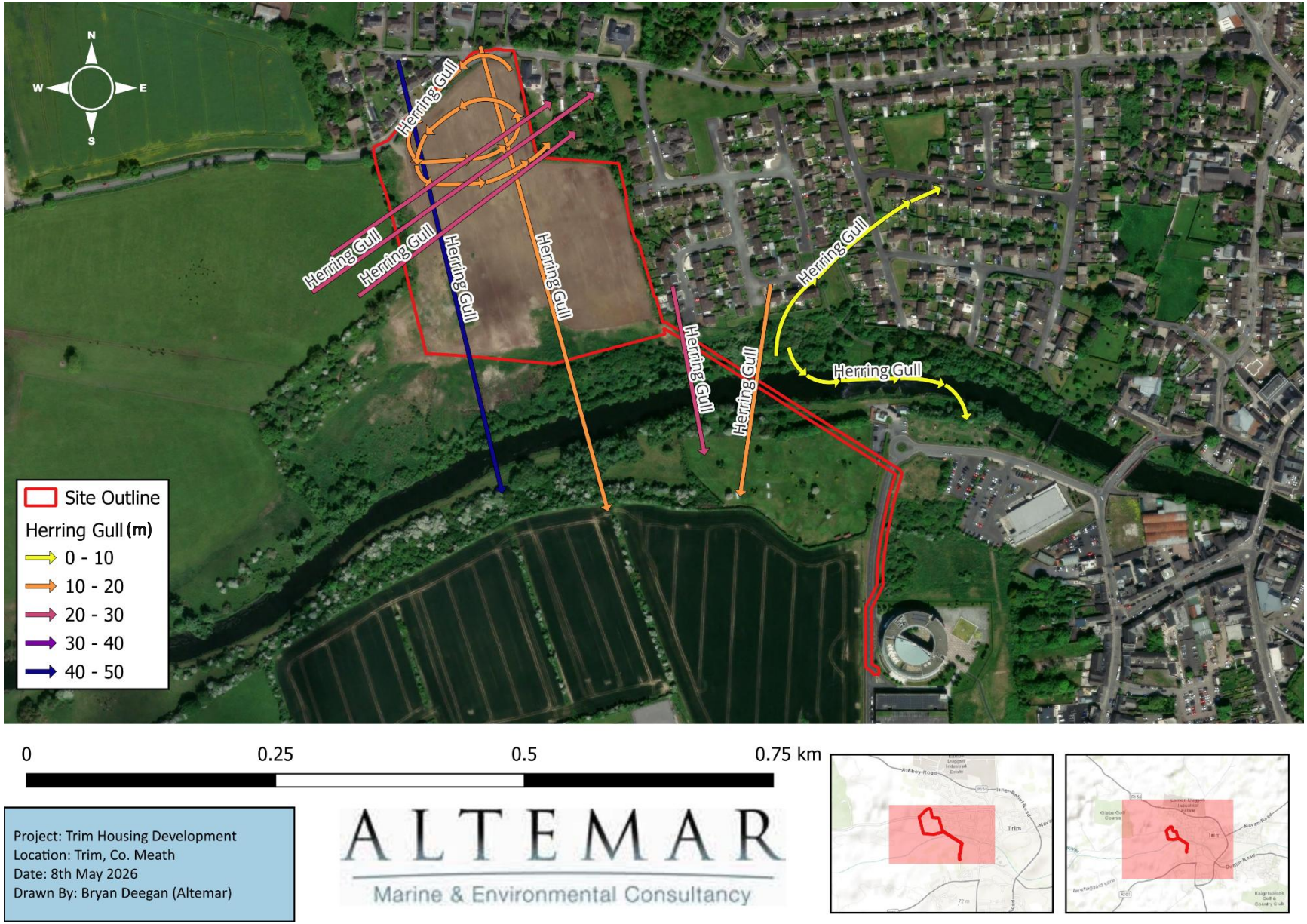

Figure 5. *Flight observations of Herring Gulls observed within, over and immediately adjacent to the survey area*

Figure 6. *Flight observations of Grey Herons observed within, over and immediately adjacent to the survey area*

Wintering bird assessment findings

Review of local bird records

The review of existing bird records (sourced from NBDC Database) within a 2 km^2 grid (Reference grids N75Y) encompassing the study area reveals that 47 known bird species have previously been observed and recorded locally (*Table 3*).

Table 3: *NBDC bird records within 2 km^2 (grids N75Y)*

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Blackbird *(Turdus merula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Blackcap *(Sylvia atricapilla)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Blue Tit *(Cyanistes caeruleus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Bullfinch *(Pyrrhula pyrrhula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Chaffinch *(Fringilla coelebs)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Chiffchaff *(Phylloscopus collybita)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Coal Tit *(Periparus ater)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Collared Dove *(Streptopelia decaocto)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Dipper *(Cinclus cinclus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Dunnock *(Prunella modularis)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Fieldfare *(Turdus pilaris)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Goldcrest *(Regulus regulus)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Goldfinch (*Carduelis carduelis)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Great Tit *(Parus major)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Greenfinch *(Chloris chloris)*	2	20/12/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Heron *(Ardea cinerea)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Grey Wagtail *(Motacilla cinerea)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Hooded Crow *(Corvus cornix)*	2	31/12/2011	Bird Atlas 2007 - 2011	
House Sparrow *(Passer domesticus)*	2	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Jackdaw *(Coloeus monedula)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Kingfisher *(Alcedo atthis)*	6	18/09/2019	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Lapwing *(Vanellus vanellus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Lesser Redpoll *(Acanthis cabaret)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Little Grebe *(Tachybaptus ruficollis)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Magpie *(Pica pica)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Mallard *(Anas platyrhynchos)*	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mistle Thrush *(Turdus viscivorus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Moorhen *(Gallinula chloropus)*	5	31/12/2011	Bird Atlas 2007 - 2011	
Mute Swan *(Cygnus olor)*	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Pied Wagtail *(Motacilla alba)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Raven *(Corvus corax)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Redwing *(Turdus iliacus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Reed Bunting *(Emberiza schoeniclus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Robin *(Erithacus rubecula)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts
Rook *(Corvus frugilegus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Sand Martin *(Riparia riparia)*	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species Name	Record Count	Date of Last Record	Dataset	BoCCI Status
Sedge Warbler *(Acrocephalus schoenobaenus)*	1	31/12/2011	Bird Atlas 2007 - 2011	
Snipe *(Gallinago gallinago)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Song Thrush *(Turdus philomelos)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Starling *(Sturnus vulgaris)*	2	31/12/2011	Bird Atlas 2007 - 2011	Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Dove *(Columba oenas)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Swallow *(Hirundo rustica)*	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Swift (*Apus apus)*	4	07/07/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Willow Warbler *(Phylloscopus trochilus)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Woodpigeon *(Columba palumbus)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Wren *(Troglodytes troglodytes)*	2	31/12/2011	Bird Atlas 2007 - 2011	
Yellowhammer *(Emberiza citrinella)*	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List

National Summary

Species	Trend (%) National - 5 Year	National - 12 Year	National - 23 Year	Long Term Trend
Scaup	-33.6	-82.9	-89.2	Large Decline
Pochard	-19.8	-60.4	-79.1	
Goldeneye	-32.5	-39.0	-66.9	
Lapwing	-6.5	-45.1	-63.9	
Grey Plover	-21.9	-42.8	-58.8	
Golden Plover	-17.5	-58.0	-54.1	
Dunlin	5.9	-21.2	-45.2	Moderate Decline
Curlew	-9.4	-23.7	-43.1	
Turnstone	-33.6	-46.0	-23.7	Intermediate Decline
Coot	-10.1	1.1	-23.2	
Mallard	-11.3	-19.7	-19.1	
Wigeon	0.9	-17.0	-18.2	
Tufted Duck	-20.7	-28.9	-17.9	
Red-breasted Merganser	-12.9	5.2	-14.7	
Pintail	-0.8	-6.0	-13.7	
Great Crested Grebe	-39.5	-6.1	-10.8	
Shoveler	23.0	-21.3	-10.8	
Knot	0.0	-12.2	-9.8	
Bar-tailed Godwit	-32.6	-13.9	-5.1	
Ringed Plover	-4.3	-26.8	-1.1	
Grey Heron	1.0	-4.9	6.6	Stable or Increasing
Redshank	-14.0	-28.4	6.7	
Shelduck	6.3	-0.8	9.3	
Oystercatcher	-17.5	-31.1	10.8	
Mute Swan	4.6	9.6	13.8	
Teal	1.8	5.7	19.4	
Purple Sandpiper	-36.4	-37.6	23.5	
Gadwall	-26.5	4.3	24.4	
Little Grebe	6.1	16.7	38.2	
Greenshank	0.9	7.3	41.0	
Cormorant	38.5	8.4	42.9	
Sanderling	-23.8	-11.1	84.6	
Black-tailed Godwit	22.5	25.0	92.3	
Light-bellied Brent Goose	-11.2	1.2	93.3	
Little Egret	34.6	61.5	483.3	

Figure 7s. *I-WeBS National Trends Report.*

Historical Surveys

I-WeBS

I-WeBS National and Site Trends Report 1994/95 – 2019/20 report presents national and site-specific trends of wetland birds in Ireland. This report was used to assess the trends of species recorded during wintering bird surveys at Trim in winter of 2024/25. The survey area is proximate to River Boyne (OV301) I-WeBS site.

One species (Mallard) was observed during surveys that is listed on River Boyne's Site Summary. This species was labelled as having a Stable or Increasing long term trend. Mean peak count at River Boyne for cormorant is 1. Mean peak count for herring gull is 31.

The national wetland bird trend summary (Figure 7) provides long-term population trends for wintering species in Ireland. Trends for total and individual species nationally and River Boyne are included in Appendix 1b, 1c, 1d, and 1e of this report.

Mitigation

The proposed site is of low importance to the local wintering bird population. However, there is the potential for minor negative impacts by the development during construction phase through collision risks to species transiting to and from foraging and roosting areas along the River Boyne corridor. Out of an abundance of caution, the following mitigation measures relevant to birds should be implemented to minimise any potential negative impact on biodiversity:

1. During the construction phase, lights should be incorporated onto cranes illuminating their entirety on a 24/7 basis to reduce collision risk to birds from cranes and other relevant equipment/structures.
2. The construction corridor will be marked out prior to the commencement of construction.
3. All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ER.
4. Lighting during construction should not spill outside the proposed development.
5. An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation, including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas, including birds will not be impacted.
6. The effectiveness of the proposed mitigation will be monitored throughout the construction period.
7. All elements of the CEMP and other mitigation measures outlined in the accompanying NIS/EcIA will be adhered to.

Conclusion

This report aims to build on the baseline data and provide information to assist in assessing the potential impact of proposed developments at Trim, Co. Meath, on wintering birds within/over/adjacent to the development area. This report presents the methodology and results of 5 visits to this location by Altemar Ltd. from January to March 2025.

A total of 28 species were recorded within, above and adjacent to the survey area across five surveys. 21 green, five amber, and two red species of conservation concern were recorded either within, over or immediately adjacent to the survey area boundary. One species listed as a Qualifying Interest of the nearby River Boyne and River Blackwater SPA (Kingfisher). One red-listed species of conservation concern in Ireland, meadow pipit (*Anthus pratensis*) was recorded within or over the survey area.

The proposed development in Trim is not predicted to significantly reduce available foraging areas for wintering birds, in particular those listed as Qualifying Interests of nearby SPAs. Impacts on wintering bird species moving between foraging and roosting sites are not likely in the absence of mitigation measures. The proposed development is likely to reduce total foraging area within the survey area for red-listed species recorded during surveys. However, the reduction of foraging area for these species is not considered significant due to the scale of the development in the context of the surrounding areas and habitats available, and as the proposed site layout and landscape plan will continue to facilitate foraging by these species within the site.

Out of an abundance of caution due to the proximity of the River Boyne and River Blackwater SPA, mitigation measures are recommended. Following the full implementation of mitigation measures, no significant impacts on wintering bird species, particularly Qualifying Interests of nearby SPAs, are predicted.

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Appendix I

Appendix 1a – Individual survey observations of target species.

Date	Species	No.	Behaviour	Height (m)	Details
30/01/2025	Little Egret	1	Foraging	--	Southern bank of River Boyne and River Blackwater SPA
11/02/2025	Cormorant	1	Flight path	5	West flight from south of survey area over SPA.
11/02/2025	Grey Heron	1	Flight path	5	Southeast flight from south of survey area over SPA.
11/02/2025	Grey Heron	1	Flight path	1	West flight across survey area.
11/02/2025	Grey Heron	1	Flight path	15	Northwest flight across survey area.
11/02/2025	Herring Gull	3	Flight path	15	South flight from southeast of survey area over SPA.
11/02/2025	Herring Gull	1	Flight path	5	Northeast flight from east of survey area.
11/02/2025	Herring Gull	2	Flight path	5	East flight from south of survey area over SPA.
11/02/2025	Herring Gull	6	Flight path	50	South flight across survey area.
11/02/2025	Herring Gull	1	Flight path	15	South flight across survey area.
11/02/2025	Marsh Tit	2	Flight path	3	East flight from south of survey area over SPA.
21/02/2025	Herring Gull	14	Flight path	20	Circling flight north of survey site.
21/02/2025	Herring Gull	2	Flight path	30	South flight from east of survey area over SPA.
21/02/2025	Herring Gull	31	Flight path	25	Northeast flight across survey area.
21/02/2025	Herring Gull	13	Flight path	25	Northeast flight across survey area.
21/02/2025	Herring Gull	20	Flight path	30	Northeast flight across survey area.
21/02/2025	Meadow Pipit	1	Foraging	--	Shrubs southeast of site.
21/02/2025	Snipe	1	Flight path	10	East flight from foraging area within the survey area.
21/02/2025	Snipe	3	Foraging	--	Grassland southeast of site.
21/02/2025	Snipe	1	Foraging	--	Grassland on eastern boundary of site.
03/03/2025	Mallard	2	Flight path	2	West flight from south of survey area over SPA.
03/03/2025	Starling	1	Foraging		Shrubs southeast of site.
25/03/2025	Kingfisher	5	Flight path	3	West flight from south of survey area over SPA.

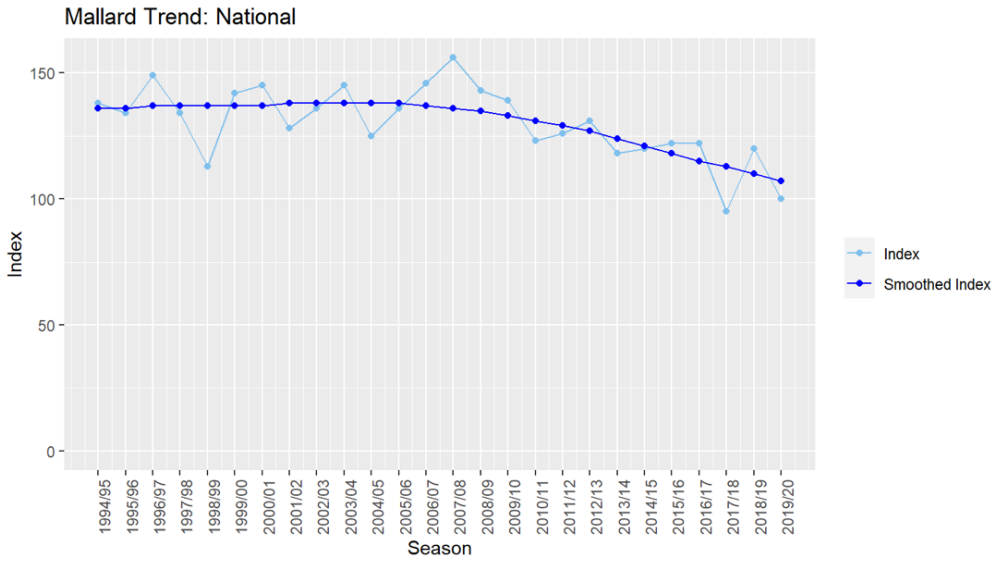
Appendix 1b – I-WeBS Trends for River Boyne (site code OV301).

Site Summary

Species	Trend (%) River Boyne - 5 Year	River Boyne - 12 Year	River Boyne - 23 Year	Long Term Trend
Teal	-99.1	-79.2	-85.2	Large Decline
Mallard	-8.2	-19.8	0.0	Stable or Increasing
Lapwing	-73.1	18.4	22.0	
Curlew	8.5	-11.1	28.0	
Wigeon	-7.6	621.9	1343.8	

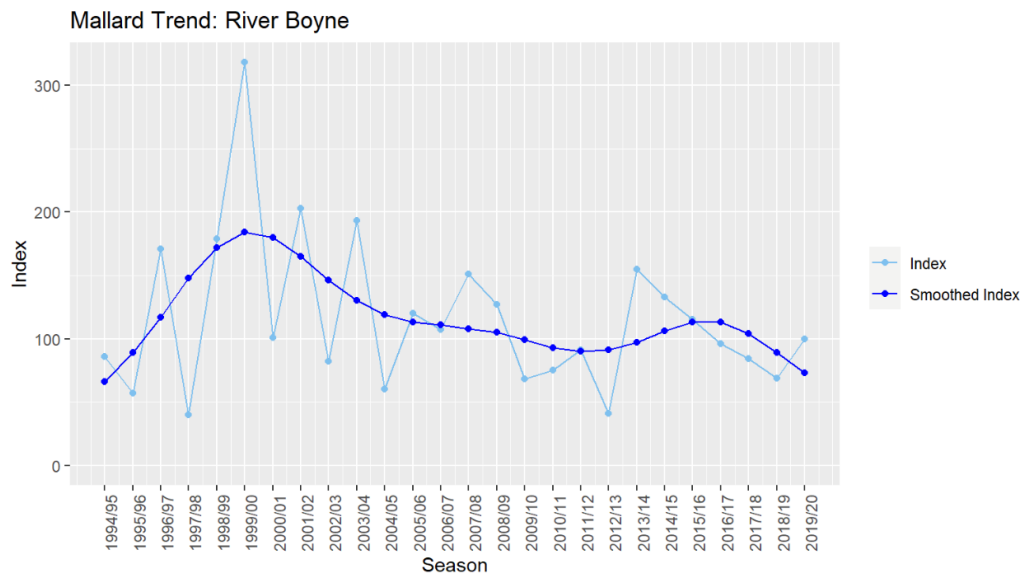
Appendix 1c – I-WeBS National Trends of relevant species recorded in this report.

