Ecological Impact Assessment

Residential Development

Monacnapa, Blarney, Cork

Doherty Environmental Consultants Ltd.

3rd February 2022

Ecological Impact Assessment

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Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

For and on behalf of

Doherty Environmental Consultant (DEC) Ltd.

Prepared By: Pat Doherty

Signed: 

This report has been prepared by DEC Ltd. with all reasonable skill, care and diligence. Information report herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is prepared for Mr Eoin Sheehan and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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1.0 INTRODUCTION

Doherty Environmental Consultants (DEC) Ltd. has been commissioned by Mr Eoin Sheehan to undertake an ecological impact assessment for a proposed residential development (the project) at Monacnapa, Blarney, Cork.

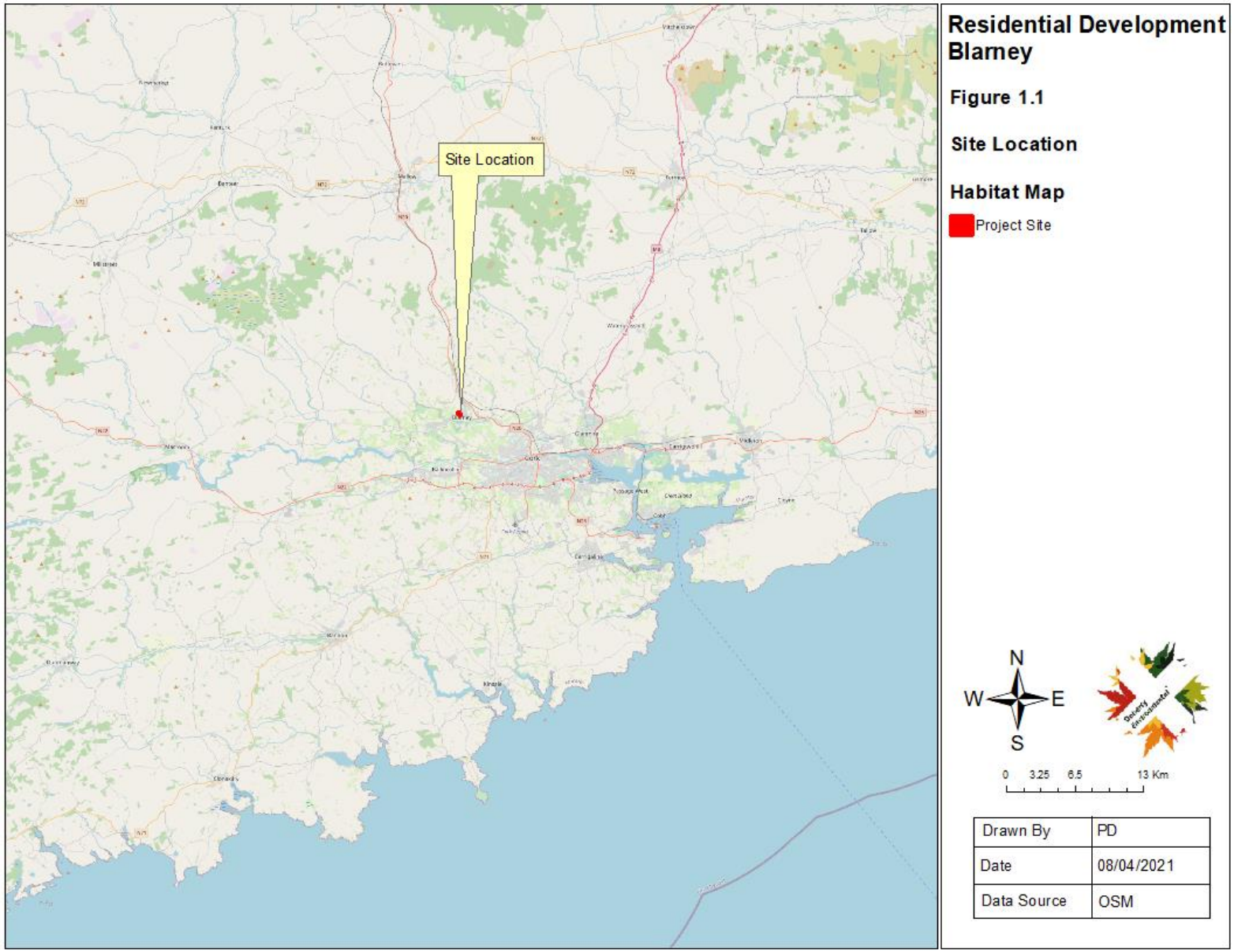
DEC understand that this work is to prepare an ecological assessment of the proposed development to allow the relevant information and findings to be incorporated into a planning application for the proposed scheme on the subject lands.

The proposed scheme location is presented in Figure 1.1 while a satellite image is provided as Figure 1.2.

1.1 PROJECT DESCRIPTION

1.2 OVERVIEW

The project will consist of a strategic housing development of 143no. residential units, comprising 105no. houses and 38no. apartments at the project site at Monacnapa, Blarney, Cork. The project will also consist of the demolition of an existing garage and southern boundary wall, to be replaced with a new southern boundary wall, as well as the lowering of the existing eastern boundary wall and pier, at no. 1 Sunberry Drive; a crèche; all associated ancillary site development and landscaping works, to include bin stores, bicycle and car parking, ground works and retaining structures, foul drainage, stormwater drainage, water supply, service ducting and cabling, public lighting, relocation of existing ESB substation, and all boundary treatments. The proposed development is to be accessed via the existing Sunberry Heights/Sunberry Drive off the Blarney Relief Road (R617). An upgrade is proposed to the existing Sunberry Heights/Sunberry Drive and the existing access to the proposed strategic housing development, including the widening of the footpath at the junction with the Blarney Relief Road (R617), raised platforms, security barriers and fencing as necessary, road markings, and road resurfacing to facilitate improved pedestrian/cycle connectivity.


Site Location
Residential Development
Blarney
Figure 1.1
Site Location
Habitat Map
Project Site
N
W
E
S
0 3.25 6.5 13 Km
Drawn By PD
Date 08/04/2021
Data Source OSM


Residential Development
Blarney
Figure 1.2
Aerial View of the
Project Site
Project Site
N
W
E
S
0 0.03 0.06 0.12 Km
Drawn By PD
Date 25/01/2022
Data Source Bing

1.3 CONSTRUCTION PHASE

The estimated duration of work will be 24 months in total. The construction compound for the project will be located towards the southwestern boundary such that there is sufficient separation between the compound and the dwellings on Sunberry Heights. The compound area will consist of a crushed stone working platform, utilities, offices, welfare facilities and stores.

The site will require temporary connections for water and a connection to the Foul Sewer on the nearby Estate Road. It may be decided to install the permanent connections on the Estate Road to minimise disruption on the Public Road during the initial site setup and mobilisation phase. It will also be necessary to provide temporary power to the Site which will include the installation of a temporary distribution board on site.

Following completion of the works; all construction materials will be removed from the compound, all temporary services decommissioned and disconnected and the area will be reinstated with finishes (e.g. topsoil) consistent with the landscaping features as identified in the project Landscape Masterplan.

Plant and machinery to be used during the construction phase will be typical construction machinery, including front-tip loaders, wheel loaders/load shovels, 360 degree excavators, off-road dump trucks, track machines, graders, telescopic handlers, compactors/rollers and backhoe loaders. Typical materials to be used during the construction phase will include concrete, concrete blocks, bricks, slate, plaster, sand, insulated cladding panels, steel members etc. Hydrocarbons, such as petrols, diesels, oils etc and other plant and machinery lubricants will be used onsite during the construction phase. Aside from these latter materials, no hazardous material will be used during the construction phase. All hydrocarbons and other aqueous construction material will be stored in bunded areas within the construction compound on site. All refuelling by plant and machinery will be undertaken in designated bunded areas within the construction compound during the construction phase.

Any excavations to be stored on site will be stored in a designated stockpile area located in the construction site compound or other suitable location on site for the storage of segregated wastes prior to their transport for recovery/disposal at suitably licensed/permitted facilities. . Topsoil will be stockpiled on site for reuse in soft landscaping and will be stored separately to subsoils. Stockpiles will be graded to a <1:4 profile The stockpile area will be located over

50m from any watercourse or drainage channels occurring within the site. Stockpiles will be covered with plastic sheeting during wet weather and a temporary berm will be constructed around the stockpile area to prevent runoff to watercourses or drainage channels. Excess inert spoil material, not to be reused on site, will be transported off site for deposition. All waste spoil material arising from the construction phase will be inert, non-hazardous spoil material and will be disposed at an approved facility.

Waste material arising on site during the construction phase will be managed in accordance with the waste management hierarchy detailed in the Construction Environmental Management Plan (CEMP) prepared for the project and provided under separate cover.

1.4 CONSTRUCTION PHASING

The proposed development will be constructed in four phases in accordance with the phasing strategy set out in the Architect's Design Statement that accompanies this planning application. Development will start from the south and east of the site and develop firstly towards the north and then anticlockwise to the northwest and southwest areas of the site.

1.4.1 Phase 1-Southeast Area of the Site

Phase 1 will comprise of the construction of 45no. dwelling houses varying from 2 storey height to 3 storey height. Phase 1 will also involve the construction of the childcare facility.

Site setup and site mobilisation will also be undertaken in Phase 1 which will involve the establishment of a contractor's compound, site offices, securing of the construction site, erection of signage for site security purposes, site clearance, and the putting in places of surface water management and waste management measures.

1.4.2 Phase 2 - Northeast Area of the Site

Phase 2 will comprise of the construction of 29No. dwelling houses, mainly 2 storey and split level houses as well as 4No. apartments split into two blocks (one up/one down typology).

1.4.3 Phase 3 - Northwest Area of the Site.

Phase 3 will comprise of the construction of 20No. dwelling houses, mainly 2 storey and split level houses as well as 4No. Apartments split into 2 blocks (one up/one down typology).

1.4.4 Phase 4 - Southwest Area of the Site

Phase 4 will comprise of the construction of 18No. dwelling houses varying from 2 storey height to 3 storey height. Phase 4 will also comprise of the construction of 2No. apartment blocks containing 15No. apartments in each block.

Within each phase of the development works, the provision of services and site infrastructure will be developed as required by each phase of development. This will involve the laying of new sewers and water mains within the site, the provision of footpaths, lighting and roadways. As part of any works (i.e. provision of services) along the public areas/roads in the vicinity of the site, it will be ensured that the surface of the roads/areas will be re-instated to a high standard.

The construction of the residential units will, to a certain degree respond to the demand/sale of the units involved, however, it is anticipated that the units will be constructed/completed over a 2 year period and will involve up to 90 no. construction staff (depending on the number of units being constructed at any one time).

1.5 SURFACE WATER MANAGEMENT

The surface water drainage system at the project site has been designed to take account of the following requirements:

- Surface water shall be collected in a series of stormwater drains that will be laid on the estate roads. The drains will collect stormwater arising from roofs and hard-standing areas within the individual properties and stormwater collected on the estate roads via the road gullies.

- The Surface water system shall include Attenuation designed for the 1/100 Year event. The Attenuation shall be provided for in three zones, constructed of Wavin Aquacell Plus Cells installed as per manufacturers' instructions in each zone.

- The principal point of discharge for surface water shall be to an existing stream/watercourse located to the west of the site (see Figure 1.3 for discharge point location). The existing stream/watercourse currently provides drainage from the project site. Discharge to the existing stream/watercourse shall be at a rate equal to the greenfield run-off rate to ensure no significant changes in flow in the existing stream/watercourse.

- The second point of discharge for surface water shall be to the existing surface water sewer on Sunberry Drive (see Figure 1.3 for location). This discharge point shall only be used to serve the most south-easterly area of the site which cannot be facilitated by the principal discharge due to levels. This discharge will serve circa 3.5% of the site and the discharge will be limited to the greenfield runoff rate.

1.5.1 Details of Existing Principal Stormwater Outfall at Western Boundary

A minor un-named stream/watercourse occurs to the southwest of the project site and this will be the principal point of discharge for treated surface water from the project site to this stream.

Discharge to this existing stream/watercourse shall be at a rate equal to the Greenfield Runoff Rate to ensure no significant changes in flow in the existing stream/watercourse. This unnamed stream flows into the River Martin. The River Martin is a tributary of the River Shournagh, which finally drains into the River Lee to the east of Ballincollig.

The unnamed stream/watercourse begins as an open land drain running in a north to south direction within the western boundary of the development site. At the southwest point of the development site, this open land drain joins with a similar land drain from the adjacent property to discharge into an existing unnamed stream/watercourse which descends through the wooded area towards the Kilowen Road and subsequently towards the R617 Regional Road. The watercourse crosses both roads via precast concrete culvert crossings.

A catchment runoff assessment of the potential impact of surface water discharge from the development site to the receiving un-named stream/watercourse was completed by Irish Hydrodata Ltd.[1] The modelling assessment demonstrates that the proposed development will give a 16% (19.2 litres/second) increase in the 1/100-year rainfall event. Irish Hydrodata Ltd. conclude that the post development flow of 142litres per second is well below the culvert capacities which are estimated to be circa 400litres/second. Therefore, there will be no negative impact on the existing watercourse and associated road crossings which are deemed to have sufficient capacity.

The project engineers (OLS Consulting Ltd.) undertook consultations with Cork County Council with respect to the stormwater outfall pathway. Cork County Council advised that there was uncertainty surrounding the discharge point of the culverted road crossing on the R617 Tower Road which forms part of the existing watercourse to which the proposed surface water discharge is to be made. Cork City Council sought clarity in this matter to ensure the existing watercourse was connected to the watercourse south of the Tower Road which ultimately discharges to the River Martin. The following actions were taken to demonstrate connectivity:

The culverted road crossing on the R617Tower Road was visually inspected by OLS Consulting Engineers on Tuesday 23rd November 2021. The crosssing comprised of a 600mm diameter concrete pipe which was clearly visible on the upstream side of the crossing.