Mallard



Appendix 1d – I-WeBS River Boyne Trends of relevant species recorded in this report.

Mallard



Appendix 1e – I-WeBS Site Summary Table for OV301 River Boyne.

"Peak counts for each species in each of the most recent 10 seasons are presented. Please note:

- *The mean is based only on available survey data from the most recent 5-season period, i.e. for the period 2016/17 - 2020/21, using I-WeBS core counts.*
- *Blank columns indicate seasons when no counts were carried out, while blank cells show that a species was absent, where other counts are in the same column.*
- *Counts that are poor quality are excluded from these tables, with the exception of known underestimates of individual species.*
- *Where peak counts were recorded outside the midwinter period (Nov, Dec, Jan) these are marked with an asterisk (*). This may indicate that higher numbers occurred during passage periods, or may be due to a lack of counts in the midwinter months.*
- *The 'Peak Months' column indicates the months when the highest number of peak counts were recorded."*

Species	1% national	1% international	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Mean	Peak Months
Mute Swan	90	100	32	16	4*	7*	12	7*	3*	2	4*	2	4	Dec
Whooper Swan	150	340	9*	10*	27*	32*	27	11*		6*	51*	41*	22	Feb
Greylag Goose	35	980										1*	0	Mar
Shelduck	100	2500			2*	1							0	Jan, Feb
Wigeon	560	14000	128*	243*	89*	184*	296	300*	220*	250*	100*		174	Feb, Mar
Teal	360	5000	82	103	108	103*	64*		1				0	Feb, Dec
Mallard	280	53000	47	56*	120	125*	79	105	96	60	86	8*	71	Jan
Goosander				1*									0	Feb
Little Grebe	20	4700		1*	3*	1*	3	4*	1*	2*	3		2	Jan, Feb, Oct, Nov
Cormorant	110	1200	3	1*	2	2*	3*	3	4*	1*	4		2	Nov, Dec
Little Egret	20	1100	2	1*	2*	1	4*	1*	2		2	1*	1	Dec
Grey Heron	25	5000	2	2*	2*	1*		2*	2*	1*	1	2*	2	Oct
Water Rail						1*							0	Jan, Feb
Moorhen			3*	1*	4*	17*	6*	2*	2	2*	2	1*	2	Sep, Oct
Oystercatcher	610	8200	1*										0	Feb
Golden Plover	920	9300	600	1800*	300	300*	30		300	270*	26*		119	Feb, Dec
Lapwing	850	72300	550	667*	430	250	429	50*	350*	77	110		117	Jan, Dec
Snipe					1	19*	25*	14*	7	13	8		8	Feb
Curlew	350	7600	272*	175	73	156	307	195*	250*	85	228	125*	177	Jan
Redshank	240	2400			7	25	107*	13	36	10	15		15	Jan, Dec
Green Sandpiper				1*							1		0	Feb, Dec
Common Sandpiper					1*								0	Oct
Black-headed Gull			61*	21	60	68	106	8	120*	120	250		100	Jan, Dec
Common Gull					99		20		1*		1*		0	Jan
Lesser Black-backed Gull									22	3		3*	6	Nov
Herring Gull					3*			1*					0	Mar, Sep
Great Black-backed Gull							1		2	1	1		1	Jan
Mediterranean Gull			5										0	Jan

Appendix III – Bat Fauna Impact Assessment

ALTEMAR
Marine & Environmental Consultancy

Bat Fauna Impact Assessment for a proposed residential development at Kildalkey Road, Trim, Co. Meath.

8th June 2026

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Loughglynn Developments

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Directors: Bryan Deegan and Sara Corcoran
Company No.427560 VAT No. 9649832U
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Document Control Sheet			
Client	Loughglynn Developments		
Project	Bat Fauna Impact Assessment for a residential development at Kildalkey Road, Trim, Co. Meath.		
Report	Bat Fauna Impact Assessment		
Date	8th June 2026		
Version	Author	Reviewed	Date
Planning	Bryan Deegan		8th June 2026

SUMMARY

Structure:	The survey area primarily consists of tilled land. Linear features such as treelines and hedgerows are also present. A wet-willow-ash woodland is present along the southern boundary of the proposed site/the River Boyne. The site outline also transects the River Boyne. There are no buildings located within the site outline.
Location:	Kildalkey Road, Trim, Co. Meath.
Bat species present:	Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*), Daubenton's Bat (*Myotis daubentonii*), and Soprano Pipistrelle (*Pipistrellus pygmaeus*) bats noted foraging within the subject site. No roosts were present on site.
Proposed work:	Proposed residential development
Impact on bats:	No confirmed bat roosts will be lost. The proposed development will change the local environment as trees are to be felled and hedgerows lost. The main portion of the site primarily consists of tilled land, and new trees are to be planted throughout the site, as per the proposed landscape plan. The development is likely to displace bats from foraging at the site during construction and operation due to increased lighting on-site. The site is adjacent to the River Boyne, which is a bat foraging corridor used by multiple common species, as seen in Figure 17. Lighting in the centre/southern portion of the site is compliant with bat lighting guidelines (2700^{o}K). Bat foraging (post-construction) would be expected on site and adjacent to the site with the implementation of the sensitive lighting and landscape strategy. Given this, and the implementation of the outlined mitigation measures, the proposed development is not deemed to have any significant effect on local bat populations. The potential for collision risk and impact on flight paths in relation to bats is considered low as the buildings would be deemed to be clearly visible to bats. Bat foraging would be expected to continue on-site, albeit at a lower level, until landscaping matures.
Survey by:	Jack Doyle (MSc)
Survey date(s):	17th September 2025

Receiving Environment

Background

The proposed development comprises a Large-Scale Residential Development (LRD) on lands at Crowpark (1st Division), Kildalkey Road, Trim, Co. Meath.

The scheme provides a total of 183 residential units, comprising 127 houses and 56 apartments. The housing mix includes 19 no. detached 4-bedroom houses, 9 no. semi-detached/end-terrace 4-bedroom houses, 4 no. detached 3-bedroom houses, 43 no. semi-detached/end-terrace 3-bedroom houses, and 52 no. mid-terrace 3-bedroom houses, with building heights from 2 to 2 ½ storeys. The apartment element comprises 56 no. units in two blocks of up to four stores, including 16 no. one-bedroom and 40 no. two-bedroom units.

The development also includes a crèche facility, new vehicular and pedestrian accesses from Kildalkey Road.

The proposal provides for associated infrastructure and site works, including landscaping, public and communal open space, internal streets and footpaths, car and bicycle parking, bin stores, private open space, boundary treatments, plant and waste management areas, utility infrastructure and a foul sewer connection to the existing network adjoining the OPW offices on Jonathan Swift Street, to be delivered beneath the River Boyne and Trim Pitch & Putt.

The proposed site location, layout, elevations and sections are demonstrated in Figures 1-7.

Landscape

The landscape plan for the proposed development has been prepared by Jane McCorkell Design. The landscape plan is shown in Figure 8.

Arborist

An Arboricultural Report has been prepared by Charles McCorkell Arboricultural Consultancy for the proposed development. It outlines the following tree impacts and mitigation:

'Arboricultural Impacts

6.1 ***Loss of trees –*** *The proposed development will require the removal of 2 trees and the partial removal of 1 hedgerow of moderate quality and value (B Category), 5 trees, 4 hedgerows, 2 shrub groups and 1 tree group, and the partial removal of 1 hedgerow, of low quality and value (C Category), and 2 trees of poor quality (U Category).'*

'6.3 The proposed development has been carefully designed to retain and incorporate the majority of trees and hedgerows located around the perimeter of the site. The retention of these trees and hedgerows will add an element of maturity to the new landscape and have a positive impact on the character and appearance of the new development.'

'6.6 There is only a small section of the moderate quality native hedgerow (H17) located along the western boundary to be removed. This is to facilitate a future possible connection with the neighbouring field. Its removal will have an insignificant impact on the surrounding local area.'

'6.16 ***Drainage and services*** *– The main drainage proposal has been designed to avoid the RPAs of retained trees. No special methods of construction are therefore required; however, it will be necessary to ensure that site operations do not impact trees or the soil environment upon which they rely. Details of the measures to be taken to protect trees are included in the Tree Protection Plans at Appendix B.'*

'6.19 ***Tree protection measures –*** *All retained trees and hedgerows can be successfully protected during the proposed development works by using robust fencing measures which comply with the recommendations outlined within BS 5837:2012. The location of tree protection measures is highlighted in the Tree Protection Plans at Appendix B.'*

'6.20 ***Landscape operations -*** *Landscaping operations will typically take place at the end of the construction period. These works will normally require the removal of protective fencing to facilitate access for works. There is a risk that machinery may damage soil structure where tree roots are growing. These risks can be managed by maintaining good professional standards of work and working to a method statement. The principle of*

avoiding soil disturbance or changes in levels within the RPAs of retained trees should be followed unless arboricultural advice has been sought.'

'Arboricultural Mitigation

6.21 A detailed landscape plan has been designed and will form part of the planning application for the development proposal. This design includes the planting of a large number of new high-quality trees and hedgerows.

6.22 The proposed new planting will mitigate the loss of hedgerows and trees required to facilitate the development and will enhance the tree cover throughout the site and within the local area. This will have a positive impact on the local canopy cover and the character and appearance of development, and the surrounding landscape.'

The tree survey and constraints, removals and protection plans are shown in Figures 9-14.

Lighting

The lighting strategy for the proposed development has been prepared by ORS. The site lighting report outlines the following:

'Site Lighting Design

It is proposed to install new luminaires throughout the scheme:

- *49 x Metro Streetlight 27w LED 2700K (38 x Street Optic R03 and 11 x Forward Throw A Optic) mounted on 6m columns with no tilt.*
- *19 x Metro Streetlight 14w LED 2700K Street Optic R01 (9 no. with integrated external shield along the southern boundary) mounted on 6m columns with no tilt.*

The design also includes 8 x 36w Streetlights LED 4000K mounted on 6m columns as an estimated representation of the existing lighting along Kildalkey Road.

1.2 Proposed Lighting Fittings

The lighting design is based on the following light fittings:

Veelite Metro Streetlight 27w LED Street Optic R03		
	Led:	No. 38 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours. (at 25°C).
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 27w LED Forward Throw A Optic		
	Led:	No. 11 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 14w LED Street optic R01		
	Led:	No. 19 x 14w 8 LED / 2700K G4 (of which 9 no. with integrated external shield along the southern boundary)
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

In relation to ecological impact design considerations, this report notes the following:

'*Optics/ shields/ cowls shall be installed where necessary, in consideration of wildlife (e.g. bats) and to prevent unnecessary up lighting or illumination of nearby trees, buildings etc.*

The site lighting design will be developed further during the detailed design stage, taking on board any further recommendations from the Ecologist or Meath County Council.'

The proposed site lighting layout is shown in Figure 15.

Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

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Figure 1. *Proposed site location*

Figure 2. *Proposed Site Outline*

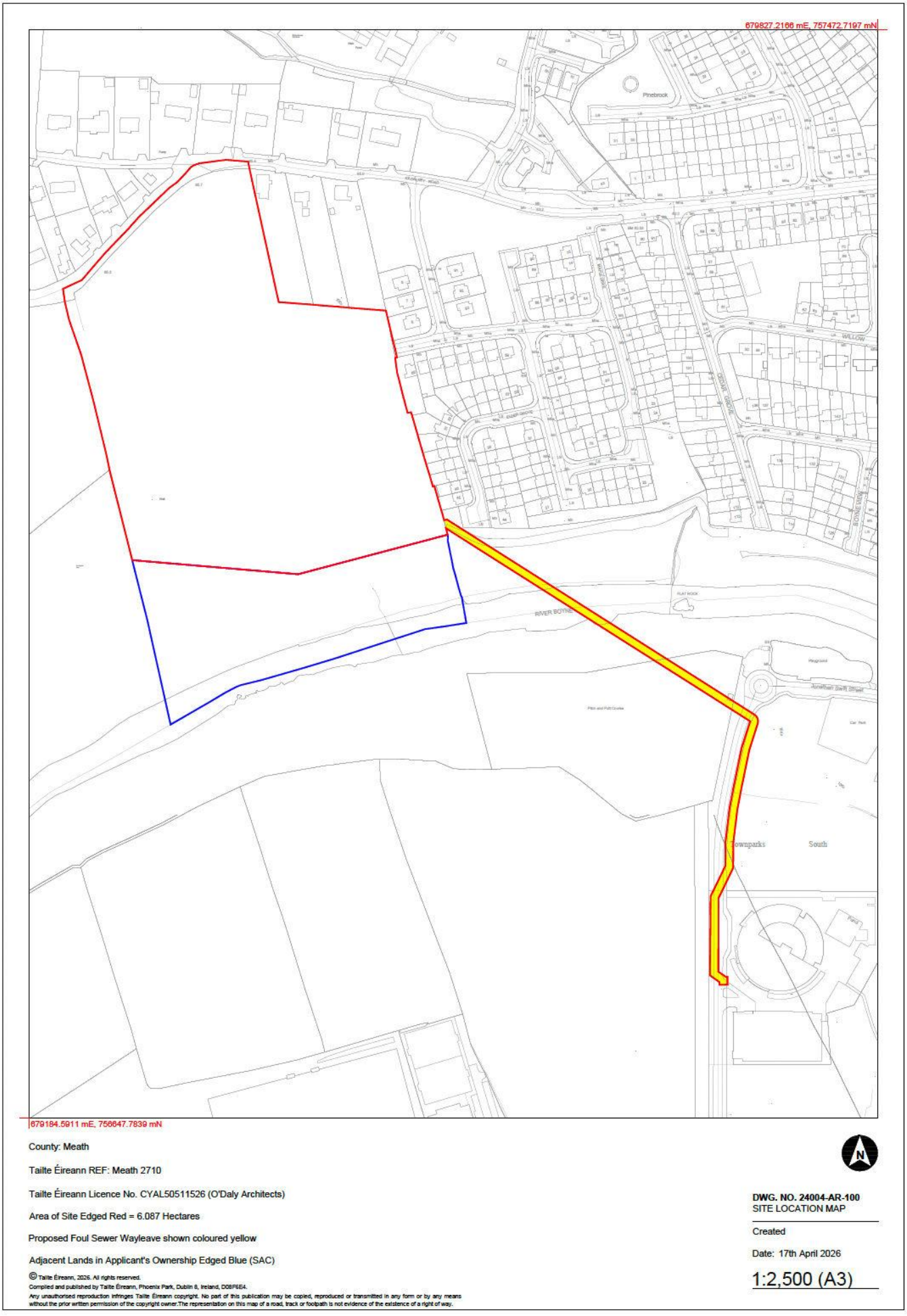

Figure 3. *Proposed Site Location*

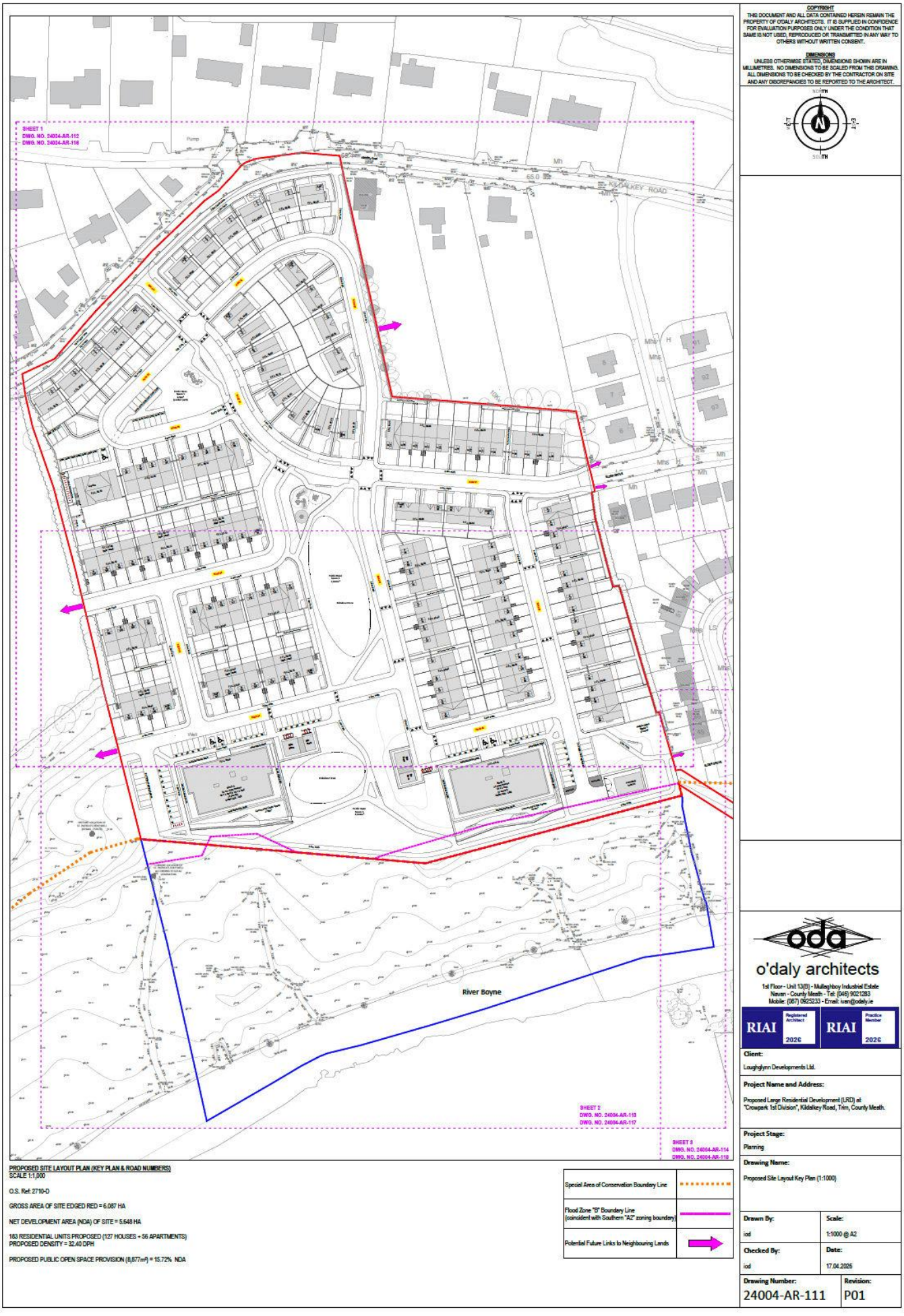

Figure 4. *Proposed Site layout*

Figure 5. *Proposed contiguous elevations 1-6*

***Figure 6**. Proposed contiguous elevations 7-12*

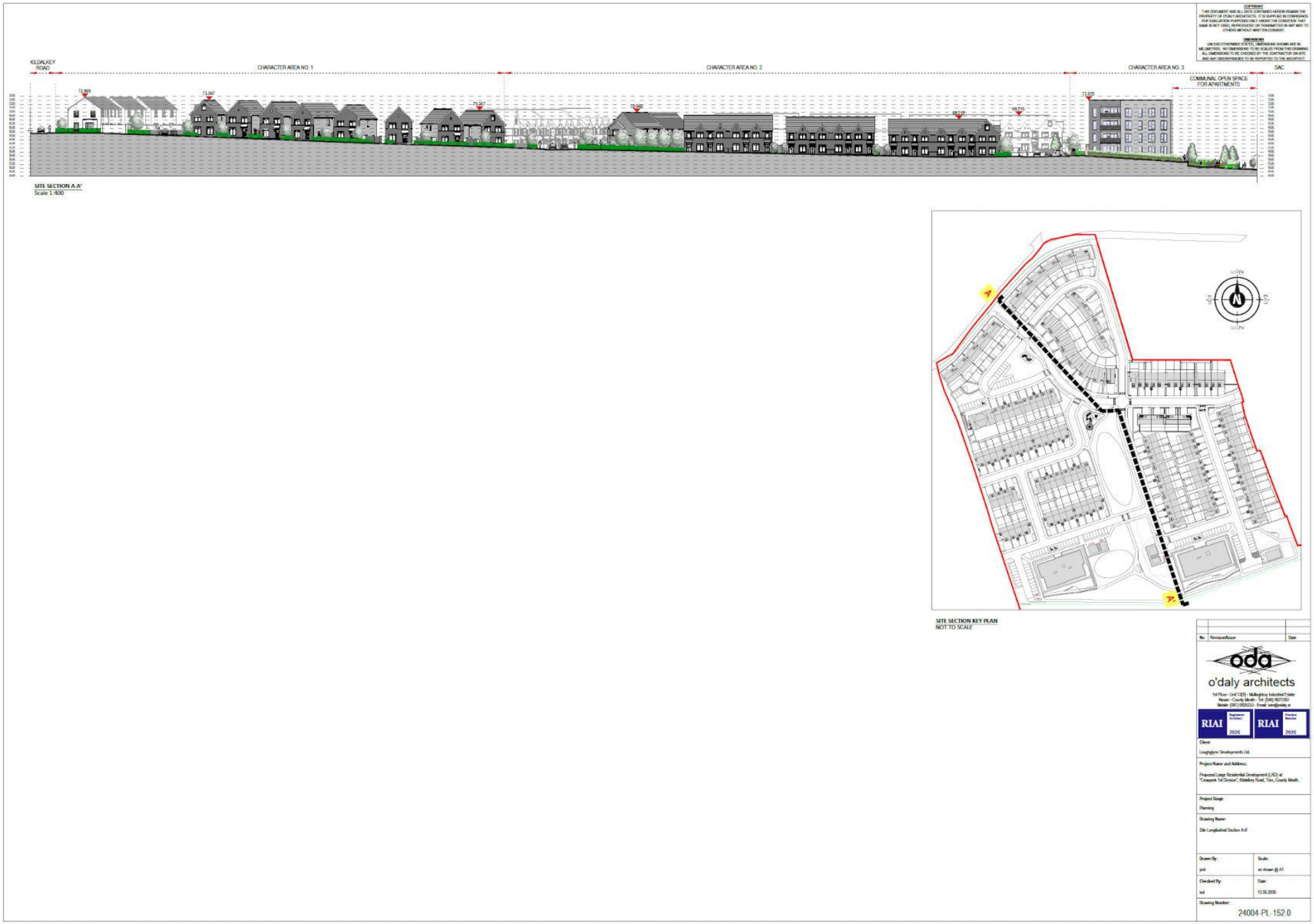

Figure 7. *Proposed Longitudinal Section A-*

Figure 8. *Proposed Landscape Plan*

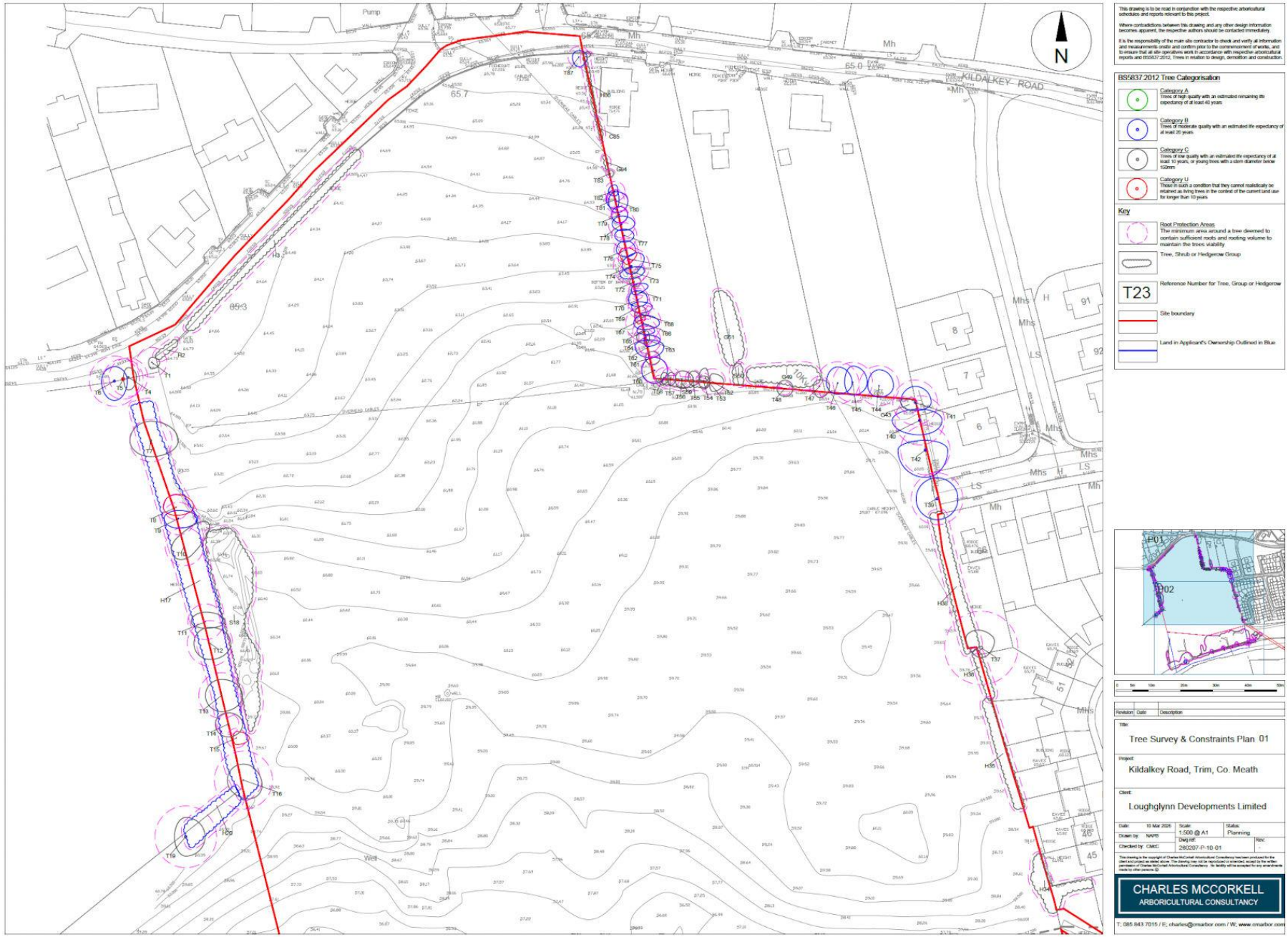

***Figure 9**. Tree survey and constraints plan (1/2)*

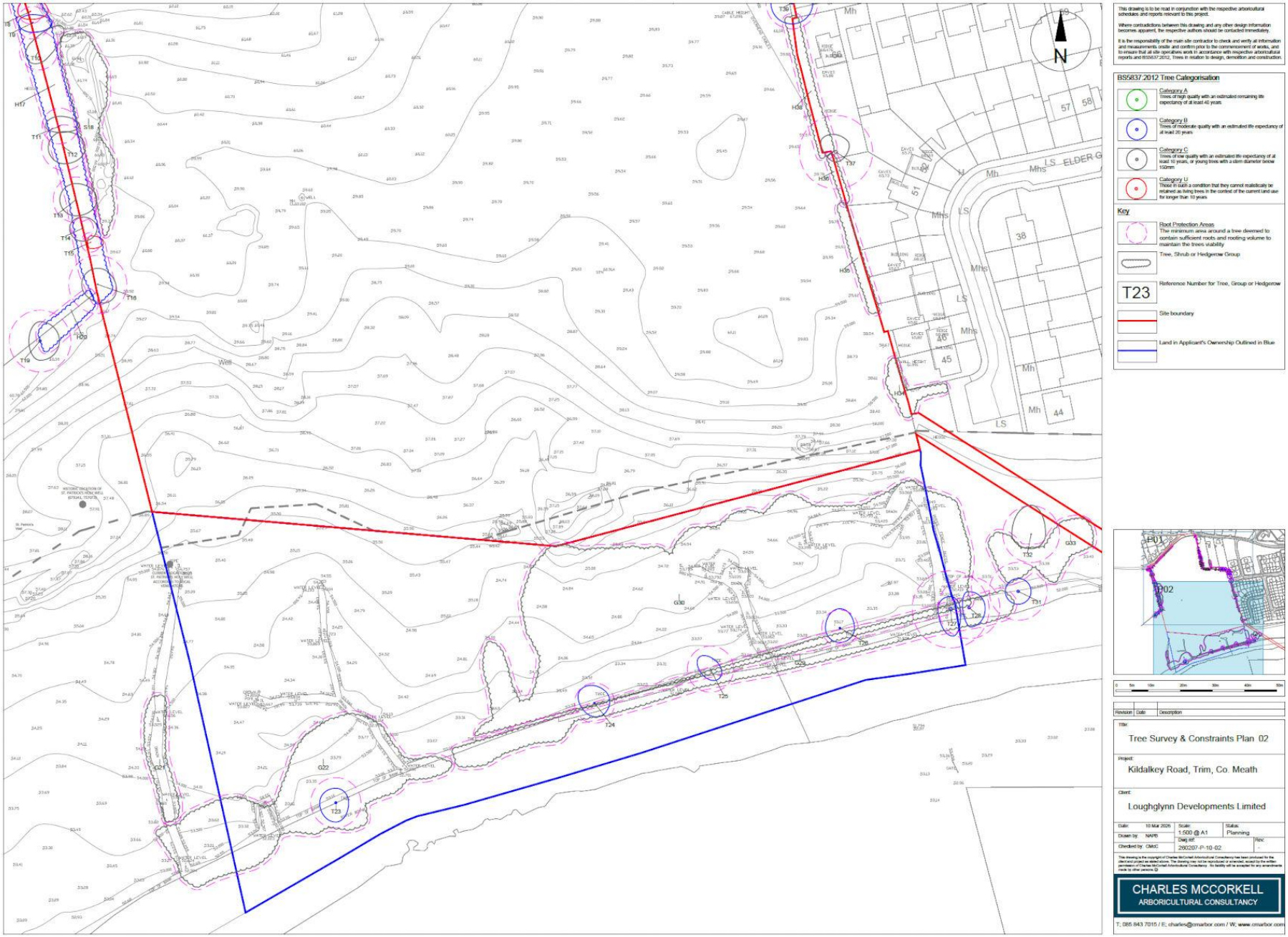

***Figure 10**. Tree survey and constraints plan (2/2)*

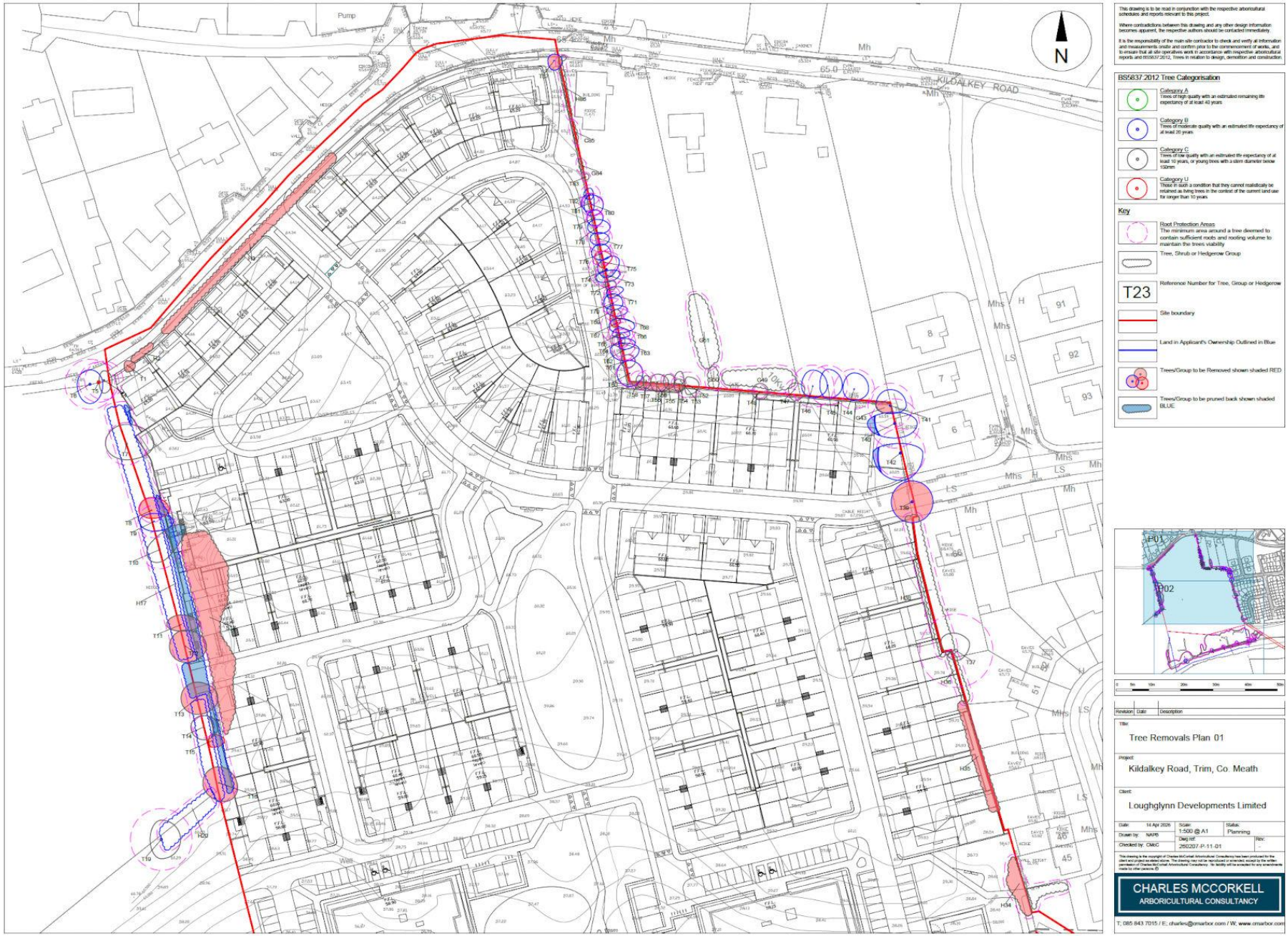

***Figure 11**. Tree removals plan (1/2)*

***Figure 12**. Tree removals plan (2/2)*

***Figure 13**. Tree protection plan (1/2)*

***Figure 14**. Tree protection plan (2/2)*

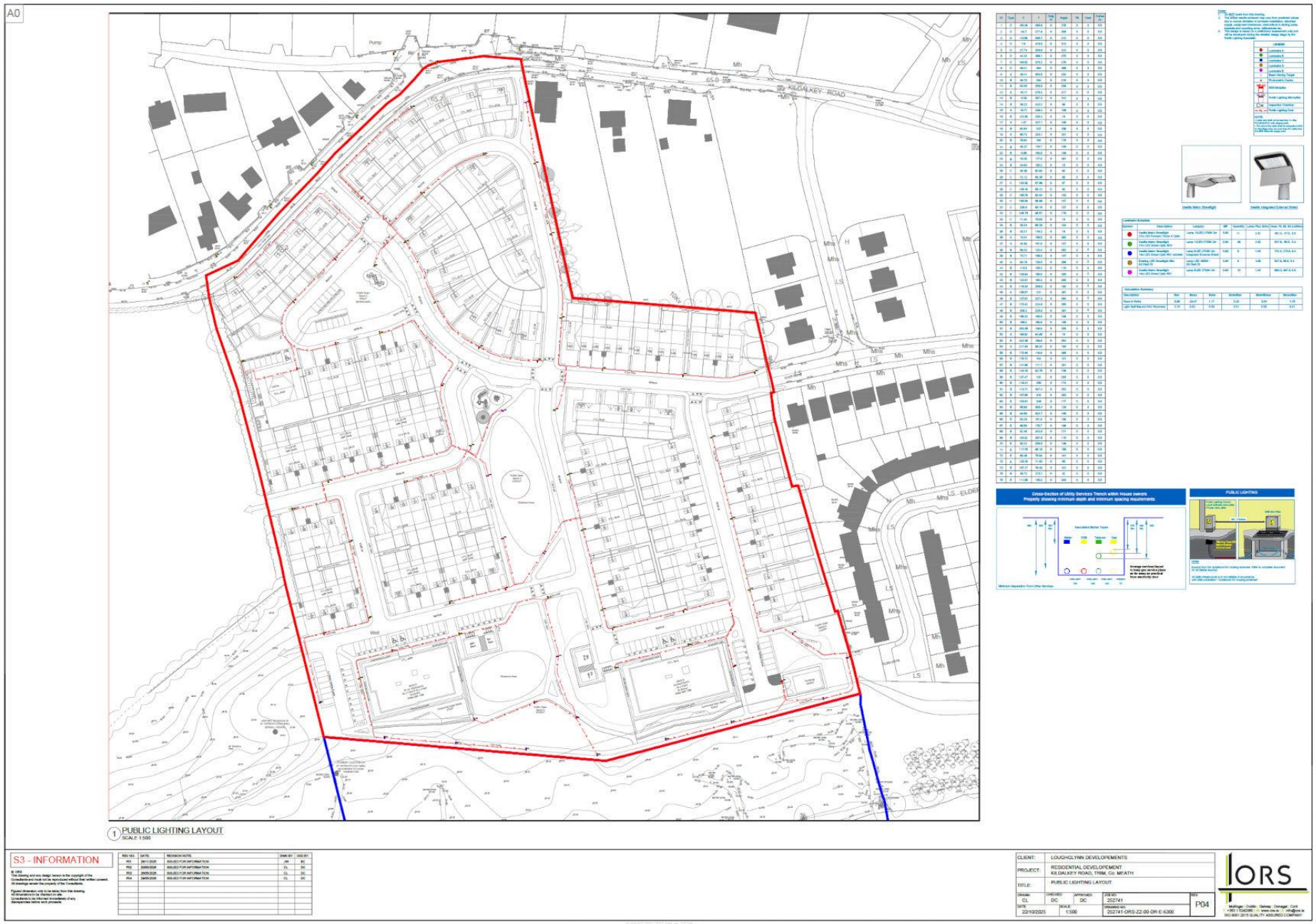

Figure 15. *Site services – public lighting*

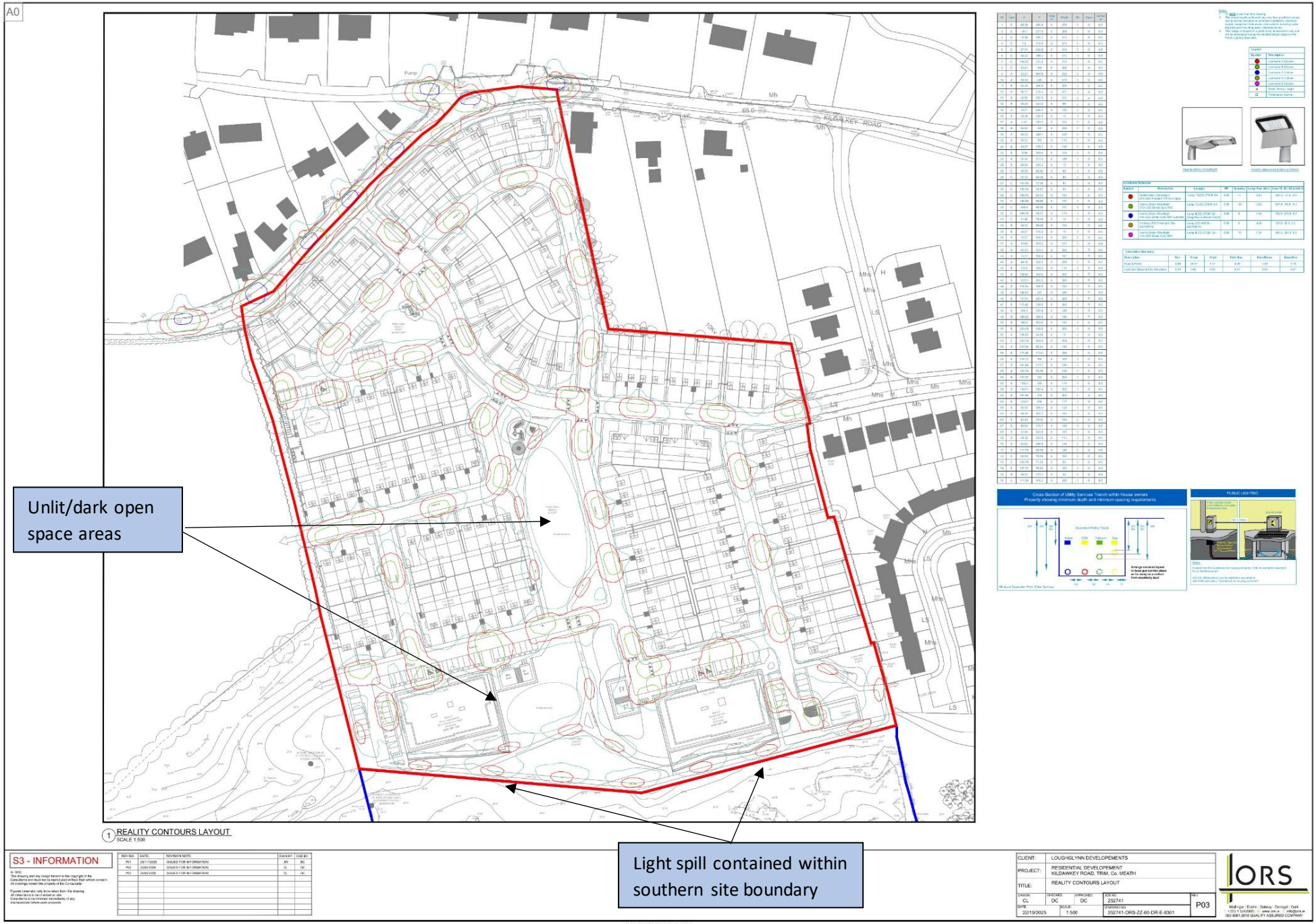

Figure 16. *Site services – reality contours layout*

Competency of Assessor

This report has been prepared by Bryan Deegan, MSc, BSc (MCIEEM). Bryan has over 32 years of experience providing ecological consultancy services in Ireland. He has extensive experience in carrying out a wide range of bat surveys, including dusk emergence, dawn re-entry and static detector surveys. He also has extensive experience reducing the potential impact of projects that involve external lighting on Bats. Bryan trained with Conor Kelleher, author of the Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2022), and Bryan is currently providing bat ecology (impact assessment and enhancement) services to Dun Laoghaire Rathdown County Council, primarily on the Shanganagh Park Masterplan. The desk and field surveys were carried out having regard to the guidance: Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins, J. (Ed.) 2016) and Marnell, Kelleher and Mullen (2022), Bat Mitigation Guidelines for Ireland V2 (which updates and replaces the Bat Mitigation Guidelines for Ireland published in 2006).

Jack Doyle (MSc Sustainable Environments) also carried out the fieldwork elements of this Bat Fauna Assessment. Jack is an experienced environmental project manager, joining Altemar in March 2021. Jack has led and carried out a wide range of flora and fauna surveys across Ireland and produced ecological assessments on residential, commercial, and infrastructure projects. Jack is skilled in breeding & wintering ornithological surveys, roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, and habitat identification.

Legislative Context

Wildlife Act 1976 (as amended by, inter alia, the Wildlife (Amendment) Act 2000).

Bats in Ireland are protected by the Wildlife (Amendment) Act 2000. Based on this legislation it is an offence to wilfully interfere with or destroy the breeding or resting place of any species of bat. Under this legislation it is an offence to "*Intentionally kill, injure or take a bat, possess or control any live or dead specimen or anything derived from a bat, wilfully interfere with any structure or place used for breeding or resting by a bat, wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose. "*

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). See Art.73 of the 2011 Regulations which revokes the 1997 Regulations.

Annex II of the Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) lists animal and plant species of Community interest, the conservation of which requires the designation of Special Areas of Conservation (SACs); Annex IV lists animal and plant species of Community interest in need of strict protection. All bat species in Ireland are listed on Annex IV of the Directive, while the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is protected under Annex II which related to the designation of Special Areas of Conservation for a species.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), all bat species are listed under the First Schedule and, pursuant to, *inter alia*, Part 6 and Regulation 51, it is an offence to:

- Deliberately capture or kill a bat;
- Deliberately disturb a bat particularly during the period of breeding, hibernating or migrating;
- Damage or destroy a breeding site or resting place of a bat;
- Keep, sell, transport, exchange, offer for sale or offer for exchange any bat taken in the wild.

Bat survey

This report presents the results of a site visit by Jack Doyle on the 17th September 2025. A bat emergent and detector survey was carried out by Jack Doyle on the 17th September 2025. No buildings are located within the site outline. Trees on site were examined for bat roosting potential.

Survey methodology

As outlined in Marnell et al. 2022 '*The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which for this definition exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.'* In relation to the factors influencing survey results the guidelines outlines the following *'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.'*

The survey involved the methodologies outlined in Collins (2016) which included the roost inspection methodologies i.e. external methodology outlined in section 5.2.4.1 and the internal survey outlines in section 5.2.4.2 of the guidelines. In addition, the methodologies for Presence absence surveys (Section 7) was carried out for dust emergent surveys.'

As outlined in Collins (2016) 'The bat active period is generally considered to be between April and October inclusive (although the season is likely to be shorter in northern latitudes). However, because bats wake up during mild conditions, bat activity can also be recorded during winter months.'

Survey Results

Trees as potential bat roosts

A ground level roost assessment was carried and used to examine the trees on site for features that could form bat roosts. Potential roosting features include heavy ivy growth, broken limbs, areas of decay, vertical or horizontal cracks, cracks in bark etc. All trees on site were assessed for bat roosting potential. No evidence of bats or bat roost were identified in any of the onsite trees. A derogation license is therefore not required for the removal of trees on site.

Emergent/detector surveys

An emergent/detector survey was carried out by Jack Doyle on the 17th September 2025.

The detector survey was undertaken within the active bat season, and the transects covered the entire site multiple times during the night. Weather conditions were good with mild temperatures greater than 10^{o}C, after sunset. Winds were light, and there was no rainfall. Insects were observed in flight during the survey.

As outlined in Collins (2016), in relation to weather conditions, '*The aim should be to carry out surveys in conditions that are close to optimal (sunset temperature 10^{o}C or above, no rain or strong wind.), particularly when only one survey is planned…. Where surveys are carried out when the temperature at sunset is below 10^{o}C should be justified by the ecologist and the effect on bat behaviour considered.'* There were no constraints in relation to the surveys carried out. All areas of the site were accessible and weather conditions were optimal for bat assessments.

At dusk, bat detector surveys were carried out onsite using a*n Echo Meter Touch 2 Pro* detector to determine bat activity. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations.

Survey Results