The crossing was dye traced on the day of the inspection and the outlet was located south of the R617 Tower Road where it discharges to an open watercourse which runs

[1] The Irish Hydrodata Ltd. Catchment Runoff Assessment is provided under separate cover as Appendix 5 to the Engineering Services Report

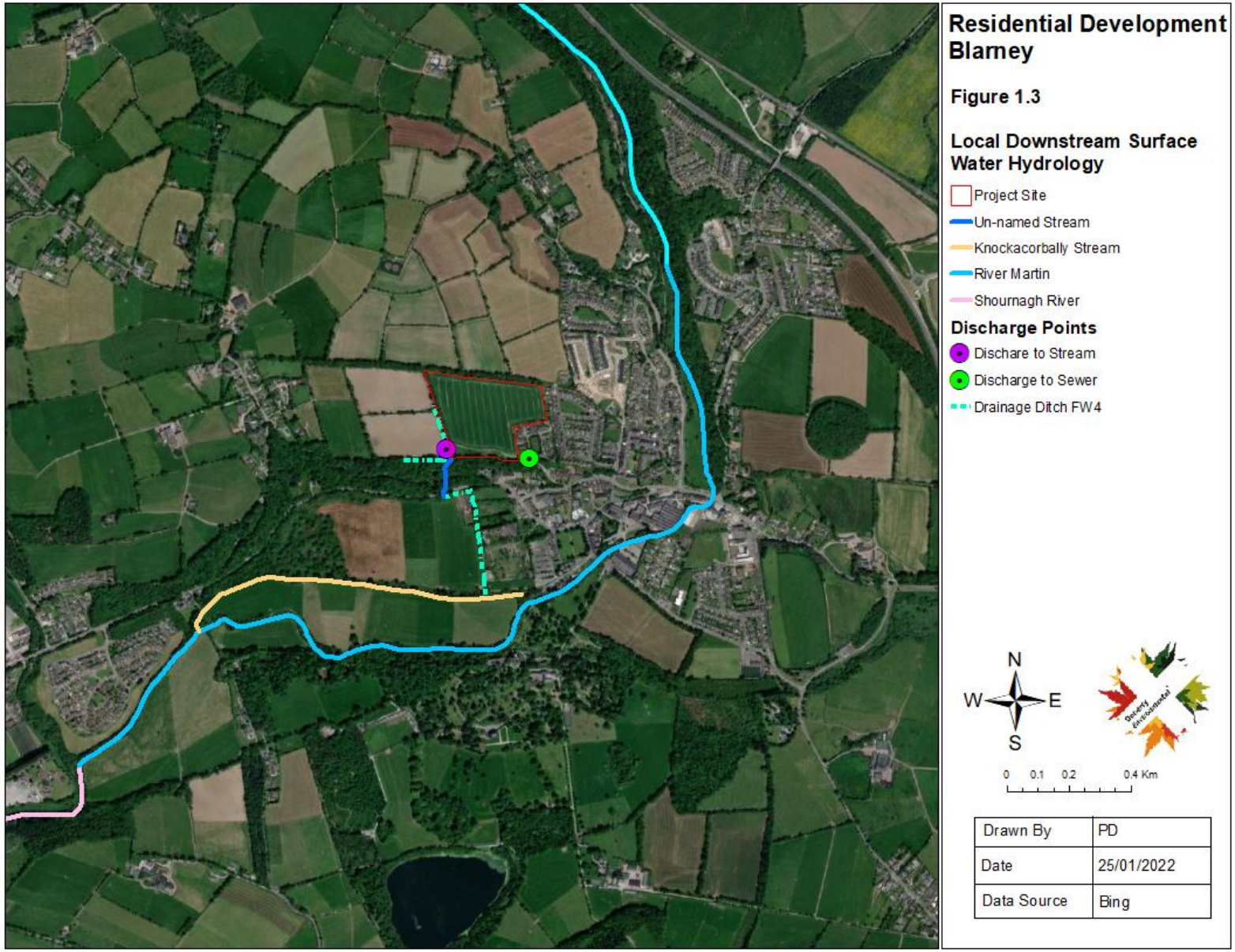
in a southerly direction from the R617 Tower Road. The 600mm diameter pipe was found to be heavily silted on the day of inspection and in need of cleaning.

The dye tracing confirmed that the open land drain which descends through the woodland crossing the Killowen Road initially and subsequently the R617 Tower Road does connect to the open watercourse to the south of the R617 Tower Road which ultimately discharges to the River Martin.

The matter of the condition of the culverted road crossing on the R617 Tower Road was subsequently discussed with Mr. Simon Lyons of the Water and Drainage Services Department of Cork City Council. It was agreed that that piped crossing will need to be cleaned and CCTV surveyed to ascertain the condition of the pipe. Cork City Council intend to undertake the cleaning and CCTV works in due course, however, Mr. Simon Lyons has indicated that the Planning Application may be lodged on the basis that connectivity has been demonstrated.

Following the undertaking of the CCTV works on the piped crossing and at the point where the condition of the piped crossing has been established, it has been agreed that should remedial works be required to ensure the piped crossing is fit for purpose, the applicant shall enter into an agreement with Cork City Council to pay a contribution towards any remedial works to the crossing proportionate to the quantity of surface water discharging through the piped crossing from the proposed development.

For the purposes of this application and predominantly from an environmental perspective, a "worst case" approach has been considered in respect of the necessary remedial works. From an environmental perspective, it has been assumed that the road crossing may have to be replaced in its entirety and all environmental assessment and reporting is based on this "worst case" scenario although it is not envisaged that such extensive remedial works will be required.


Residential Development Blarney
Figure 1.3
Local Downstream Surface Water Hydrology
Project Site
Un-named Stream
Knockacorbally Stream
River Martin
Shournagh River
Discharge Points
Dischare to Stream
Discharge to Sewer
Drainage Ditch FW4
N
W
E
S
0 0.1 0.2 0.4 Km
Drawn By PD
Date 25/01/2022
Data Source Bing

1.5.2 Surface Water Management on Upper Site Area (North of Net Developable Area)

The area of the development site north of the Net Developable Area shall be retained as existing Meadow. The site is sloping in a north to south direction towards the developable area of the site.

To prevent excess surface water entering the developable area, an open swale shall be constructed north of the net developable area/on the southern extremity of the existing meadow. The open swale shall facilitate infiltration and shall also be connected to the existing open land drain located on the western boundary of the development site.

1.5.3 "Worst Case" Remedial Works to the R617 Tower Road Crossing

The culverted road crossing on the R617 Tower Road was inspected on the 23rd November 2021 where it was found to be heavily silted at the outfall of the culvert on the southern side of the R617 Tower Road.

The crossing will need to be fully cleaned and CCTV surveyed to ascertain the condition of the crossing which comprises of a 600mm diameter precast concrete pipe. There is an element of screening installed on the upstream side of the culvert to prevent large debris entering the pipe but this needs to be cleaned and maintained.

As outlined in the previous section a "worst case" approach has been considered in respect to the required remedial works for this crossing in the absence of information on the condition of the precast pipe. In this regard and for the purposes of comprehensive environmental assessment, it is assumed that the entire precast pipe crossing may need to be replaced. The following is an outline scope of the works required to replace the crossing in its entirety:

- Implement Traffic Management appropriate to the task and scope of the works in hand - this may necessitate a temporary road closure depending on how the contractor plans to undertake the works.
- Retain the existing culvert in operation for the duration of the laying of the new culvert crossing to prevent unnecessary contamination of surface water.

- Saw cut existing road surfacing, excavate trenching for new precast pipe and dispose of all waste materials to appropriate licensed facilities by licensed contractors.
- Lay new 600mm Precast Pipe Crossing, backfill with suitable fill material.
- Install new head wall at pipe outfall location.
- Divert surface water flow to new culvert and make good to inlet screen upstream of culvert.
- Decommission/remove old pipework.
- Backfill/reinstate road crossing in preparation for laying road surfacing.
- Lay road surfacing to match existing, seal all joints.
- Reinstate public footpath, hedgerows and existing boundaries .
- Reinstate road markings and signage where affected.
- Stand down traffic management procedures.

1.5.4 Stormwater Attenuation Design

The management of surface water on the site has been considered in the context of the CIRIA SuDS Manual 2015. In this regard, it is proposed to attenuate surface water generated on the site in a series of 3 attenuation zones designed in accordance with the guidelines set out in Chapter 21 of the SuDS Manual 2015.

Attenuation of surface water on site is considered to be the most effective means of controlling and managing surface water discharge from this site to ensure that surface water arising within the site is discharged at a controlled rate equal to the Greenfield Runoff Rate for the Site.

1.5.4.1 Design Flood Event

The attenuation volume for all zones is calculated on the basis of a 1 in 100 year return period and the outflow from each zone shall be equal to the greenfield run-off rate calculated for each zone.

Detailed attenuations calculations for the 1 in 100 Year Event are contained in the Engineers Report provided for the project under separate cover. The greenfield runoff rates, required and proposed attenuation volumes are summarised in Table 2.1 below.

1.5.4.2 Siting of Attenuation Chambers

All attenuation chambers will be sited in green areas/soft landscaped areas within the site and at least 15m from any dwelling on the site.

Table 1.1: Attenuation Volume Summary

Zone	Storage Volume Required (m^3)	Storage Volume Provided (m^3)*
Zone 1	738.43	760.00 20m x 20m x 2m Zone 4,000 Aquacell Plus Units laid in 5 Layers 800 Units/Layer
Zone 2	533.61	570.00 30m x 10m x 12m Zone 3,000 Aquacell Plus Units laid in 5 Layers 600 Units/Layer
Zone 3	47.35	57.00 7.5m x 5m x 1.6m Zone 600 Aquacell Plus Units laid in Layers

		150 Units/Layer
***Note Volume Provided is calculated on 95% Void Ratio for Aquacell Plus Units which have a volume of 0.19m^3/Unit**		

1.5.4.3 Attenuation Storage Proposal

It is proposed to install a Wavin Aquacell Underground Attenuation System on site. The system shall comprise of 3 no. Attenuation Zones distributed throughout the site.

The Aquacell Plus Cells are wrapped in a fully sealed & welded geomembrane and an outer protective layer to prevent damage to the geomembrane. This will give a fully sealed installation with no potential for groundwater infiltration.

The units shall be installed as per manufacturers' instructions. The outline method of construction as prescribed by the manufacturer is a s follows:-

a) Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the Aquacell units.

b) Lay 100mm bed of coarse sand, level and compact.

c) Lay the geotextile over the base and up the sides of the trench.

d) Lay the geomembrane on top of the geotextile over the base and up the sides of the trench.

e) Lay the Aquacell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a 'brick bonded' formation (i.e. to overlap the joints).

f) Wrap the geomembrane around the Aquacell structure and seal to manufacturers recommendations.

g) If side connections into the Aquacell units is required, (other than the preformed socket), use the appropriate Flange Adaptor (6LB104 or 6LB106). Fix the flange adaptor to the unit using self-tapping screws. Drill a hole through the Flange Adaptor and connect the pipework. (6LB106 should not be used with Aquacell Eco).

h) In order to prevent silt from entering the tank, clogging inlet pipework and reducing storage capacity, it is recommended that the Domestic Silt Trap (6LB300) or the standard Silt Trap (6LB600) is installed prior to the inlet pipework.

i) Wrap and overlap the geotextile covering the entire AquaCell structure, to protect the geomembrane.

j) Lay 100mm of coarse sand between the trench walls and the AquaCell units and compact.

k) Lay 100mm bed of coarse sand over the geotextile and compact. Backfill with suitable material.

The outfall manhole from each attenuation zone shall be fitted with a Vortex Flow Control Valve to limit the flow to the outfall discharge points to the Greenfield Runoff Rate.

The outfall discharge works by gravity as follows:

- The Outfall Manhole which shall be constructed with a weir fills with water and continues to discharge normally for flows up the greenfield runoff rate.
- As flows increases, the outfall manhole fills with water up to the top of the weir wall.
- Water overflows the weir wall and enters the Aquacell Storage Chamber.
- The Aquacell Chamber fills with water for the duration of the rainfall event.
- After the rainfall event; water flows back out of the Aquacell storage chamber, finding its own level and through the non-return flap valve fitted at the bottom of the weir wall.
- The water discharges from the outfall manhole via the vortex flow control valve so that flow from the attenuation zones at all times is limited to the greenfield run-off rate.

1.5.5 Oil & Silt Interception

A Hydrocarbon Interceptor shall be installed prior to each attenuation zone. The units to be installed shall be Kingspan Environmental Class 1 Bypass Separator which shall suitably sized to treat surface waters generated in each attenuation zone.

All Attenuation Zones will be preceded by a Wavin Silt Trap (6LB600) to prevent excessive silt build up in the Aquacell Chambers.

1.6 WASTEWATER MANAGEMENT

It is proposed to discharge foul effluent arising within the development to the Public Foul Sewer located on Sunberry Drive, which is located to the southeast extremity of the site.

There has been consultation with Irish Water in this matter through the submission of a Pre-Connection Enquiry for the development which was submitted on the 25th January 2021. Irish Water subsequently issued Confirmation Feasibility on the 24th March 2021 confirming the proposed connection to the Irish Water Network could be facilitated.

Irish Water further advised in their confirmation of Feasibility Letter that it is likely that an upgrade of the foul sewer in Sunberry Drive will be necessary to facilitate the development and have advised that should the works proceed. Irish Water may seek a contribution towards the upgrade of the network. Irish Water advise the detail surrounding any such upgrades and possible contributions can be agreed as part of the putting in place of a valid connection agreement.

All houses on the site are served by 160/225mm diameter gravity foul sewers which collect foul effluent from each dwelling connection on the site. The new sewer shall be connected to the existing foul sewer network on Sunberry Drive.

The Foul Sewerage System shall be designed and installed in accordance with the guidance contained in the " Code of Practice for Wastewater Infrastructure" published by Irish Water in July, 2020 (Rev. 2).

The following key guidance criteria has been established from the above publication:

- The sewers have been designed on the basis of 6 times Dry Weather Flow (6DWF). Dry weather flow (DWF) is taken as 400 litres per dwelling (2.7 persons per house and a per capita wastewater flow of 150 litres per head per day with provision for a 10% consumption allowance).
- All sewers have been designed with gradients that ensure self-cleansing velocities are achieved. This is based on a minimum flow velocity of 0.75m/second at one third design flow or during average flow conditions (2 times DWF).

In addition to satisfying the criterion on self-cleansing velocity the following conditions shall also be satisfied:

- 150mm nominal internal diameter gravity sewer shall be laid at gradients not flatter than 1:150 where there is at least ten dwelling units connected;
- 225mm nominal internal diameter gravity sewer shall be laid at gradients not flatter than 1:225 where there is at least twenty dwelling units connected;
- A service connection with a nominal internal diameter of 100mm laid to a gradient not flatter than 1:80, where there is at least one WC connected and 1:40 if there is no WC connected.

On the basis of the guidance above, sewer connections from individual houses shall be 100mm diameter pipes laid at a minimum gradient of 1 in 60.

A Statement of Design Acceptance has also been issued by Irish Water on 16th September, 2021 in respect of the proposed wastewater services for the site.

All wastewater will be conveyed from the project site, via the Irish Water sewerage system to the Blarney/Tower wastewater treatment plant (WWTP). Following treatment effluent will be discharged from the WWTP to the River Shournagh, which is a tributary of the River Lee.