Two Daubenton's Bat (*Myotis daubentonii*), were observed foraging along the River Boyne, and three other Daubenton's were noted transiting through the northern portion of the site. Six Soprano Pipistrelles (*Pipistrellus pygmaeus*) were observed foraging on-site, with four foraging along the riparian corridor of the River Boyne, as well as an additional two foraging along the treelines in the north/north-west of the site. Three Common Pipistrelles (*Pipistrellus pipistrellus sensu stricto*) were noted foraging within the survey area during the survey; one of which was foraging along the River Boyne, and two were observed along the treelines in the north/north-west of the survey area. No bat activity was noted in the portion of the site south of the River Boyne. No bats were observed emerging from onsite trees or structures on or proximate to the subject site. Bat flightlines from the survey are demonstrated in Figure 17.

***Figure 17**. Bat activity/flightlines on-site (17/09/2025)*

Bat Assessment Findings

Review of local bat records

The review of existing bat records (sourced from Bat Conservation Ireland's National Bat Records Database) within a 2km^2 grid (Reference grid N75Y) encompassing the study area reveals that none of the nine known Irish species have been observed locally. The National Biodiversity Data Centre's online viewer was consulted in order to determine whether there have been recorded bat sightings in the wider area. This is visually represented in Figures 17-19. The following species were noted in the wider area: Daubenton's Bat (*Myotis daubentonii*), Leisler's Bat (*Nyctalus leisleri*), Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), and Brown Long-eared Bat (*Plecotus auritus*) (Figures 18-20).

Figure 18. Daubenton's Bat (*Myotis daubentonii*) (purple) and both Daubenton's Bat and Leisler's Bat (*Nyctalus leisleri*) (orange) (Source: NBDC) (Site – red circle)

Figure 19. Both Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*) (orange) (Source: NBDC) (Site – red circle)

Figure 20. Brown Long-eared Bat (*Plecotus auritus*) (purple) (Source: NBDC) (Site – red circle)

Evaluation of Results

The bat surveys comply with bat survey guidance documentation, including Marnell et al (2022) and Collins (2016). No bats were observed emerging from trees on site. No evidence of bats roosting was noted. Moderate bat activity was noted on site by Common Pipistrelle, Soprano Pipistrelle and Daubenton's bat. Given that the River Boyne is a foraging corridor for the local bat population and its proximity to the site, the site is considered to be of moderate importance to the local bat population.

Potential Impact of the development on Bats

No confirmed bat roosts will be lost. The proposed development will change the local environment as trees are to be felled and hedgerows lost. The main portion of the site primarily consists of tilled land, and new trees are to be planted throughout the site, as per the proposed landscape plan. The development is likely to displace bats from foraging at the site during construction and operation due to increased lighting on-site. The site is adjacent to the River Boyne, which is a bat foraging corridor used by multiple common species, as seen in Figure 16. Lighting in the centre/southern portion of the site is compliant with bat lighting guidelines (2700ºK). No light spill will extend into the southern riparian corridor. Bat foraging (post-construction) would be expected to continue in the southern portion of the site, along the River Boyne. Ensuring lighting is done sensitively, and in line with the proposed lighting plan and below mitigation measures, the proposed development is not deemed to have any significant effect on local bat populations. The potential for collision risk and impact on flight paths in relation to bats is considered low as the buildings would be deemed to be clearly visible to bats. Bat foraging would be expected to continue on-site, albeit at a lower level, until landscaping matures.

Mitigation Measures

As outlined in Marnell et al. (2022) "*Mitigation should be proportionate. The level of mitigation required depends on the size and type of impact, and the importance of the population affected*." In addition as outlined in Marnell et. al (2022) '*Mitigation for bats normally comprises the following elements:*

- *Avoidance of deliberate, killing, injury or disturbance – taking all reasonable steps to ensure works do not harm individuals by altering working methods or timing to avoid bats. The seasonal occupation of most roosts provides good opportunities for this*
- *Roost creation, restoration or enhancement – to provide appropriate replacements for roosts to be lost or damaged*
- *Long-term habitat management and maintenance – to ensure the population will persist*
- *Post-development population monitoring – to assess the success of the scheme and to inform management or remedial operations.*'

No bats were noted roosting on site. The level of activity on site is considered moderate, with common bat species transiting through and foraging within the site and along the adjacent River Boyne. As a result, the following mitigation will be implemented:

- Lighting at all construction stages should be done sensitively on site with no direct lighting of hedgerows and treelines.
- A post-construction bat survey and light spill assessment will be carried out to ensure compliance with the lighting plan.
- A pre-construction bat roosting inspection will be carried out onsite, prior to the commencement of works. A derogation license will be applied for from NPWS if bats are found during the future inspection. All works will be carried out in compliance with NPWS conditions if bats or bat roosts are found during pre-commencement inspections.

Predicted Residual Impact of Planned Development on Bats

The present survey found no evidence of roosting bats in any onsite tree; the proposed development will not result in the loss of any bat roost removed. In the centre of the subject site, there would be expected to be a short to medium-term reduction in foraging until the landscaping and, in particular, the trees within the landscaping proposal matures. Based on the relatively small number of common species found using the portion of the site that is to be developed, it will not have any significant effect on bat populations, and any such effect will be only significant at the local level. The lighting within the centre and southern portion of the site has been designed to achieve the performance requirements as set out in the Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010) and Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2018). This lighting is set to 2700^{o}K – compliant with bat lighting guidelines. Lighting along the southern boundary will be contained within the site. The lighting along the northern boundary of the site, along the already-lit Kildalkey Road, is set to 4000 ^{o}K. Although this is not within bat lighting guidelines, foraging was low along this boundary during the survey, with only one common pipistrelle noted foraging along the road. Furthermore, there are existing lights present along the Kildalkey Road, which spill into the northern boundary of the site. As outlined in the proposed lighting strategy: '*Optics/ shields/ cowls shall be installed where necessary, in consideration of wildlife (e.g. bats) and to prevent unnecessary up lighting or illumination of nearby trees, buildings, etc'*. In the medium-long term, bat foraging would be expected to continue on site and along the River Boyne.

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Invasive Species Management Plan the proposed Residential Development at Kildalkey Road, Trim, Co. Meath.