The latest available Annual Environmental Report (AER) for the Blarney Agglomeration published on the EPA website is for 2019 (published August, 2020). The 2019 AER reported an exceedance in the emissions limit values (ELVs) for orthophosphate and total phosphorous as a result of low influent flows and inadequately adjusted chemical dosing, however the discharges from the wastewater treatment plant were found not to have an observable impact on water quality of the River Shournagh, which is the receiving watercourse for effluent from the WWTP.

The results of the AER monitoring show that effluent from the WWTP does not negatively impact the River Shournagh and given this result and the adequate capacity available at the WWTP to treat additional loads generated by the project site, all wastewater generated by the project will be adequately treated prior to discharge to the River Shournagh and the Lee catchment such that it will not have the potential to perturb the water quality of the River Shournagh and Lee catchment.

1.7 WATER SUPPLY

There has been consultation with Irish Water in this matter through the submission of a Pre-Connection Enquiry for the development which was submitted on the 25th January 2021. Irish Water subsequently issued Confirmation of Feasibility on the 24th March 2021 confirming the proposed connection to the Irish Water Network could be facilitated.

Irish Water advised in their Confirmation of Feasibility that the preferred connection point for water is the 150mm water main running through the northeast of the site.

The proposed development will be served by a network of 150mm diameter watermain laid out as shown on the accompanying drawings to the Engineering Services Report (provided under separate cover).

Fire Hydrants will be provided such that each house will be within 46m of a Hydrant and these hydrants will be provided so as to be fully accessible to the fire service.

Sluice valves will be installed on all principal water main connections to ensure sections of the development or areas of the development can be isolated for maintenance and repair as required.

A Statement of Design Acceptance has also been issued by Irish Water on 16th September, 2021 in respect of the proposed wastewater services for the site.

1.8 LIGHTING

Outdoor public street lighting will be provided during the operation of the development along the estate public roads.

The entire proposed development will consist of low rise residential buildings, no more than 3-storeys in height and will not involve any tall or brightly illuminated structures. The principal source of night-time lighting associated with the project will be public lighting along the housing estate roads. The proposed development will aim to control the levels of light emitted by all public lighting associated with the development by implementing best practice approaches that aim to minimise light pollution. These measures are as follows:

- All external lighting will be designed to avoid night sky pollution/upward light spill;
- All lighting will be shielded and pointed so that is shines downward onto the ground, minimising the levels of sky glow and glare;
- The minimum amount of light will be used to allow adequate ground level illumination;
- No street lighting will be directed towards the existing hedgerow and treeline bounding the north of the project site and the woodland bounding the south of the project site. These habitat features will be located outside the 1 lux contour of the proposed lighting regime as detailing in the Outdoor Lighting Report prepared for the project.
- Street lighting has also been designed to ensure that new woodland landscape planting to be provided to the north of the developable area will also be located outside the lux contour associated with the outdoor lighting design. This will ensure that this area of proposed woodland habitat will no be subject to elevated lighting and will be optimised to function as habitat for wildlife.

1.9 LANDSCAPING

It is proposed to retain all vegetation associated with the existing woodland habitats bounding the project site to the north, south and west. The project includes a significant programme for tree planting (which is shown on the Landscape Masterplan drawings, presented under separate cover as part of the project planning application documentation). The landscaping design proposes to plant additional specimen and small/medium woodland trees along the northern boundary of the proposed project layout. The specimen woodland trees and small/medium woodland trees will include native species such as *Quercus petraea, Betula pendula, Corylus avellana, Alnus glutinosa, Sorbus acuparia* and *Pinus sylvestris*. The enhancement tree planting will augment the extent of woodland habitat occurring within the footprint of the project site.

The upper part of the site is excluded from development and the long-term planting strategy will provide green infrastructure in keeping with existing field boundary trees to provide a natural backdrop to the development and contribute towards integration of the new houses in the local landscape setting.

Landscape planting will also be provided along the southern boundary to the south of Apartment Block 1 and 2. This planting will consist of a line of tall growing Koster columnar

oaks that will provide screening of the apartment blocks and also provide for a corridor between the oak treeline and the woodland to the south.

2.0 LEGISLATION

Flora and fauna in Ireland is protected at a national level by the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000 and the Flora (Protection) Order, 1999 (SI 94/1999). They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC).

The transposition of the EU Habitats Directive by the European Communities (Natural Habitats) Regulations 1997 – 2011 (referred to as the Habitat Regulations) provides the legal basis for the protection of habitats and species of European importance in Ireland.

The legislative protection of habitats and species provided by the Habitats Directive has been implemented in Ireland and throughout Europe through the establishment of a network of designated conservation areas known as the Natura 2000 (N2K) network (with individual sites being referred to as Natura 2000 Sites). The N2K network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) designated under the EU Birds Directive. SACs are designated in areas that support habitats listed on Annex I and/or species listed on Annex II of the Habitats Directive. SPAs are designated in areas that support: 1% or more of the all-Ireland population of bird species listed on Annex I of the EU Birds Directive; 1% or more of the population of a migratory species; and more than 20,000 waterfowl. Under the National Habitat Regulations all designated Natura 2000 Sites are referred to as European Sites.

The Wildlife Act 1976 (as amended) also provides for the statutory designation of nature conservation areas. These areas are referred to under the Wildlife Acts as Natural Heritage Areas and are designated in areas that support habitats and/or species of national importance. Other relevant national legislation concerning the protection of flora, fauna and fisheries include the:

- Planning Act 2010;
- European Communities (Quality of Salmonid Waters) Regulations, 1988;

- The Freshwater Fish Directive 1978 (78/659/EEC); and
- The Surface Water Regulations, 2009.

3.0 METHODS

3.1 EXTENDED PHASE 1 HABITAT SURVEY

Ecological surveys were completed at the project site in 2018, 2020 and 2021. An extended Phase 1 Habitat Survey was undertaken by DEC Ltd. on the 10th March 2018 and 19th June 2018. A site survey was completed on the 9th September 2020 to confirm the whether the findings of the 2018 surveys were still consistent with the land cover and habitats supported by the project site. A further ground-truthing habitat survey was completed on the 11th May and 30th August 2021. The methodology used during this survey was based on the Heritage Councils *Best Practice Guidance for Habitat Survey and Mapping* (2010). The classification of habitats recorded during the field survey is based on the Heritage Council's *A Guide to Habitats in Ireland*.

The *Guide to Habitats in Ireland* classifies habitats according to a hierarchical framework with Level 1 habitats representing broad habitat groups, Level 2 representing habitat sub-groups and Level 3 representing individual habitat types. The Phase I Field Survey focused on identifying habitats to Level 3 of the *Guide to Habitats in Ireland*.

The annotation of vegetation occurring within sites was undertaken using the DAFOR scale. This scale refers to plant species in terms of dominance, abundance, frequency, occasional and rare (DAFOR). Plant nomenclature in this report follows Webb (1996) for vascular plants and Smith (2004) for mosses.

A survey for field signs indicating the presence of badgers or other protected non-volant mammal species such as Irish stoat and red squirrel was undertaken during the field surveys in the spring and summer of 2018; September 2020 and on the 7th September 2021. This survey was undertaken during the daytime and particular attention was given to habitat features normally associated with badgers. Any mammal field signs typical of badger activity were

recorded during the surveys. These field signs, as described in Neal & Cheeseman (2) and Bang & Dahlstrom (3), include:

- mammal breeding and resting places, such as setts, lairs;
- pathways;
- prints;
- spraints and faecal deposits;
- latrines (and dung pits used as territorial markers);
- prey remains and feeding signs (snuffle holes);
- hair; and
- scratch marks.

All bird species seen using the site (as opposed to simply flying over it) were recorded.

3.2 BAT SURVEYS

3.2.1 Assessment of Trees for Potential Bat Roosts

An assessment of mature trees occurring within and bounding the project site for their potential to function as bat tree roosts was completed. This assessment followed established Bat Conservation Trust (BCT) guidance and sought to identify features of trees commonly used by bats for roosting and shelter. Such features include natural holes, cracks in major limbs, loose bark, hollows/cavities and dense ivy cover. Where such features were identified they were inspected for field signs indicating the presence of bats. These field signs include scratches and

(2) Neal, E., & Cheeseman, C., (1996). 'Badgers'. Poyser Natural History, London.

(3) Bang, P., & Dahlstrom, P., 'Animal Tracks and Signs'. Oxford University Press, Oxford.

staining at entry points, the presence of bat droppings and the smoothing of surfaces around cavities.

Following the completion of this assessment each tree was graded according to the BCT tree roost grading system which includes five categories as follows:

- Known or confirmed tree roost;
- Category 1* tree roost which supports multiple features capable of supporting large roosts;
- Category 1 tree roost with definite bat potential but supports fewer features than Category 1*;
- Category 2 tree roosts although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats; and
- Category 3 tree roosts which are trees with no potential to support bats.

3.2.2 Bat Activity Surveys

A targeted bat survey was completed to establish levels of bat activity along woodland habitats bounding the project site.

Three automatic SM4 static bat detectors were left in-situ along the northern, western and southern boundary of the project site to record bat activity on a nightly basis for 6 nights from the 19 June to the 24 June 2018. Additional bat surveys were completed at the project site during the 2021 bat activity season. SM4 static bat detectors were left in-situ along the western and southern boundary of the project site to record bat activity on a nightly basis for 8 consecutive nights from the 30th August 2021 to the 7th September 2021.

All bat calls recorded during the automatic monitoring sessions were analysed using Kaleidoscope Pro software (V4.3.0). The bat call classifiers for British Bats provided by Kaleidoscope Pro were used to identify the species responsible for generating the bat call. These classifiers assign calls to species based on call characteristics, with the peak frequency of the calls being particularly important in distinguishing between species with similar call characteristics (i.e. Pipistrelle species). Kaleidoscope Pro automatically identified calls recorded during the monitoring sessions to Serotine, Noctule and Nathusius Pipistrelle bats.

Serotine and Noctule are not known to occur in the West of Ireland and the project site is located outside their known distribution range. Nathusius Pipistrelle has been rarely recorded in south Galway and analysis by Lundy et al. (2011) suggests a low probability of this species occurring in this part of Ireland. As such all automatically identified Serotine and Noctule calls were manually analysed using Analook W and following this analysis all of these calls were assigned to Leisler's Bats. All automatically idenitifed Nathusius Pipistrelle calls were also manually analysed using Analook W. It is noted that the automatic detector monitoring point were positioned in uncluttered habitat. As such any automatically idenitifed Nathusius Pipistrelle call that showed a peak frequency at 40kHz or above were reassigned to Common Pipistrelle. This approach, which is in line with the recommendations outlined in Russ (2012), resulted in all automatically identified Nathusius Pipistrelle calls being reassigned as Common Pipistrelle calls.

3.3 ECOLOGICAL EVALUATION

Commentary on the ecological value of habitats is provided in Section 4 of this report.

The nature conservation value of habitats and ecological sites occurring within the proposed site are based upon an established geographic hierarchy of importance as outlined by the National Roads Authorities (NRA, 2009). The outline of this geographic hierarchy is provided below and this has been used to determine ecological value in line with the ecological valuation examples provided by the NRA (see NRA, 2009). The geographic evaluation hierarchy is as follows:

- International Sites (Rating A);
- National Importance (Rating B);
- County Importance (Rating C);
- Local Importance (higher value) (Rating D); and
- Local Importance (lower value) (Rating E)

3.4 IMPACT ASSESSMENT

3.4.1 Impact Magnitude

Impact magnitude refers to changes in the extent and integrity of an ecological receptor. The IEEM (2006) defines integrity of designated conservation areas as "the coherence of the ecological structure and function across the area that enables it to sustain the complex of habitat and/or the levels of populations of the species for which it was classified". For non-designated sites this can be amended to: "the coherence of ecological structure and function, that enables it (the site or population's supported by the site) to be maintained in its present condition'. For the purposes of this assessment the impact magnitude is influenced by the intensity, duration, frequency and reversibility of a potential impact and is categorised as follows:

High magnitude impact: that which results in harmful effects to the conservation status of a site, habitat or species and is likely to threaten the long-term integrity of the system.

Moderate magnitude impact: that which results in harmful effects to the conservation status of a site, habitat or species, but does not have an adverse impact on the integrity of the system.

Low magnitude impact: that which has a noticeable effect but is either sufficiently small or of short duration to cause no harm to the conservation status of the site, habitat or species.

Imperceptible: that which has no perceptible impact.

Positive: that which has a net positive impact for the conservation status of a site, habitat or species.

3.4.2 Impact Significance

The significance of impacts is determined by evaluating the nature conservation value of the site, habitat or species concerned together with the magnitude of the impacts affecting the system. The more ecologically valuable a receptor and the greater the magnitude of the impact, the higher the significance of that impact is likely to be. Table 3.1 outlines the levels of impact significance to be used during the assessment of impacts. The probability of an impact occurring will also be outlined when defining the significance of impacts.

Table 3.1: Impact Assessment Matrix

Nature Conservation Value	**Magnitude of Potential Impact**			
	High	**Moderate**	**Low**	**Imperceptible**
International	Severe	Major	Moderate	Minor
National	Severe	Major	Moderate	Minor
County	Major	Moderate	Minor	Minor
Local	Moderate	Minor	Minor	Negligible
Low	Minor	Negligible	Negligible	Negligible

4.0 RESULTS

4.1 SITE OVERVIEW

The project site comprises an area of approximately 7.7 ha. The site is accessed from Sunberry Drive to the east of the project site. The site is bounded to the south by woodland, to the west by a hedgerow and treeline field boundary; to the north by a hedgerow and treeline field boundary along the dismantled Western Railway corridor; and to the east by the rear boundaries of existing residential housing within the Sunberry estate.

A review of the Geological Survey of Ireland (GSI) database information identified the Gyleen Formation to be the dominant bedrock formation underlying the project site. This formation consists of sandstone with mudstones and siltstones. The more steeply sloping ground at the south of the site and under the woodland bounding the site to the south is underlain by the Cuskinny Member which is comprised of flaser-bedded sandstones and mudstones.

The project site is located within the River Lee catchment and the River Shournagh sub-catchment. There is an existing stream/watercourse located within the western boundary of the site. This existing stream/watercourse currently provides drainage from the project site. At the southwest point of the project site, this open land drain joins with a similar land drain from the adjacent property to discharge into an existing watercourse which descends through the wooded area towards the R617 which is crosses to an existing stream and eventually drains to the Shournagh River, which is tributary of the River Lee.