16th June 2026

Prepared by: Bryan Deegan MSc., BSc. (MCIEEM) of Altemar Ltd.
On behalf of: Loughglynn Developments Limited

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Document Control Sheet			
Client	Loughglynn Developments Limited		
Project	Invasive Species Management Plan a proposed residential development at Kildalkey Road, Trim, Co. Meath.		
Report	Invasive Species Management Plan		
Date	16th June 2026		
Version	Author	Reviewed	Date
Draft 01	Bryan Deegan	Gayle O'Farrell	16th June 2026

Introduction

The proposed development comprises a Large-Scale Residential Development (LRD) on lands at Crowpark (1st Division), Kildalkey Road, Trim, Co. Meath.

The scheme provides a total of 183 residential units, comprising 127 houses and 56 apartments. The housing mix includes 19 no. detached 4-bedroom houses, 9 no. semi-detached/end-terrace 4-bedroom houses, 4 no. detached 3-bedroom houses, 43 no. semi-detached/end-terrace 3-bedroom houses, and 52 no. mid-terrace 3-bedroom houses, with building heights from 2 to 2 ½ storeys. The apartment element comprises 56 no. units in two blocks of up to four stores, including 16 no. one-bedroom and 40 no. two-bedroom units.

The development also includes a crèche facility, new vehicular and pedestrian accesses from Kildalkey Road.

The proposal provides for associated infrastructure and site works, including landscaping, public and communal open space, internal streets and footpaths, car and bicycle parking, bin stores, private open space, boundary treatments, plant and waste management areas, utility infrastructure and a foul sewer connection to the existing network adjoining the OPW offices on Jonathan Swift Street, to be delivered beneath the River Boyne and Trim Pitch & Putt.

During site assessments for the proposed project, Sea Buckthorn was noted on site. An Invasive Species Management Plan has been prepared to outline the extent of the infestation and the measures that will be in place to mitigate the potential impact and prevent spread of the invasive species during works in line with National and international legislation.

The proposed site outline is demonstrated in Figure 1. A site visit was carried out by Emma Peters on the 25th and 30th September 2025 and the presence and extent of invasive species on site was recorded. The location of the sea buckthorn is seen in Figure 2. Areas requiring treatment and post-treatment monitoring are demonstrated in Figure 3.

Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

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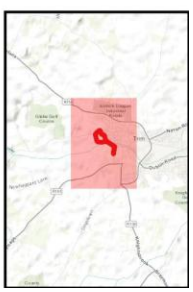

Figure 1. *Proposed Site Outline*

FIGURE 2. *SEA* BUCKTHORN LOCATIONS

Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

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FIGURE 3. AREAS REQUIRING EXCLUSION, TREATMENT AND POST-TREATMENT MONITORING.

Invasive Species Assessment

The following management plan was compiled by Bryan Deegan MCIEEM of Altemar Ltd. Bryan is an ecologist with over 30 years survey experience and former project manager for the EU LIFE project CAISIE on invasive species. This was a €1.5 million EU project that carried out surveys and developed control tools for aquatic and riparian invasive species in Ireland.

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000 where it states that '*Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora,['refers only to exotic species thereof'][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence*.'

Under the European legislation, the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibit the introduction and dispersal of species listed in the Third Schedule whereby "*any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."* Relevant species within this legislation include but, are not limited to (See Table 1):

Giant hogweed	*Heracleum mantegazzianum*	Throughout the State
Giant knotweed	*Fallopia sachalinensis*	Throughout the State
Giant-rhubarb	*Gunnera tinctoria*	Throughout the State
Himalayan balsam	*Impatiens glandulifera*	Throughout the State
Himalayan knotweed	*Persicaria wallichii*	Throughout the State
Japanese knotweed	*Reynoutria japonica*	Throughout the State
Rhododendron	*Rhododendron ponticum*	Throughout the State
Hottentot-fig	*Carpobrotus edulis*	Throughout the State
Sea-buckthorn	*Hippophae rhamnoides*	Throughout the State

This report applies the most relevant and current guidance in relation to non-native invasive plant species in construction projects. The following literature was referred to in preparation of this report.

- S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. http://www.irishstatutebook.ie/eli/2011/si/477/made/en/pdf
- NRA Guidelines on The Management of Noxious Weeds and Non-Native
- Invasive Plant Species on National Roads

Site Survey

Walkover assessments of the development site were carried out by Emma Peters on the 25th and 30th September 2025. All areas were examined for Invasive species during the optimal survey season. Two areas of sea buckthorn infestation were identified; one within the site outline along the western boundary treeline , and a another area also to the west of the site, located c.50m outside the site boundary. Sea buckthorn third Schedule listed species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011. No other non-native invasive species listed in the third schedule of (SI 477 of 2011) were noted on site (Plants Table 1 & and Animals Table 2).

Table 1. Plant species listed in the Third Schedule of SI 477 of 2011

Common Name	**Species**	**Location**	**Present on site**
American skunk-cabbage	*Lysichiton americanus*	Throughout the State	Not observed
A red alga	*Grateloupia doryphora*	Throughout the State	Not observed
Brazilian giant-rhubarb	*Gunnera manicata*	Throughout the State	Not observed
Broad-leaved rush	*Juncus planifolius*	Throughout the State	Not observed
Cape pondweed	Aponogeton distachyos	Throughout the State	Not observed
Cord-grasses Spartina	*(all species and hybrids)*	Throughout the State	Not observed
Curly waterweed	*Lagarosiphon major*	Throughout the State	Not observed
Dwarf eel-grass	*Zostera japonica*	Throughout the State	Not observed
Fanwort	*Cabomba caroliniana*	Throughout the State	Not observed
Floating pennywort	*Hydrocotyle ranunculoides*	Throughout the State	Not observed
Fringed water-lily	*Nymphoides peltata*	Throughout the State	Not observed
Giant hogweed	*Heracleum mantegazzianum*	Throughout the State	Not observed
Giant knotweed	*Fallopia sachalinensis*	Throughout the State	Not observed
Giant-rhubarb	*Gunnera tinctoria*	Throughout the State	Not observed
Giant salvinia	*Salvinia molesta*	Throughout the State	Not observed
Himalayan balsam	*Impatiens glandulifera*	Throughout the State	Not observed
Himalayan knotweed	*Persicaria wallichii*	Throughout the State	Not observed
Hottentot-fig	*Carpobrotus edulis*	Throughout the State	Not observed
Japanese knotweed	*Fallopia japonica*	Throughout the State	Not observed
Large-flowered waterweed	*Egeria densa*	Throughout the State	Not observed
Mile-a-minute weed	*Persicaria perfoliata*	Throughout the State	Not observed
New Zealand pigmyweed	*Crassula helmsii*	Throughout the State	Not observed
Parrot's feather	*Myriophyllum aquaticum*	Throughout the State	Not observed
Rhododendron	*Rhododendron ponticum*	Throughout the State	Not observed
Salmonberry	*Rubus spectabilis*	Throughout the State	Not observed
Sea-buckthorn	***Hippophae rhamnoides***	**Throughout the State**	**Present**
Spanish bluebell	*Hyacinthoides hispanica*	Throughout the State	Not observed
Three-cornered leek	*Allium triquetrum*	Throughout the State	Not observed
Wakame	*Undaria pinnatifida*	Throughout the State	Not observed
Water chestnut	*Trapa natans*	Throughout the State	Not observed
Water fern	*Azolla filiculoides*	Throughout the State	Not observed
Water lettuce	*Pistia stratiotes*	Throughout the State	Not observed
Water-primrose	*Ludwigia (all* species)	Throughout the State	Not observed
Waterweeds	*Elodea* (all species)	Throughout the State	Not observed
Wireweed	*Sargassum muticum*	Throughout the State	Not observed

Table 2. Animal species listed in the Third Schedule of SI 477 of 2011

Common Name	Species	Location	Present on site
A colonial seasquirt	*Didemnum spp.*	Throughout the State	Not observed
A colonial seasquirt	Perophora japonica	Throughout the State	Not observed
All freshwater crayfish except *Austropotamobius pallipes*	All Freshwater crayfish except *Austropotamobius pallipes*	Throughout the State	Not observed
American bullfrog	*Rana catesbeiana*	Throughout the State	Not observed
American mink	*Neovison vison*	Throughout the State	Not observed
American oyster drill	*Urosalpinx cinerea*	Throughout the State	Not observed
Asian oyster drill	*Ceratostoma inornatum*	Throughout the State	Not observed
Asian rapa whelk	*Rapana venosa*	Throughout the State	Not observed
Asian river clam	*Corbicula fluminea*	Throughout the State	Not observed
Bay barnacle	*Balanus improvisus*	Throughout the State	Not observed
Black rat	*Rattus rattus*	Offshore islands only	N/A
Brown hare	*Lepus europaeus*	Throughout the State	Not observed
Brown rat	*Rattus norvegicus*	Offshore islands only	N/A
Canada goose	*Branta canadensis*	Throughout the State	Not observed
Carp	*Cyprinus carpio*	Throughout the State	Not observed
Chinese mitten crab	*Eriocheir sinensis*	Throughout the State	Not observed
Chinese water deer	*Hydropotes inermis*	Throughout the State	Not observed
Chub	*Leuciscus cephalus*	Throughout the State	Not observed
Common toad	*Bufo bufo*	Throughout the State	Not observed
Coypu	*Myocastor coypus*	Throughout the State	Not observed
Dace	*Leuciscus leuciscus*	Throughout the State	Not observed
Freshwater shrimp	*Dikerogammarus villosus*	Throughout the State	Not observed
Fox	*Vulpes vulpes*	Offshore islands only	N/A
Grey squirrel	*Sciurus carolinensis*	Throughout the State	Not observed
Greylag goose	*Anser anser*	Throughout the State	Not observed
Harlequin Ladybird	*Harmonia axyridis*	Throughout the State	Not observed
Hedgehog	*Erinaceus europaeus*	Offshore islands only	N/A
Irish stoat	*Mustela erminea hibernicus*	Offshore islands only	N/A
Japanese skeleton shrimp	*Caprella mutica*	Throughout the State	Not observed
Muntjac deer	*Muntiacus reevesi*	Throughout the State	Not observed
Muskrat	*Ondatra zibethicus*	Throughout the State	Not observed
Quagga Mussel	*Dreissena rostriformis*	Throughout the State	Not observed
Roach	*Rutilus rutilus*	Throughout the State	Not observed
Roe deer	*Capreolus capreolus*	Throughout the State	Not observed
Ruddy duck	*Oxyura jamaicensis*	Throughout the State	Not observed
Siberian chipmunk	*Tamias sibiricus*	Throughout the State	Not observed
Slipper limpet	*Crepidula fornicata*	Throughout the State	Not observed
Stalked sea squirt	*Styela clava*	Throughout the State	Not observed
Tawny owl	*Strix aluco*	Throughout the State	Not observed
Wild boar	*Sus scrofa*	Throughout the State	Not observed
Zebra mussel	*Dreissena polymorpha*	Throughout the State	Not observed

Proposed Management

The key objective of the Invasive Species Management Plan is to develop a safe and biosecure approach to the long-term control of invasive species in and proximate to the site and to remove the risk of spread and future. The successful implementation of the Plan will prevent the further spread of sea buckthorn as a result of the proposed works and ensure that future structures on site are not impacted by invasive species. The Management Plan describes procedures that will ensure the effective control of the specific invasive species.

It is recommended that all control methods follow the TII 4 phase approach to control of Invasive species as outlined in TII (2020)[2]:

Phase 1 – Site assessment – Mapping – Description of site – Habitat mapping – Presence of IAPS – Sensitive receptors – Proximity to designated sites – Topographical survey

Phase 2 – IAPS Management Plan – Costing – Site management objectives – Treatment required – Risk of re-infestation – Costings of appropriate control strategies – Acquisition of land/Compulsory Purchase Order (CPO) if necessary

Phase 3 – Implement control methods – Treatment reporting – IAPS control (chemical, physical or a combination of both) – Biosecurity measures – Documentation of method of treatment

Phase 4 – Re-growth monitoring – Re-growth reporting – Survey re-growth – Report on re-growth – Make provisions for site protection to prevent future IAPS infestations

One invasive species (SI 49 of 2011) were noted within the proposed development area (Figure 2).

Sea buckthorn

The sea buckthorn plants can be physically removed by grubbing up the above and below ground components of the plant by mechanically excavating them from the ground. All grubbed or excavated material should be bagged and removed from site for appropriate disposal. However, small root or rhizome parts in the ground may regrow and produce new plants. A more effective, long-term but labour-intensive method to control Sea-buckthorn is to cut the stems close to ground level, drilling and injecting the stump with a concentrated solution of glyphosate (Roundup Gold) or 2-4D amine. All grubbed or excavated material should be bagged and removed from site for safe disposal. No matter what method is used, the site should be monitored for regrowth at the end of the season.

Re-growth monitoring will be carried out on an annual basis for three years by an ecologist or invasive species specialist. Localised treatment will be carried as per above methodologies if required.

On site Management specific to the proposed works

Sea buckthorn is a highly invasive plant species and can unwittingly be transferred easily across a development site. The first stage of management of the species, prior to works commencing on site, will be to mark out the stands on site with a 7m buffer of tape or fencing to ensure that no machinery or personnel come within close proximity to the plants. Failure to do this could result in the transfer of sea buckthorn across the site particularly in the tracks of machinery. All works in this area must be approved and carried out in consultation with the project ecologist. Prior to the works commencing an updated survey will be carried out and 7m buffer adjusted. With basic precautions in relation to marking out the 7m buffer on site to prevent human or machinery access in the vicinity of sea buckthorn that this area can be avoided and removed as a localised control. If works are to be carried out within 7m of a plant of Japanese knotweed full biosecurity measures will be in place which will involve the works being supervised by a project ecologist/invasive species specialist.

[2] TII (2020) The Management of Invasive Alien Plant Species on National Roads – Standard. GE-ENV-01104 https://www.tiipublications.ie/library/GE-ENV-01104-01.pdf

A Guide to Landscape Treatments for National Road Schemes in Ireland (TII)). As outlined in TII "The Management of Invasive Alien Plant Species on National Roads – Standard"[3] "*Areas infested with IAPS must be clearly identified and the specific sites of infestation isolated with fencing or warning tape. 'Biosecure zone' signs must be erected at each contaminated site to alert workers that IAPS are present and to avoid entering or interfering with these sites. Likewise, any stockpiles of soil that are or could be contaminated with IAPS must be clearly marked. Designated and clearly marked cleaning and/or disinfection stations should be strategically placed within the work site for use by staff, vehicles and machinery. Where it is necessary to work in contaminated areas, every effort should be made not to use vehicles with caterpillar tracks.*

All vehicles and equipment that have been used in IAPS control operations must be thoroughly pressure-washed in a designated wash-down area each time they leave the works site and once work in that area has been completed. This also includes footwear, personal protective equipment (PPE), tools, and other light equipment. It is important to remove soil that may contain seeds or plant fragments, which otherwise could be transported along the road corridor as works are being undertaken. Vehicles leaving contaminated area(s) should either be confined to marked haulage routes protected by root barrier membranes, or be pressure-washed before leaving the area. Only vehicles that are deemed to be biosecure (i.e. sealed so that no soil can escape) shall be used to transport contaminated soil and all must be thoroughly pressure-washed in the designated wash-down area before exiting the infested area."

Conclusion

Areas infested with Sea Buckthorn have been noted to the west of the site, both within and outside the proposed development boundary. The proposed works would involve the removal of soil off site. It is proposed to initially mark out the areas where sea buckthorn is present and prevent access within 7m of these areas. Where works are required within 7m of a stand full biosecurity measure will be in place under the supervision of a project ecologist/invasive species specialist. It is recommended that all above and below ground components removed with/without a combined herbicide treatment. and the areas marked with suitable signage, with subsequent treatments to keep the Sea buckthorn under control. As part of the management plan ongoing monitoring is required post control to ensure that invasive species have been fully controlled in site.

[3] https://www.tiipublications.ie/library/GE-ENV-01104-01.pdf

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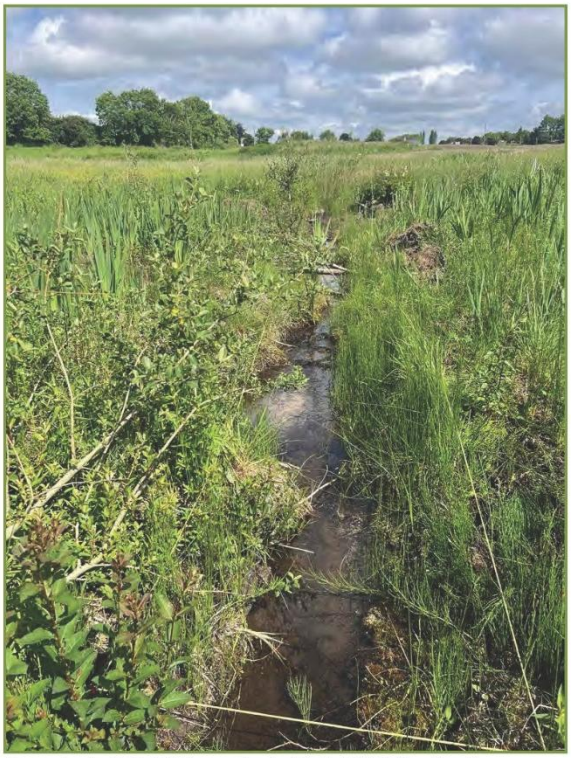
KILDALKEY ROAD PETRIFYING SPRING SURVEY AND ASSESSMENT 2025

November 2025



Annex I priority Petrifying spring habitat at Kildalkey Road

Report produced by Denyer Ecology
for Loughglynn Developments Limited

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1 INTRODUCTION

1.1 Background

Dr Joanne Denyer was commissioned by Loughglynn Developments Limited to undertake detailed plot survey and condition assessment of petrifying spring habitat Kildalkey Road, Trim, Co. Meath. Petrifying springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat. Part of the survey site is located within the River Boyne and River Blackwater SAC [site code 002299]. Whilst there are several examples of Annex I priority petrifying springs recorded from this SAC, they are not currently listed as a Qualifying Interest for the site.

1.2 Survey area

The survey area is shown in Figure 1.1 The site is located on the western edge of Trim, Co. Meath, between Kildalkey Road to the north and the River Boyne to the south.

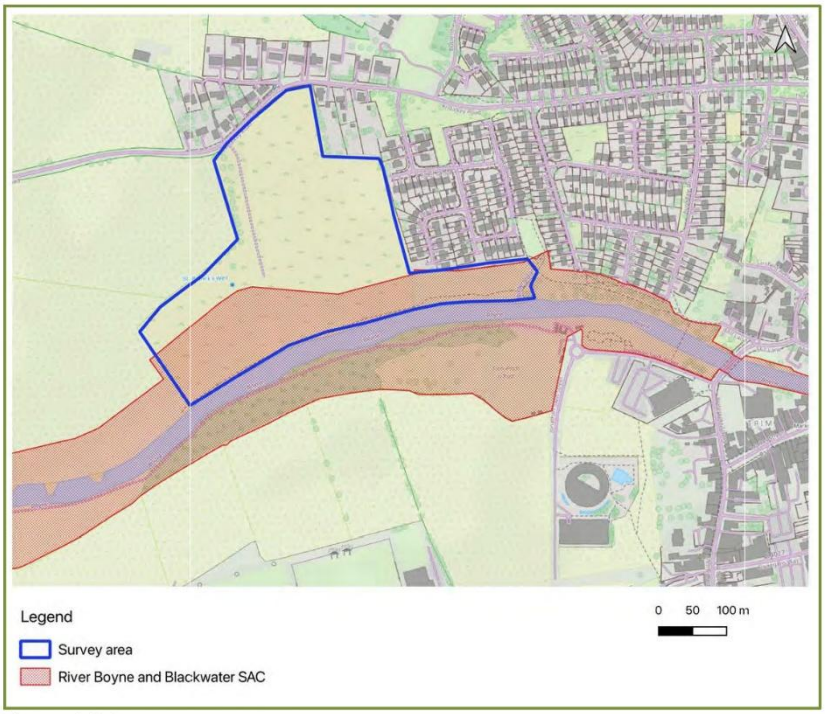

Figure 1.1 Survey area
Maps © Thunderforest, Data © OpenStreetMap contributors

1.3 Aims

A walk-over survey of the site in February 2025 mapped an area of Annex I petrifying springs/ seepages in the south of the site (Figure 1.2). The summary report for this survey (Appendix A) recommended that a detailed botanical survey and condition assessment be undertaken of the petrifying springs/ seepages, in the survey season (May to September), with water chemistry sampling. This was undertaken and the results are included in this report.

Figure 1.2 Location of petrifying spring/ seepage areas within the survey area
RGB Aerial Photography - © Bluesky Geospatial Limited

1.4 Relevant expertise

Dr Joanne Denyer is a highly experienced botanist and bryologist with over 25 years' experience of ecological survey and research. She specialises in botanical, wetland and bryological survey in the Republic of Ireland. She is a national expert on Annex I priority habitat petrifying springs and has worked on a wide range of projects and sites in relation to this habitat. This includes detailed site survey, assessment and monitoring, habitat management, Ecological Impact Assessment, pre and post construction monitoring, acting as an expert witness on calcareous springs at Oral Hearing and providing advice to county councils and NPWS. In 2018 (Denyer et al, 2018) and 2024 she assisted National Parks and Wildlife Service (NPWS) in Article 17 reporting on Petrifying springs to the European Commission. The 2024 assessment included a national survey of petrifying spring sites across Ireland. She is the lead author of new guidance on petrifying spring assessment and monitoring (Denyer et al, 2023 and Denyer, in press).

2 METHODOLOGY

2.1 Desktop information

The following resources were consulted:

- GIS boundaries of designated site data (data accessed via NPWS website).
- Site synopsis for River Boyne and River Blackwater SAC [site code 002299] (NPWS, 2014)
- Site specific conservation objectives for River Boyne and River Blackwater SAC (SSCOs) (NPWS 2021).
- Aerial photography and historic mapping for the site (geohive.ie).
- Article 17 of the Habitats Directive reports and accompanying data for the periods 2013-2018 (NPWS, 2019b) and 2008-2023 (NPWS, 2013b).
- Article 17 of the Habitats Directive data for the period 2019-2024 (NPWS, In Preparation).

2.2 Survey and assessment

- Three detailed plots were undertaken in Annex I petrifying springs within the survey area in June 2025. The plot locations were positioned to contain representative spring vegetation at each spring location and to encompass the variation of tufa types in the survey area.
- Spring water pH and conductivity was measured in the field from each surveyed spring using a handheld pH meter.
- Detailed water chemistry sampling was also undertaken in the three surveyed petrifying springs in June 2025 and October 2025. These were laboratory tested for the following parameters (see Denyer et. al., 2023 for more details): pH, Electrical conductivity, Alkalinity (HCO_3^- mg/l), Calcium (Ca^{2+} mg/l), Magnesium (Mg^{2+} mg/l), Potassium (K^+ mg/l), Sodium (Na^+ mg/l), Chloride (Cl^- mg/l), Nitrate (NO_3^- mg/l), Soluble Reactive Phosphorous (ortho-phosphate) (PO_4^{3-} µg/l), Ammonia (NH3 mg/l) and ammonium (NH4+ mg/l) and Sulphate (SO_4^{2-} mg/l).
- The plot sampling methodology follows Denyer (2025); Denyer et al. (2023) and Lyons & Kelly (2016). The plots were either 2m x 2m or 1m x 4m in size, depending on the spring type. Within each plot the data collected included habitat and plot photographs; plot location(s) (GPS); recording of percentage cover of vascular plant and bryophyte species (including positive and negative indicator species); shading; tufa type and extent; and, impacting activities (such as grazing, invasive species, changes to water quality and/ or quantity, trampling and dumping).
- Petrifying spring vegetation communities were classified using Lyons & Kelly (2017).
- The ecological condition of the springs was assessed using Denyer (2025); Denyer et al. (2023) and Lyons & Kelly (2016). Criteria include positive and negative indicator species (frequency and cover), woody species cover, vegetation height and disturbance.
- The 'Conservation Score' of the petrifying springs was assessed using Denyer et al. (2023) and Lyons & Kelly (2016). Criteria such as species diversity, High Quality indicator species, tufa-forming capacity and other positive characteristics are used to calculate the 'Conservation Score' for each spring. The maximum score possible is 10. This score is then used to rank the quality of the spring at a national level as follows: 1-2 = Low; 3-4 = Moderate; 5-6 = High, 7-8 = Very high and 9-10 = Outstanding. See Denyer et al. (2023) and Lyons & Kelly (2016) for more details.

2.3 Plant species nomenclature

Vascular plant nomenclature follows that of the *New Flora of the British Isles*. 4th Edition (Stace, 2019). The bryophyte nomenclature adopted by Blockeel et al. (2021) is used.

3 RESULTS

3.1 Detailed plot survey and condition assessment

Three detailed petrifying spring plots were undertaken: KD01- KD03. These are shown on Figure 3.1 and listed in Table 3.1. A summary of the results is shown in Tables 3.2 and 3.3. and the full results of the plot survey and condition assessment are shown in Appendix B.

The petrifying springs within plots KD01 and KD03 are examples of the vegetation community Group 3 *Brachythecium rivulare-Platyhypnidium riparioides* tufaceous streams and flushes (Lyons & Kelly, 2017), which is typical of water with moderate to high levels of nutrient enrichment. The petrifying spring vegetation in KD02 however is an example of *Carex lepidocarpa* small sedge springs, with open low growing vegetation and the presence of frequent *Chara vulgaris* (charophyte). This may change as the vegetation recovers from the disturbance in this area.

The main tufa type in most of the petrifying springs is sparse but frequent paludal tufa, with some cascade tufa in the wooded spring (KD03). KD02 and KD03 have three positive indicator species, which is the minimum for good condition in petrifying springs (Denyer, 2025; Denyer et al., 2023). However, only one positive indicator species was recorded from KD01.

All three of the plots with water chemistry data had elevated nitrate levels at least one water sample. KD01 had very high nitrate levels in both the June and October samples and this has the lowest number of positive indicator species. KD02, which had vegetation typical of lower nutrient conditions, only had high nitrate in the June sample. KD03 exceeded the phosphate threshold in June with very high phosphate levels, but phosphate was non-detectable in the October sample. All three plots are considered to fail the condition assessment on water quality based on the current sample data. Additional impacts to the surveyed springs include the vegetation and soil disturbance prior to February 2025, where some springs were completely cleared of vegetation and there was landscaping/ soil movement within the spring area. As the springs are recovering from this past disturbance, they may change over the next year as vegetation regenerates and there are less nutrients and sediment entering the water from the disturbed soil.

Figure 3.1. Location of botanical plots and water samples within petrifying spring seepage areas
RGB Aerial Photography - © Bluesky Geospatial Limited

Table 3.1. Summary of petrifying springs and seepages within the survey area

Map reference	Description	Detailed plot & water sample	Photo
KD01	Spring in west of site, linked to site of 'St Patrick's Well' and marked as spring on old mapping. Appears to arise from broken concrete structure and flows south. Sparse paludal tufa present on bryophytes. Linked to wetland area with hydrophilous tall herb fen to west and some tall vegetation within spring. Signs of nutrient enrichment such and low number of positive indicator species.	Plot KD01 and Water sample KD01	
KD02	Western edge of large seepage zone where springs arise in multiple locations. This spring has an obvious channel and flow. Sparse but frequent paludal tufa present on bryophytes. Positive indicator species frequent in channel. This spring area was damaged with disturbance of soil, vegetation and tufa prior to the February 2025 walk-over survey.	Plot KD02 and Water sample KD02	
KD03	Eastern edge of large seepage zone where springs arise in multiple locations. This area is wooded with wet Willow *Salix cinerea* woodland. KD03 located where there is a clear spring flow. Frequent paludal tufa in channel and on banks and some cascade tufa in channel. Cover of negative indicator species suggests some nutrient enrichment.	Plot KD03 and Water sample KD03	

Table 3.2. Main tufa formation, vegetation type and species richness in each plot

Plot ID	Vegetation community[1]	Main tufa type[2]	Total tufa formation (%)	No. of positive indicator species
KD01	Group 3	Paludal	20	1
KD02	Group 6	Paludal	25	3
KD03	Group 3	Paludal and cascade	19	3

[1]Lyons & Kelly (2017) & Denyer (2025); [2]Lyons (2015) and Denyer (2025).

Table 3.3. Conservation score, ranking and condition assessment summary for each plot

Plot no.	Conservation score	Conservation ranking	Condition assessment	Failed criteria
KD01	6	Moderate	Fail	Positive indicator species; nitrate level, negative indicator species, woody species and recent disturbance
KD02	5	Moderate	Fail	Nitrate level, negative indicator species, woody species and recent disturbance
KD03	4	Moderate	Fail	Nitrate level, phosphate level, negative indicator species.

3.2 Water chemistry

The 2025 water chemistry data is shown in Table 3.4 and is shown in full in Appendix C. The water chemistry data is largely consistent with that recorded in Irish springs by Lyons (2015) and more recent fieldwork (Denyer, unpublished data). However, the phosphate levels in the June water sample in KD03 (0.384 mg/l) were very high and outside of the recorded range by Lyon (2015) (0.002-0.14), although within sampling from additional springs by Denyer in Ireland (0-0.78 mg/l). Phosphate in this spring was non-detectable in the October sample but should be monitored in case this exceedance is repeated.

The threshold for nitrate in Annex I petrifying springs (Denyer, 2025) is 5 mg/l. Above this level there is likely to be anthropogenic influence. All of the water samples had nitrate levels of >5 mg/l in at least one sample. The levels in KD01 (17.8 and 19.8) were very high, although within the recorded range from Irish springs (<0.07-44.05 mg/l; Lyons, 2015) (<4.4-85.5 mg/l, Denyer, unpublished data).

There is currently no threshold for ammonia (NH_3) or ammonium (NH_4^+) levels in petrifying springs in Ireland (Denyer, in press). An upper limit of 1.0 mg/l ammonia is recommended until further information is available (Denyer, 2025), but it is not currently included as a criterion in the Structure and Functions assessment. The total ammonia and ammonium concentrations recorded from the Kildalkey sampled springs (Table 3.4) are below 1.0 mg/l but are detectable and should be monitored.

Table 3.4. 2025 water chemistry data from the Kildalkey sampled springs

Water chemistry parameter	KD01 - Jun	KD01 - Oct	KD02 - Jun	KD02 - Oct	KD03 - Jun	KD03 - Oct
Alkalinity (mg $CaCO_3$/l)	353	353	347	345	351	343
Alkalinity (mg HCO_3/l)	431	431	423	421	428	418
Ammonia (mg /l)	0.0130	0.031	0.0500	<0.01	0.727	0.01
Ammonium (mg /l)	0.0140	0.033	0.0520	<0.01	0.770	0.011
Calcium (mg/l)	151	118	149.0	151.0	146.0	148
Chloride (mg/l)	25.2	24.7	27.4	25.9	29.6	28.4
Conductivity @25°C (µS/cm)	740	754	758	753	754	751
Magnesium (mg/l)	15.3	16.3	15.8	15.9	16.8	16.8
Nitrate (mg N/l)	19.8	17.8	6.42	<4.4	7.240	5.91
pH	7.2	7.1	7.4	7.6	7.2	7.2
Phosphate Ortho-P (mg P/l)	<0.03	<0.03	<0.03	<0.03	0.384	<0.03
Potassium (mg/l)	1.47	1.79	1.54	1.84	1.7	1.76
Sodium (mg/l)	9.76	9.72	10.3	10.1	12.1	11.9
Sulphate (mg/l)	47.8	55.0	66.8	71.6	60.0	65.3
Temperature	n/a	n/a	n/a	n/a	n/a	n/a

Lyons (2015) sampled the water from 91 separate Irish springs (115 water samples in total) from 2012-2013. The summary data from this work is shown in Table 3.5 to compare with the samples from the

Kildalkey sampled springs (Table 3.4). Note that Lyons (2015) did not analyse electrical conductivity or ammonia so there are no reference values for these parameters.

4 POTENTIAL IMPACTS FROM PROPOSED DEVELOPMENT

A Large Scale Residential Development (LRD) by Loughglynn Developments Limited is proposed on the lands to the north of the petrifying spring/ seepage area. Full details of the project and associated works are included in the planning application documents.

Petrifying springs can be damaged by direct habitat loss (removal or disturbance of springs) and changes to water quality (e.g. pH, mineral composition and nutrient levels) and quantity (e.g. flow rate). Changes to land-use in the recharge area of the petrifying springs (for instance from creation of hardstanding areas and changes in groundwater flow and direction resulting from landscaping and excavation) can reduce water flow. In addition, surface water run-off into the recharge area can potentially negatively impact petrifying spring water quality. Potential impacts and recommended mitigation measures and monitoring are summarised below.

4.1 Direct disturbance

- The spring/ seepages should be **protected** from any **direct disturbance**. There should be no construction works in the petrifying spring/ seepage zones within the SAC as shown on Figure 3.1.
- The spring/ seepages should be **protected from recreational disturbance**/ pressure resulting from the proposed development. Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.

4.2 Hydrogeological impacts

An assessment of potential hydrogeological impacts on petrifying springs within the site from the proposed LRD and required design and mitigation features to avoid impacts are detailed in Meehan (2025) '*Hydrogeological assessment for proposed Large Scale Residential Development (LRD), by Loughglynn Developments Limited, at a site on the Kildalkey road, Trim, County Meath –Land, soils, geology, hydrology and hydrogeology*.'

This states that no works will be undertaken in the vicinity of the springs, that the depths of the groundwater across the site are well below the level of any of the construction activities (e.g. foundations and other excavations into the subsurface on the site) and the proposed rising main borehole will not pump or dewater the area within and around it (Section 9.2 of the Hydrogeological assessment). Required mitigation and avoidance measures are detailed.

The hydrogeological assessment concludes:

'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 design of the proposed LRD Project has maintained the existing hydrological and hydrogeological regime on the site in as much as possible.

This means that all SUDS measures will discharge as diffusely as possible and at as shallow a depth as possible, using individual shallow soakaways for each house individually and wide, expansive, shallow soakaways for the road network.

This will mean no significant effects on groundwater levels and / or flows, and / or surface water, will occur as a result of the proposed LRD Project.'

4.3 Monitoring

- All survey and monitoring of the petrifying springs (pre- during and post-construction) must be undertaken by an **experienced petrifying spring ecologist.**
- The petrifying springs must be surveyed **pre-construction** to provide an updated baseline from the 2025 surveys. As the vegetation was disturbed in 2024/ 2025 the petrifying spring

vegetation is recovering and is likely to change in the next 1-2 years. The pre-construction surveys must be undertaken within 12 months of construction works starting.

- The petrifying springs must be monitored annually **during construction**. This will include a repeat of the detailed baseline plots at least once and annual walk-over surveys.
- The petrifying springs must be monitored **post construction**, once the site is operational) to assess any impact from recreational access. This should be undertaken one year after operation commences and then every two years for a minimum of five years in total. If there is any disturbance to the petrifying springs, then access to the petrifying springs must be reviewed.