4.2 DESKTOP ANALYSIS

4.2.1 Designated Conservation Areas

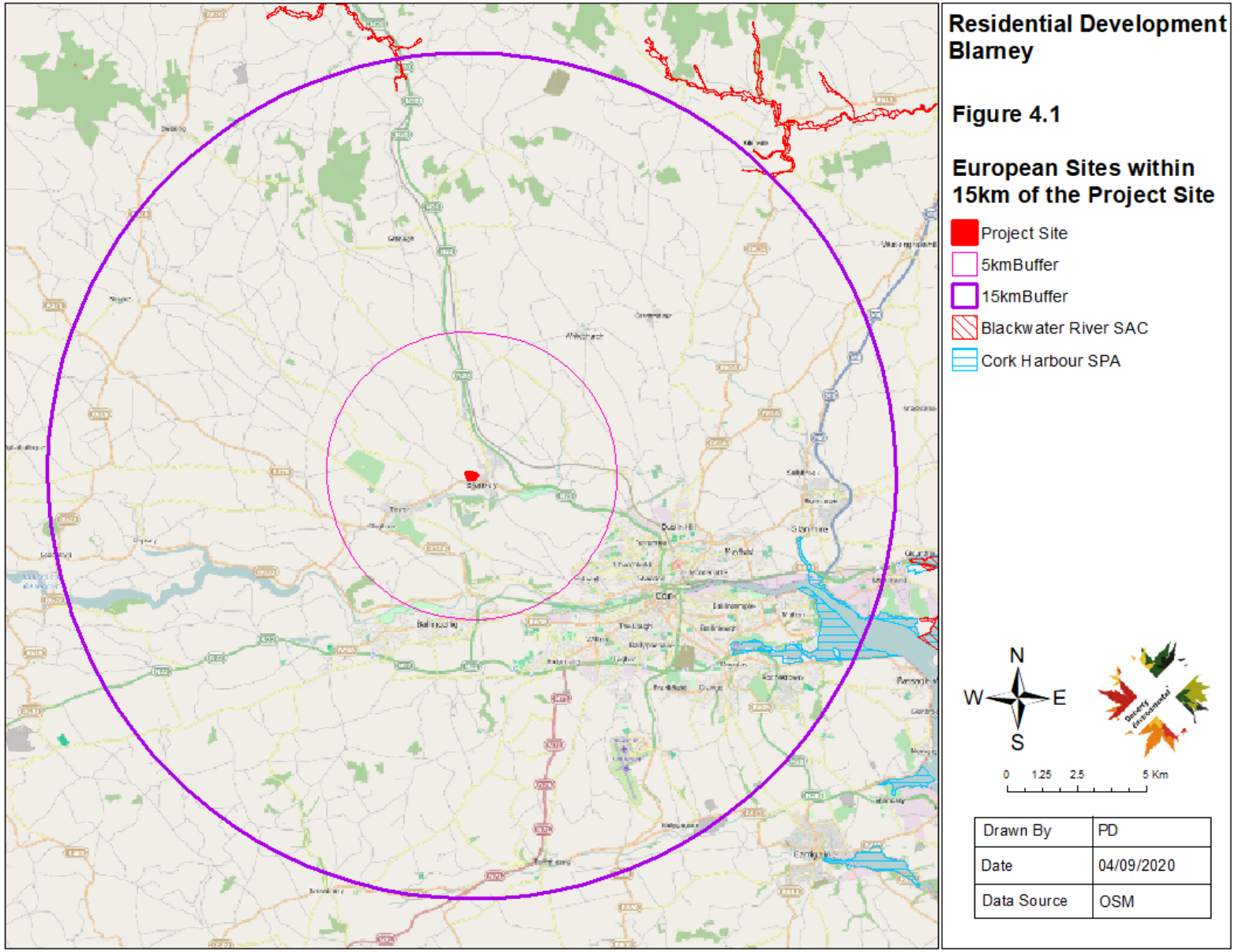
The project site is not located within or immediately adjacent to any designated conservation areas. Two European Sites, the Cork Harbour SPA and the River Blackwater SAC occur within the wider 15km radius surrounding the project site. The location of these European Sites with respect to the project site is shown on Figure 4.1.

No Natural Heritage Areas (NHAs) occur within a 15km radius of the project site.

Eleven proposed NHAs (pNHAs) occur within a 15km radius of the project site. These sites are shown in Figure 4.2 and are listed in Table 4.1 below.

The Shournagh Valley pNHA and the Lee Valley pNHA are the only pNHAs occurring downstream of the project site. The nearest point of the Shournagh Valley pNHA to the project site is approximately 4.5km downstream. This pNHA is divided into three distinct sections, the Cloghphhilip section, upstream of the project site, the Codatranavally section, located approximately 4.5km downstream of the project site and the Collymurraghne estate section located approximately 7km downstream. The two sections of the pNHA have been proposed for NHA designated for the presence of terrestrial broadleaved woodland. This woodland is located on the valley slopes above the Shournagh River.

The River Lee Valley pNHA is located over 10km downstream. This Lee Valley is proposed as an NHA for wet woodland, broadleaved woodland and fringing river bankside habitats.


Residential Development Blarney
Figure 4.1
European Sites within 15km of the Project Site
Project Site
5kmBuffer
15kmBuffer
Blackwater River SAC
Cork Harbour SPA
N
W
E
S
0 1.25 2.5 5 Km
Drawn By PD
Date 04/09/2020
Data Source OSM