5 SUMMARY

- Dr Joanne Denyer was commissioned by Loughglynn Developments Limited to undertake survey and assessment of petrifying spring habitat Kildalkey Road, Trim, Co. Meath.
- Petrifying springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat. Part of the survey site is located within the River Boyne and River Blackwater SAC [site code 002299].
- A walk-over survey of the site was undertaken in February 2025 to map examples of Annex I petrifying springs/ seepages within the site. Detailed plot survey and condition assessment of the Annex I petrifying springs/ seepages was undertaken in June 2025 and water chemistry sampled in June and October 2025.
- Annex I priority petrifying spring/ seepages occur in the south of the site (Figure 1.2). The three sampling points (detailed botanical survey and assessment and water chemistry sampling) were located to sample three different areas within this zone (Figure 3.1) and to include both open and wooded springs.
- The Annex I priority petrifying spring/ seepages have moderate tufa formation (19-25% within a 2 x 2m plot) and low species diversity (1-3 positive indicator species for this Annex habitat). They are assessed as being over moderate national conservation ranking.
- The Annex I priority petrifying spring/ seepages all failed the condition assessment. Reasons for poor condition of the springs are low positive indicator species, elevated nitrate levels, elevated ammonia and phosphate levels (June sampling only) high cover of negative indicator species, invasion of woody species in open springs, recent disturbance by heavy machinery.
- A Large Scale Residential Development (LRD) by Loughglynn Developments Limited is proposed on the lands to the north of the petrifying spring/ seepage area.
- Annex I priority petrifying springs are sensitive to direct habitat loss and disturbance and changes to water quantity (flow) and quality (water chemistry including nutrient levels).
- Measures to reduce direct disturbance are listed in Section 4.1 (protection during construction work and protection from recreational disturbance/ access during operation).
- There are no predicted significant hydrogeological impacts to the Annex I priority petrifying springs from the proposed development (Section 4.2). This is because no works will be undertaken in the vicinity of the springs, the depths of the groundwater across the site are well below the level of any of the construction activities and the proposed rising main borehole will not pump or dewater the area within and around it (Meehan, 2025). Required hydrogeological mitigation and avoidance measures are detailed in the Hydrogeological assessment (Meehan, 2025).
- Monitoring and survey of the Annex I priority petrifying springs pre, during and post construction is outlined (Section 4.3).

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To: Aidan Hora (Loughglynn Developments Limited)
From: Dr Joanne Denyer (Denyer Ecology)
Date: 27 February 2025
Subject: Kildalkey Road, Trim, Petrifying spring walk-over survey 2025

Survey summary

This site was visited on 25 February 2025 to assess whether there were any examples of the Annex I priority habitat 'Petrifying springs with tufa formation' [*7220] present. The project site and an adjacent area of riverbank to the east were walked over and the presence of *7220 recorded where encountered. Detailed plots were not undertaken at this stage, as it is outside of the main survey season for petrifying springs. Part of the site is located within the River Boyne and River Blackwater SAC [002299].

Tufa formation was found in a number of locations in streams/ springs in the lower part of the site, within the SAC (Figure 1). There is a spring in the west of the site (Photograph 1), which is marked on historic mapping. This has a springhead area with tufa present in an adjacent area of wet grassland/ spring vegetation (Photograph 2). This vegetation has affinity to alkaline fen, which is a Qualifying Interest of the River Boyne and River Blackwater, but it was not the correct time of year for assessment of this habitat. A channel flows south to the river with tufa frequent throughout the length (Photograph 3). The tufa is present as lumps of cascade tufa, oncoids and ooids (coated particles) and some paludal tufa on growing plants. There were no positive indicator species for the Annex I priority habitat 'Petrifying springs with tufa formation' [*7220] recorded. **The spring is considered an example of Annex I priority habitat 'Petrifying springs with tufa formation'**, in unfavourable condition. The lack of positive indicator species is likely to be due to nutrient enrichment in the catchment area (e.g. probable past use of nitrates/ phosphates on the agricultural land to the north, past shading by tall vegetation and scrub and recent damage by scrub clearance and machinery use in the area (Photograph 4). The pH of the water at the presumed springhead was 7.02, but this increased to 7.48 in the southern part of the spring. Electrical conductivity was 804 µS cm-1.

To the east there is an area where there are several springs and stream channels which join each other, with tufa formation present intermittently throughout the area. The central area has been recently disturbed by machinery and scrub clearance (Photograph 5), but the eastern area has some springs still within scrub and immature wet woodland on the riverbank (Photograph 6). The tufa is present as oncoids and ooid particles in the streams (Photograph 7) and occasional areas with cascade tufa (Photographs 8-10). The disturbance of the springs and adjacent vegetation (Photographs 11-13) means that it is not possible to be clear where the original springhead and springlines would have been. Only one positive indicator species for *7220 was recorded (*Didymodon tophaceus*) (Photograph 10). This was in the eastern part of the site that had not been recently disturbed and still had wet willow scrub present. The low cover of positive indicators is likely due to past and recent impacts at the site, and so the **springs in this area** are examples of the **Annex I priority habitat 'Petrifying springs with tufa formation'**, in unfavourable condition. The pH of the water at one location in the eastern disturbed area was 7.29 and electrical conductivity was 802 µS cm-1.

Ecological sensitivities

Petrifying springs can be damaged by direct habitat loss and changes to water quality (e.g. pH, mineral composition and nutrient levels) and quantity (e.g. flow rate). Changes to water quantity can result from loss of recharge area above the petrifying spring/ seepage areas (e.g. from hardstanding and changes in groundwater flow and direction resulting from landscaping and excavation) and water quality from surface water flows into the springs and/ or other nutrient rich water. Input from an experienced petrifying spring hydrogeologist, in consultation with a petrifying spring ecologist, is required to avoid impacts from any proposed development on the petrifying springs/ seepage areas.

Actions:

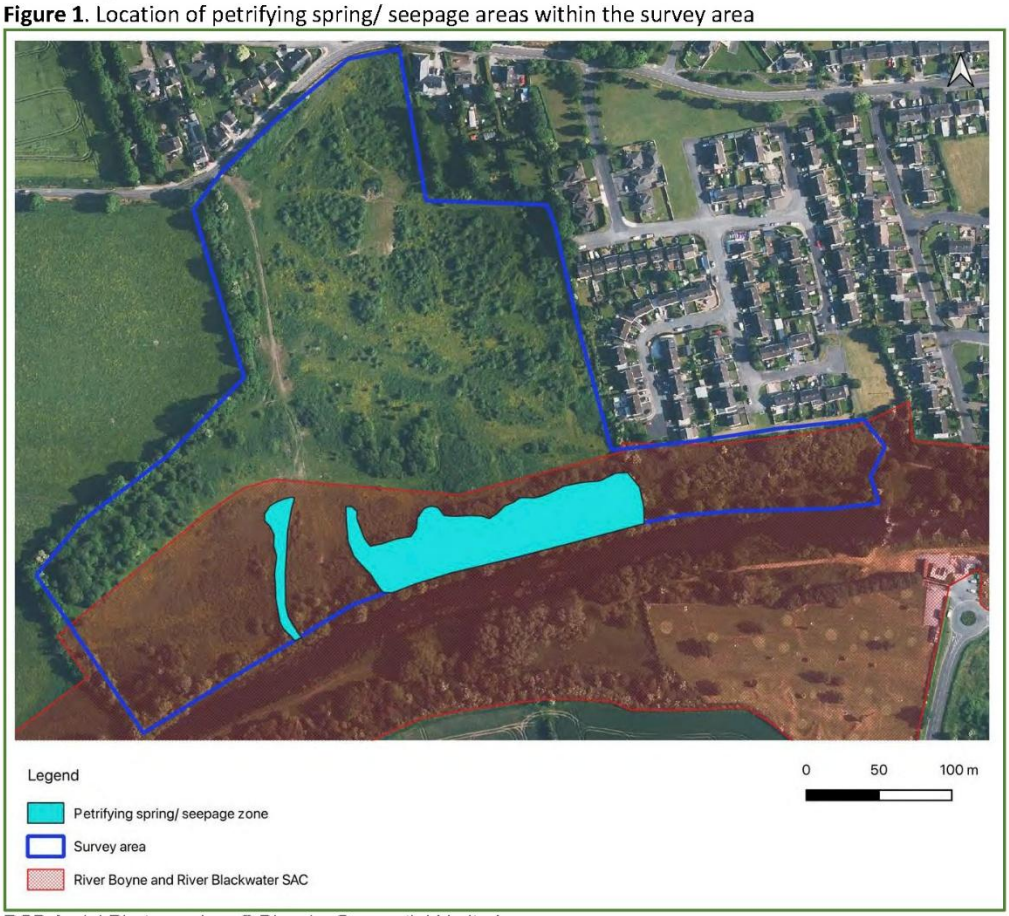
- The spring/ seepages should be **protected** from any **direct disturbance**. There should be no further machinery works in the petrifying spring/ seepage zones within the SAC as shown on Figure 1.
- There should be **no development works in the spring/ seepage areas**. This includes landscaping works and planting.
- The area of spring/ seepages should be **protected from recreational disturbance**/ pressure resulting from any proposed development.
- **Detailed botanical survey and condition assessment** of petrifying springs/ seepages and any potential alkaline fen, in the survey season (May to September). This will allow an assessment of their condition and conservation ranking, and act as a baseline for any future monitoring works. This should be accompanied by water chemistry sampling.
- An **experienced petrifying spring hydrogeologist** is required to investigate whether the proposed development to the north of the spring/ seepages could **impact the recharge zone** of the spring/ seepages. Any interception could reduce the water flow to the spring/ seepage area.
- The **drainage scheme** for the proposed development to the north of the north of the spring/ seepages will need to be **reviewed by an experienced petrifying spring hydrogeologist** to ensure there are no potential negative impacts on the spring/ seepage water quality and quantity. Surface water should not be discharged directly into this area as it would dilute the groundwater and may reduce tufa formation. Any SuDS on site must ensure that water goes through an appropriate soil zone before discharging to the spring/ seepage area, to ensure it has the correct water chemistry.
- As part of any proposed development, a **restoration plan** should be prepared by an experienced petrifying spring hydrogeologist and petrifying spring ecologist for the petrifying spring/ seepage area. With appropriate management the petrifying spring vegetation will recover from the disturbance and could be managed to improve the habitat condition.

Relevant expertise

Dr Joanne Denyer is a highly experienced botanist and bryologist with over 25 years' experience of ecological survey and research. She specialises in botanical, wetland and bryological survey in the Republic of Ireland. She is a national expert on Annex I priority habitat petrifying springs and has worked on a wide range of projects and sites in relation to this habitat. This includes detailed site survey, assessment and monitoring, habitat management, Ecological Impact Assessment, pre and post construction monitoring, acting as an expert witness on calcareous springs at Oral Hearing and providing advice to county councils and NPWS. In 2018 (Denyer et al, 2018) and 2024 she assisted National Parks and Wildlife Service (NPWS) in Article 17 reporting on Petrifying springs to the European Commission. The 2024 assessment included a national survey of petrifying spring sites

across Ireland. She is the lead author of new guidance on petrifying spring assessment and monitoring[1].

Figure 1. Location of petrifying spring/ seepage areas within the survey area



RGB Aerial Photography - © Bluesky Geospatial Limited

Photograph 1. Spring in west of site (view to north)

[1]Denyer, J., Eakin, M., & Gill, M. (2023). Guidelines for the Assessment of Annex I Priority Petrifying Springs in Ireland. *Irish Wildlife Manuals*, No. 142. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Photograph 2. Tufa formation in fen/ spring area adjacent to springhead (view to north)

Photograph 3. Tufa formation in western spring (oncoids and ooids in channel and cascade tufa on bank).

Photograph 4. Soil and tufa disturbance on bank and in channel in western spring

Photograph 5. Springs and seepage areas in recently disturbed area (view to east)

Photograph 6. Petrifying spring/ stream in scrub in eastern part of site

Photograph 7. Tufa formation in disturbed eastern spring area (oncoids and ooids in channel)

Photograph 8. Tufa formation in disturbed eastern spring area (spring water flowing over cascade)

Photograph 9. Tufa formation in disturbed eastern spring area (dislodged cascade tufa)

Photograph 10. Tufa formation in eastern spring area within scrub (cascade tufa on bank)

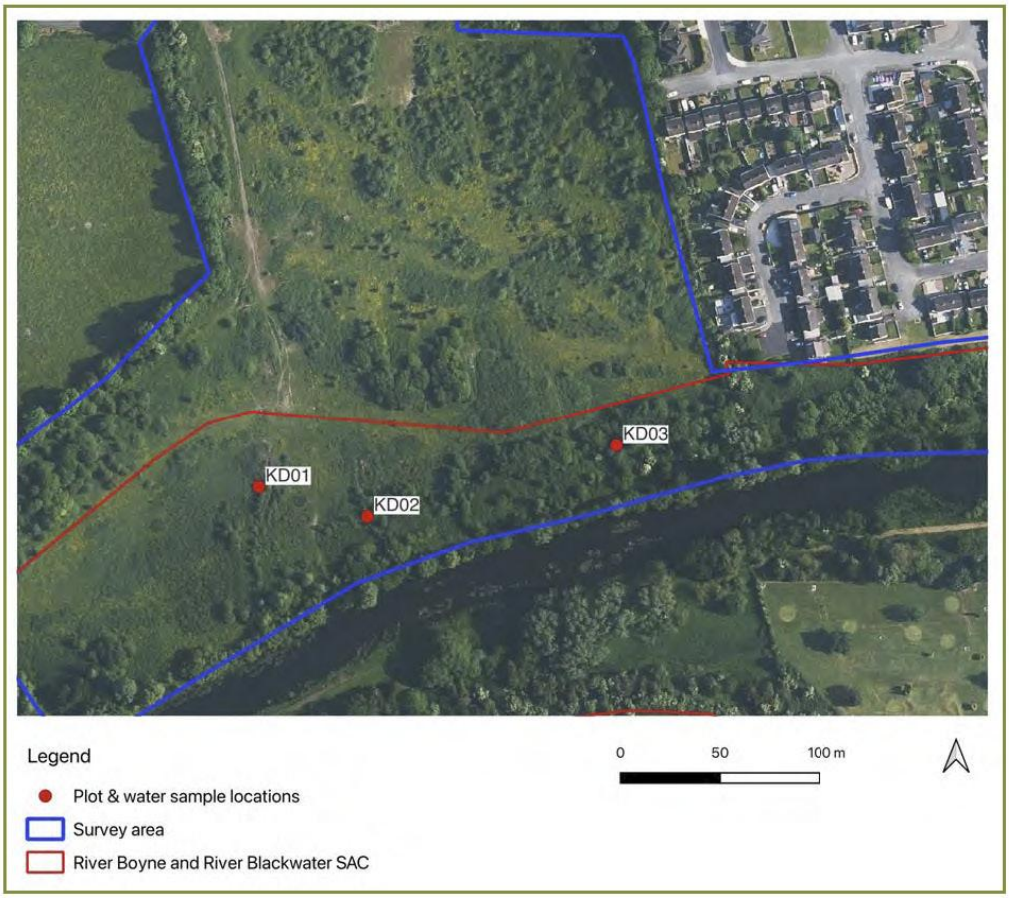
Photograph 11. Disturbed spring in central part of site (view to north)

Photograph 12. Disturbed spring in eastern part of site (view to west)

Photograph 13. Disturbed spring in central-eastern part of site (iron staining by bacteria indicating groundwater source to spring but little tufa formation as heavily disturbed)

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

PLOT LOCATION MAP



RGB Aerial Photography - © Bluesky Geospatial Limited

PLOT LOCATION PHOTOGRAPHS

Plot ID	Plot location
KD01	
KD02	
KD03	

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

PLOT DETAILS AND ASSESSMENT

Plot ID	KD01	KD02	KD03
Subsite	n/a	n/a	n/a
Surveyor	Joanne Denyer	Joanne Denyer	Joanne Denyer
Date survey	11/06/25 & 20/10/25	11/06/25 & 20/10/25	11/06/25 & 20/10/25
Grid code (IG)	N7933357012	N7938656997	N7951357028
Survey type	Baseline	Baseline	Baseline
Spring type	Springhead	Springhead	Springhead
Plot size	2m x 2m	1m x 4m	2m x 2m
Aspect	N	N	N
Water sample ref.	KD01	KD02	KD03
Water temp Jun	11.9	14.1	13.2
Water temp Oct	12.7	12.3	12.2
pH (field) Jun	6.84	7.11	7.07
pH (field) Oct	6.82	7.05	7.05
pH (lab) Jun	7.2	7.4	7.20
pH (lab) Oct	7.1	7.6	7.2
EC (field) Jun	792	810	914
EC (field) Oct	988	870	978
EC (lab) Jun	740	758	754
EC (lab) Oct	754	753	751
Altitude	56	55	55
Slope	3	2	5
[1]N03 Jun	19.8	6.42	7.24
[1]N03 Oct	17.8	<4.4	5.91
[1]PO43-P Jun	<0.03	<0.03	0.384
[1]PO43-P Oct	<0.03	<0.03	<0.03
Species richness	18	20	17
Vegetation ht (cm)	35	25	10
Fossitt adjacent	FS2/ ED3	GS4/ ED3	WN6
Vegetation code	Group 3	Group 6	Group 3
Vegetation cover			
Bryophyte cover	10 %	15 %	28 %
Vascular cover	55 %	31 %	39 %
Canopy cover	0 %	0 %	85 %
Tufa cover			
Cascade	0	0	8
Paludal 1	5	5	3
Paludal 2	0	0	0
Paludal 3	15	20	8
Stream crust	0	0	0
Oncoids and ooids	0	0	0
Dam	0	0	0
Rudities	0	0	0
Non tufa	80	75	81
Surface cover			
Field layer	65	45	70
Bare tufa	10	20	7
Inactive tufa	0	0	0
Leaf litter	3	5	0
Bare soil	22	30	23
Bare stone	0	0	0
Other	0	0	0
Water cover			
Flowing	50	60	50
Standing water	45	5	15
Dripping	0	0	0
Damp	5	35	35
Dry	0	0	0
Other	0	0	0

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

Plot ID	KD01	KD02	KD03
Conservation score			
Positive indicator species	1	3	3
Species diversity score	1	1	1
HQ Indicator Species	0	0	0
HQ Indicator score	0	0	0
Tufa-forming capacity	Patchy paludal tufa	Patchy paludal tufa	Patchy paludal tufa and small cascade tufa
Tufa score	2	2	2
Other positive characteristics	In complex with Annex I hydrophilous tall-herb fen vegetation and located within SAC with additional *7220 sites discharging to River Boyne.	In complex with Annex I hydrophilous tall-herb fen vegetation and located within SAC with additional *7220 sites discharging to River Boyne.	In complex with Annex I priority alluvial woodland vegetation and located within SAC with additional *7220 sites discharging to River Boyne.
Other score	1	1	1
Total score	4	4	4
National rank	**Moderate**	**Moderate**	**Moderate**
Condition assessment			
Positive indicator	Fail	Pass	Pass
Invasive spp.	Pass	Pass	Pass
Negative herbaceous spp.	Pass	Pass	Pass
Negative bryophytes & algae	Fail	Pass	Fail
Negative woody spp.	Fail	Fail	n/a (wooded spring)
[2]Nitrate	Fail	Fail (June sampling only)	Fail
Phosphate	Pass	Pass	Fail (June sampling only)
Water flow	Pass	Pass	Pass
Veg height	Pass	Pass	Pass
Trampling & dung	Fail Recent landscaping disturbance to area	Fail Recent landscaping disturbance to area	Pass
Overall plot assessment	**Fail**	**Fail**	**Fail**
[2]Overall site assessment	**Unfavourable Bad**		

[1]Detailed water chemistry from laboratory testing

[2]F = Favourable; UI = Unfavourable Inadequate; UB = Unfavourable Bad

PLOT SPECIES

Plot ID	Species type	Species name	Species group	Cover %
KD01		Agrostis stolonifera	Vascular	1
KD01		Angelica sylvestris	Vascular	0.5
KD01		Calliergonella cuspidata	Bryophyte	1
KD01		Cardamine flexuosa	Vascular	0.5
KD01		Cardamine pratensis	Vascular	0.5
KD01		Cirsium palustre	Vascular	0.1
KD01		Equisetum palustre	Vascular	1
KD01		Glyceria sp.	Vascular	5
KD01		Iris pseudacorus	Vascular	20
KD01		Juncus inflexus	Vascular	3
KD01		Nasturtium officinale agg.	Vascular	15
KD01		Ranunculus repens	Vascular	1
KD01		Valeriana officinalis	Vascular	1
KD01	Negative	Brachythecium rivulare	Bryophyte	0.5
KD01	Negative	Cratoneuron filicinum	Bryophyte	8
KD01	Negative	Epilobium hirsutum	Vascular	3
KD01	Negative woody	Rubus fruticosus agg. (*unwooded springs only)	Vascular	0.5

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

Plot ID	Species type	Species name	Species group	Cover %
KD01	Positive	Carex lepidocarpa	Vascular	3
KD02		Agrostis stolonifera	Vascular	3
KD02		Calliergonella cuspidata	Bryophyte	10
KD02		Cirsium palustre	Vascular	0.3
KD02		Didymodon insulanus	Bryophyte	0.3
KD02		Equisetum palustre	Vascular	12
KD02		Filipendula ulmaria	Vascular	0.5
KD02		Potentilla erecta	Vascular	0.5
KD02		Valeriana officinalis	Vascular	3
KD02	Negative	Brachythecium rivulare	Bryophyte	1
KD02	Negative	Cratoneuron filicinum	Bryophyte	1
KD02	Negative	Epilobium hirsutum	Vascular	0.5
KD02	Negative	Juncus effusus	Vascular	3
KD02	Negative woody	Salix cinerea (*unwooded springs only)	Vascular	5
KD02	Positive	Carex lepidocarpa	Vascular	3
KD02	Positive	Chara vulgaris	Charophyte	1
KD02	Positive	Pellia endiviifolia	Bryophyte	3
KD02		Arrhenatherum elatius	Vascular	1
KD02		Bryum dichotomum	Vascular	0.1
KD02		Pohlia sp.	Bryophyte	0.1
KD02		Potentilla sterilis	Vascular	0.3
KD03		Agrostis stolonifera	Vascular	7
KD03		Cardamine flexuosa	Vascular	0.3
KD03		Cirsium palustre	Vascular	5
KD03		Equisetum palustre	Vascular	5
KD03		Mentha aquatica	Vascular	5
KD03		Oxyrrhynchium hians	Bryophyte	1
KD03		Scrophularia auriculata	Vascular	3
KD03	Negative	Brachythecium rivulare	Bryophyte	20
KD03	Negative	Cratoneuron filicinum	Bryophyte	3
KD03	Negative	Epilobium hirsutum	Vascular	1
KD03	Negative woody	Hedera hibernica (*unwooded springs only)	Vascular	1
KD03	Negative woody	Rubus fruticosus agg. (*unwooded springs only)	Vascular	7
KD03	Positive	Didymodon tophaceus	Bryophyte	3
KD03	Positive	Festuca rubra	Vascular	5
KD03	Positive	Pellia endiviifolia	Bryophyte	1
KD03		Calystegia sepium	Vascular	0.5
KD03		Eurhynchium striatum	Bryophyte	3

*Negative indicator species in unwooded springs only

PLOT PHOTOS

Plot	Plot photo	Tufa formation/ vegetation close
KD01		

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

Plot	Plot photo	Tufa formation/ vegetation close
KD02		
KD03		

NEGATIVE ACTIVITIES

Pressure
PK01 Mixed source pollution to surface and ground waters (limnic and terrestrial)
PA05 PA25 Agriculture activities not referred to above (soil landscaping and disturbance)

TARGET VALUES FOR CONDITION ASSESSMENT

Criteria	Target value
Species assessment criteria	
High quality indicator species	n/a (included with positive indicator species)
Positive indicator species	3 species AND no loss from baseline number of species
Invasive species	Absent
Negative herbaceous indicator species	Total cover should not be dominant or abundant
Negative bryophyte indicator species	No one species dominant or abundant; if ≥2 species present, then fails if ≥2 are frequent or 1 is abundant
Negative woody indicator species	Absent (except in wooded springs)
Spring water composition and flow	
Nitrate level	No increase from baseline and not above 5 mg/l (≥2-5 mg/l = borderline fail)
Phosphate level	No increase from baseline and not above 0.015 mg/l

APPENDIX B – PETRIYFING SPRING DETAILED PLOT RESULTS

Criteria	Target value
Water flow	No alteration of natural flow
Impacts of grazing	
Field layer height	Height between 10 and 50cm*
Trampling/dung	Impact should not be abundant/dominant
Overall Structure & Functions Assessment	
All pass or one minor/borderline fail AND, if some indicators are Not Determined, the number of passes is at least five AND there is a pass for Positive Indicator Species	Green - Favourable
1 - 2 Fail	Amber - Unfavourable Inadequate
>2 Fail	Red – Unfavourable Bad

*Where vegetation is naturally bryophyte dominated, expert judgement may be used to pass a plot with lower vegetation height

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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 138T

Client: **Denyer Ecology**
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IRELAND

Certificate Code: **AR-25-M3-020597-01**
Page Number: **Page 1 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00021926	Received on	11/06/2025
		Analysis started on	11/06/2025
Your sample reference	KD01		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	11/06/2025
Time Sampled	10:15		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		12/06/25 10:17	EW175	30		353	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		26/06/25 10:08	EW175	30		431	m/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		12/06/25 10:17	EW175	0.01		0.0130	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		12/06/25 10:17	EW175	0.01		0.0140	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		13/06/25 15:33	EW188	1.08		151	mg/l	
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		12/06/25 10:17	EW175	5		25.2	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		11/06/25 19:59	EW152R	5		740	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		13/06/25 15:33	EW188	1.11		15.3	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		12/06/25 10:17	EW175	4.4		19.8	mg/l	C6
pH (Robotic Method) [M3051]								
pH		11/06/25 19:59	EW152R	4		7.2		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		12/06/25 10:17	EW175	0.03		<0.03	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		13/06/25 15:33	EW188	0.15		1.47	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		13/06/25 15:33	EW188	1.5		9.76	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		12/06/25 10:17	EW175	1		47.8	mg/l	C6

[4] **Accreditation Information**

C6: ISO/IEC 17025:2017 INAB 138-T

NOTES

Signed: 26/06/2025

Aoife De Barra - Organics & Instrumentation Team Lead CIE016

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Certificate Code: AR-25-M3-020597-01
Page Number: Page 2 of 2
PO reference:

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2. SPEC = Allowable limit or parametric value.
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4. ACCRED = Indicates accreditation for the test, a blank field indicates not accredited.
5. * indicates the test was sub-contracted, "D" indicates the analysis was performed in Dublin and "C" indicates the analysis performed in Cork.
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Signed: 26/06/2025
Aoife De Barra - Organics & Instrumentation Team Lead CIE016

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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 138T

Client: **Denyer Ecology**
11 Dargle View
Rathfarnham
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D16 XY51
IRELAND

Certificate Code: **AR-25-M3-020598-01**
Page Number: **Page 1 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00021927	Received on	11/06/2025
		Analysis started on	11/06/2025
Your sample reference	KD02		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	11/06/2025
Time Sampled	11:00		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		12/06/25 10:17	EW175	30		347	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		26/06/25 10:09	EW175	30		423	m/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		12/06/25 10:17	EW175	0.01		0.0500	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		12/06/25 10:17	EW175	0.01		0.0520	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		13/06/25 15:33	EW188	1.08		149	mg/l	
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		12/06/25 10:17	EW175	5		27.4	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		11/06/25 19:59	EW152R	5		758	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		13/06/25 15:33	EW188	1.11		15.8	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		12/06/25 10:17	EW175	4.4		6.42	mg/l	C6
pH (Robotic Method) [M3051]								
pH		11/06/25 19:59	EW152R	4		7.4		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		12/06/25 10:17	EW175	0.03		<0.03	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		13/06/25 15:33	EW188	0.15		1.54	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		13/06/25 15:33	EW188	1.5		10.3	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		12/06/25 10:17	EW175	1		66.8	mg/l	C6

[4] **Accreditation Information**

C6: ISO/IEC 17025:2017 INAB 138-T

NOTES

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Page Number: Page 2 of 2
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IRELAND

Certificate Code: **AR-25-M3-020599-01**
Page Number: **Page 1 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00021928	Received on	11/06/2025
		Analysis started on	11/06/2025
Your sample reference	KD03		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	11/06/2025
Time Sampled	11:45		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		12/06/25 10:17	EW175	30		351	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		26/06/25 10:10	EW175	30		428	m/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		12/06/25 10:17	EW175	0.01		0.727	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		12/06/25 10:17	EW175	0.01		0.770	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		13/06/25 15:33	EW188	1.08		146	mg/l	
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		12/06/25 10:17	EW175	5		29.6	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		11/06/25 19:59	EW152R	5		754	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		13/06/25 15:33	EW188	1.11		16.8	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		12/06/25 10:17	EW175	4.4		7.24	mg/l	C6
pH (Robotic Method) [M3051]								
pH		11/06/25 19:59	EW152R	4		7.2		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		12/06/25 10:17	EW175	0.03		0.384	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		13/06/25 15:33	EW188	0.15		1.71	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		13/06/25 15:33	EW188	1.5		12.1	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		12/06/25 10:17	EW175	1		60.0	mg/l	C6

[4] **Accreditation Information**

C6: ISO/IEC 17025:2017 INAB 138-T

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D16 XY51
IRELAND

Certificate Code: **AR-25-M3-035681-01**
Page Number: **Page 1 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00041173	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD02		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	10:44

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		21/10/25 13:06	EW175	30		345	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		03/11/25 16:31	EW175	30		421	mg/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		21/10/25 13:06	EW175	0.01		<0.01	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		21/10/25 13:06	EW175	0.01		<0.01	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		23/10/25 09:34	EW188	1.08		151	mg/l	C6
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		21/10/25 13:06	EW175	5		25.9	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		20/10/25 19:17	EW152R	5		753	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		23/10/25 09:34	EW188	1.11		15.9	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		21/10/25 13:06	EW175	4.4		<4.4	mg/l	C6
pH (Robotic Method) [M3051]								
pH		20/10/25 19:17	EW152R	4		7.6		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								

Signed: 03/11/2025

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Certificate Code: AR-25-M3-035681-01
Page Number: Page 2 of 2
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Certificate of Analysis

Sample number	966-2025-00041173	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD02		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	10:44

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		21/10/25 13:06	EW175	0.03		<0.03	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		23/10/25 09:34	EW188	0.15		1.84	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		23/10/25 09:34	EW188	1.5		10.1	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		21/10/25 13:06	EW175	1		71.6	mg/l	C6

[4] Accreditation Information

C6: ISO/IEC 17025:2017 INAB 138-T

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Client: Denyer Ecology
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IRELAND

Certificate Code: AR-25-M3-035682-01
Page Number: Page 1 of 2
PO reference:

Certificate of Analysis

Sample number	966-2025-00041174	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD03		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	11:00

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		21/10/25 13:06	EW175	30		343	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		03/11/25 16:31	EW175	30		418	mg/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		21/10/25 13:06	EW175	0.01		0.0100	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		21/10/25 13:06	EW175	0.01		0.0110	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		23/10/25 09:34	EW188	1.08		148	mg/l	C6
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		21/10/25 13:06	EW175	5		28.4	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		20/10/25 19:17	EW152R	5		751	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		23/10/25 09:34	EW188	1.11		16.8	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		21/10/25 13:06	EW175	4.4		5.91	mg/l	C6
pH (Robotic Method) [M3051]								
pH		20/10/25 19:17	EW152R	4		7.2		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								

Signed: 03/11/2025
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Certificate of Analysis

Sample number	966-2025-00041174	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD03		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	11:00

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		21/10/25 13:06	EW175	0.03		<0.03	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		23/10/25 09:34	EW188	0.15		1.76	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		23/10/25 09:34	EW188	1.5		11.9	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		21/10/25 13:06	EW175	1		65.3	mg/l	C6

[4] Accreditation Information

C6: ISO/IEC 17025:2017 INAB 138-T

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Certificate Code: **AR-25-M3-035812-01**
Page Number: **Page 1 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00041172	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD01		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	10:15

Test Code Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Alkalinity as CaCO3 [M30D3]								
Alkalinity as CAC03		21/10/25 13:06	EW175	30		353	mg/l	
Alkalinity Bicarbonate as HCO3 [M30F7]								
Alkalinity Bicarbonate as HCO3		03/11/25 16:31	EW175	30		431	mg/l	
Ammonia as NH3 (Calc) - Gallery [M3000]								
Ammonia as NH3 (Calc) - Gallery		21/10/25 13:06	EW175	0.01		0.0310	mg/l	C6
Ammonium as NH4 (calc) - Gallery [M300T]								
Ammonium as NH4 (calc) - Gallery		21/10/25 13:06	EW175	0.01		0.0330	mg/l	C6
Calcium - Dissolved [M3165]								
Calcium (Ca)		30/10/25 16:14	EW188	1.08		118	mg/l	C6
Chloride mg/L - Gallery [M300S]								
Chloride mg/L - Gallery		21/10/25 13:06	EW175	5		24.7	mg/l	C6
Conductivity at 20°C (Robotic Method) [M3052]								
Conductivity at 20°C		20/10/25 19:17	EW152R	5		754	µS/cm	C6
Magnesium - Dissolved [M3174]								
Magnesium (Mg)		30/10/25 16:14	EW188	1.11		16.3	mg/l	C6
Nitrate as NO3 (Calc) - Gallery [M300L]								
Nitrate as NO3 (Calc) - Gallery		21/10/25 13:06	EW175	4.4		17.8	mg/l	C6
pH (Robotic Method) [M3051]								
pH		20/10/25 19:17	EW152R	4		7.1		C6
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery [M300M]								

Signed: 04/11/2025

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Certificate Code: **AR-25-M3-035812-01**
Page Number: **Page 2 of 2**
PO reference:

Certificate of Analysis

Sample number	966-2025-00041172	Received on	20/10/2025
		Analysis started on	20/10/2025
Your sample reference	KD01		
Sample Matrix	Ground water		
Sample Date	20/10/2025	Time Sampled	10:15

Test Code Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Phosphate (Ortho/MRP) as PO4 (Calc) - Gallery		21/10/25 13:06	EW175	0.03		<0.03	mg/l	C6
Potassium - Dissolved [M3180]								
Potassium (K)		30/10/25 16:14	EW188	0.15		1.79	mg/l	C6
Sodium - Dissolved [M3184]								
Sodium (Na)		30/10/25 16:14	EW188	1.5		9.72	mg/l	C6
Sulphate mg/L - Gallery [M300N]								
Sulphate mg/L - Gallery		21/10/25 13:06	EW175	1		55.0	mg/l	C6

[4] Accreditation Information

C6: ISO/IEC 17025:2017 INAB 138-T

NOTES

1. This Report shall not be reproduced, except in full, without the permission of the Laboratory and only relates to the items tested.
2. SPEC = Allowable limit or parametric value.
3. LOQ = Limit of Quantification or lowest value that can be reported.
4. ACCRED = Indicates accreditation for the test, a blank field indicates not accredited.
5. * indicates the test was sub-contracted, "D" indicates the analysis was performed in Dublin and "C" indicates the analysis performed in Cork.
6. The sampling date was not communicated; this may impact the validity of the results unless provided.
7A. This test was conducted outside of recommended best practice holding time; this may impact the validity of the result while the accreditation status of the test result will stay unaffected.
7B. No time of sampling was supplied, a default time of 00:00:00 will be assumed for holding time calculations unless provided. This may impact the validity of the results.
7C. Your sample arrived at the laboratory already outside of the recommended best practice holding time.; this may impact the validity of the result while the accreditation status of the test result will stay unaffected.
7D. The sample was received close to the recommended best practice holding time; this may impact the validity of the result while the accreditation status of the test result will stay unaffected.
8. This notification is based on the numerical result for the test without consideration of the uncertainty of measurement of the result, unless otherwise agreed in writing. Uncertainty of measurement has been calculated for all INAB accredited tests and is available upon request.
9. Report is issued as per our standard T&C of sale.
10. $ = Retest result reported.

Signed: 04/11/2025

Aoife De Barra - Organics & Instrumentation Team Lead CIE016