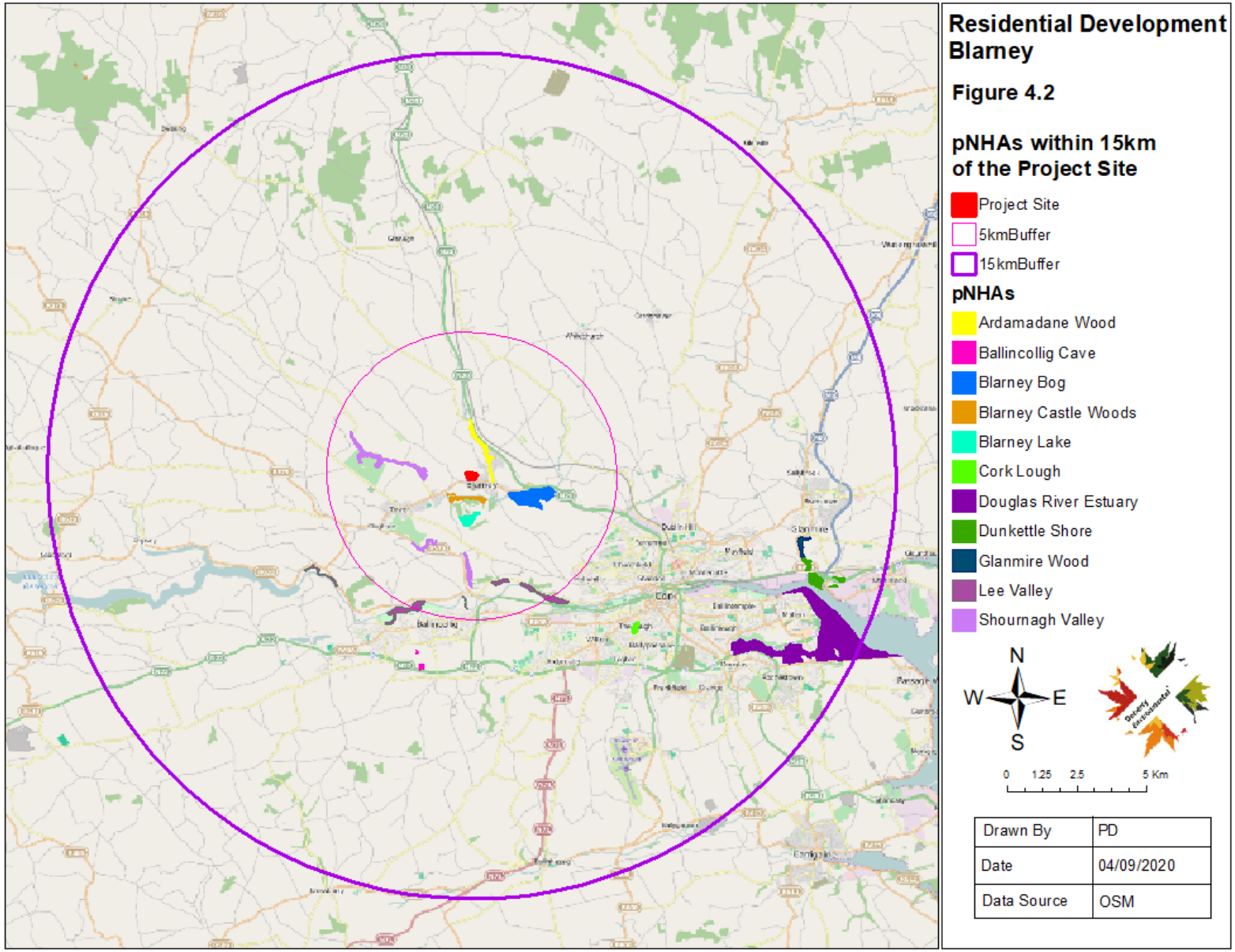

Residential Development Blarney
Figure 4.2
pNHAs within 15km of the Project Site
Project Site
5kmBuffer
15kmBuffer
pNHAs
Ardamadane Wood
Ballincollig Cave
Blarney Bog
Blarney Castle Woods
Blarney Lake
Cork Lough
Douglas River Estuary
Dunkettle Shore
Glanmire Wood
Lee Valley
Shournagh Valley
N
W
E
S
0 1.25 2.5 5 Km
Drawn By PD
Date 04/09/2020
Data Source OSM

Table 4.1: pNHAs within 15km of the Project Site

Site Code	Site Name	Distance (as the crow flies)
94	Lee Valley	3.7km to the south
103	Shournagh Valley	1.3km to the west
1039	Blarney Castle Woods	0.6km to the south
1046	Douglas River Estuary	11km to the southeast
1054	Glanmire Wood	11.7km to the east
1081	Cork Lough	7.9km to the southeast
1082	Dunkettle Shore	12km to the east
1249	Ballincollig Cave	6.8km to the south
1798	Blarney Lake	1.2km to the south
1799	Ardamadane Wood	0.5km to the east
1857	Blarney Bog	1.3km to the east

4.2.2 Protected Species Records

A search of the National Biodiversity Data Centre (NBDC) for records of rare and/or threatened species previously identified in the vicinity of the project site was completed in October 2021. Information for the two tetrads W67D and W67C, in which the project site is located, was downloaded.

The protected species identified as occurring within these two tetrads are listed in Table 4.2 below and a comment on the project site's potential to support these species is also provided.

Table 4.2: Protected Species recorded in the Two Tetrads W67C and W67D adjacent to the Project Site

Species name	Date of last record	Designation	Occurrence in Project Site
Common Frog (Rana temporaria)	03/03/1997	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts	Not likely, limited suitable habitat.
Barn 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	Foraging over the project site.

Black-headed Gull (Larus ridibundus)	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	Do not rely on the project site.
Common Coot (Fulica atra)	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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat
Common Goldeneye (Bucephala clangula)	31/12/2001	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 – Amber List	No suitable habitat
Common Kestrel (Falco tinnunculus)	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	Forage over boundary habitats.
Common Kingfisher (Alcedo atthis)	31/07/1991	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	No suitable habitat
Common Linnet (Carduelis cannabina)	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	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
Common Pheasant (Phasianus colchicus)	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	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.

Common Pochard (Aythya ferina)	31/12/2001	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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat
Common Snipe (Gallinago gallinago)	31/12/2001	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 – Amber List	No suitable habitat
Common Starling (Sturnus vulgaris)	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	Suitable habitat in woodland habitat to the south, west and north of the project site.
Common Swift (Apus apus)	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	Suitable foraging habitat in woodland habitat to the south, west and north of the project site.
Common Wood Pigeon (Columba palumbus)	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	Suitable habitat in woodland habitat to the south, west and north of the project site.
Eurasian Teal (Anas crecca)	31/12/2001	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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat

Eurasian Wigeon (Anas penelope)	31/12/2001	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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat
European Golden Plover (Pluvialis apricaria)	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II 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	No suitable habitat
Gadwall (Anas strepera)	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat
Great Cormorant (Phalacrocorax carbo)	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	No suitable habitat
Greylag Goose (Anser anser)	31/12/2001	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || 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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	Do not rely on the project site.

House Martin (Delichon urbicum)	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	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
House Sparrow (Passer domesticus)	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	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
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	No suitable habitat
Mew Gull (Larus canus)	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	No suitable habitat
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	No suitable habitat
Northern 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	Do not rely on the project site.
Northern Shoveler (Anas clypeata)	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	No suitable habitat
Rock Pigeon (Columba livia)	31/12/2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species	No suitable habitat within project site. Suitable habitat within woodland habitats

			bounding the project site.
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	Do not rely on the project site.
Sky Lark (Alauda arvensis)	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	No suitable habitat.
Slavonian Grebe (Podiceps auritus)	31/12/2001	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat.
Spotted Flycatcher (Muscicapa striata)	31/07/1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
Stock Pigeon (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 – Amber List	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
Tufted Duck (Aythya fuligula)	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 II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern – Amber List	No suitable habitat.
Water Rail (Rallus aquaticus)	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	No suitable habitat within or adjacent to the project site.

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	Suitable habitat along field boundaries and within the project site.
European Eel (Anguilla anguilla)	31/12/1998	Threatened Species: OSPAR Convention || Threatened Species: Critically Endangered	No suitable habitat within or adjacent to the project site.
Donacia marginata	31/12/1900	Threatened Species: Near threatened	This species relies on wetland habitat. No suitable habitat within or adjacent to the project site.
Gatekeeper (Pyronia tithonus)	13/07/2014	Threatened Species: Near threatened	No suitable habitat within project site. Suitable habitat along hedgerows and woodland edge bounding the project site.
Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)	09/07/2014	Threatened Species: Near threatened	No suitable habitat within project site. suitable habitat in hedgerows and woodland along project site boundary.
Brown Snail (Zenobiella subrufescens)	25/01/2002	Threatened Species: Vulnerable	No suitable habitat within project site.
Common Shelled Slug (Testacella (Testacella) haliotidea)	28/02/1995	Threatened Species: Vulnerable	No suitable habitat within project site
Prickly Snail (Acanthinula aculeata)	10/07/2000	Threatened Species: Near threatened	No suitable habitat within project site
Silky Snail (Ashfordia granulata)	25/01/2002	Threatened Species: Near threatened	No suitable habitat within project site
Tandonia rustica	24/11/2008	Threatened Species: Vulnerable	No suitable habitat within the project site. Suitable habitat in woodland to the south of the project site.
Daubenton's Bat (Myotis daubentonii)	29/01/2000	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	Limited suitable habitat within the project site.
Eurasian Badger (Meles meles)	31/12/2010	Protected Species: Wildlife Acts	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.

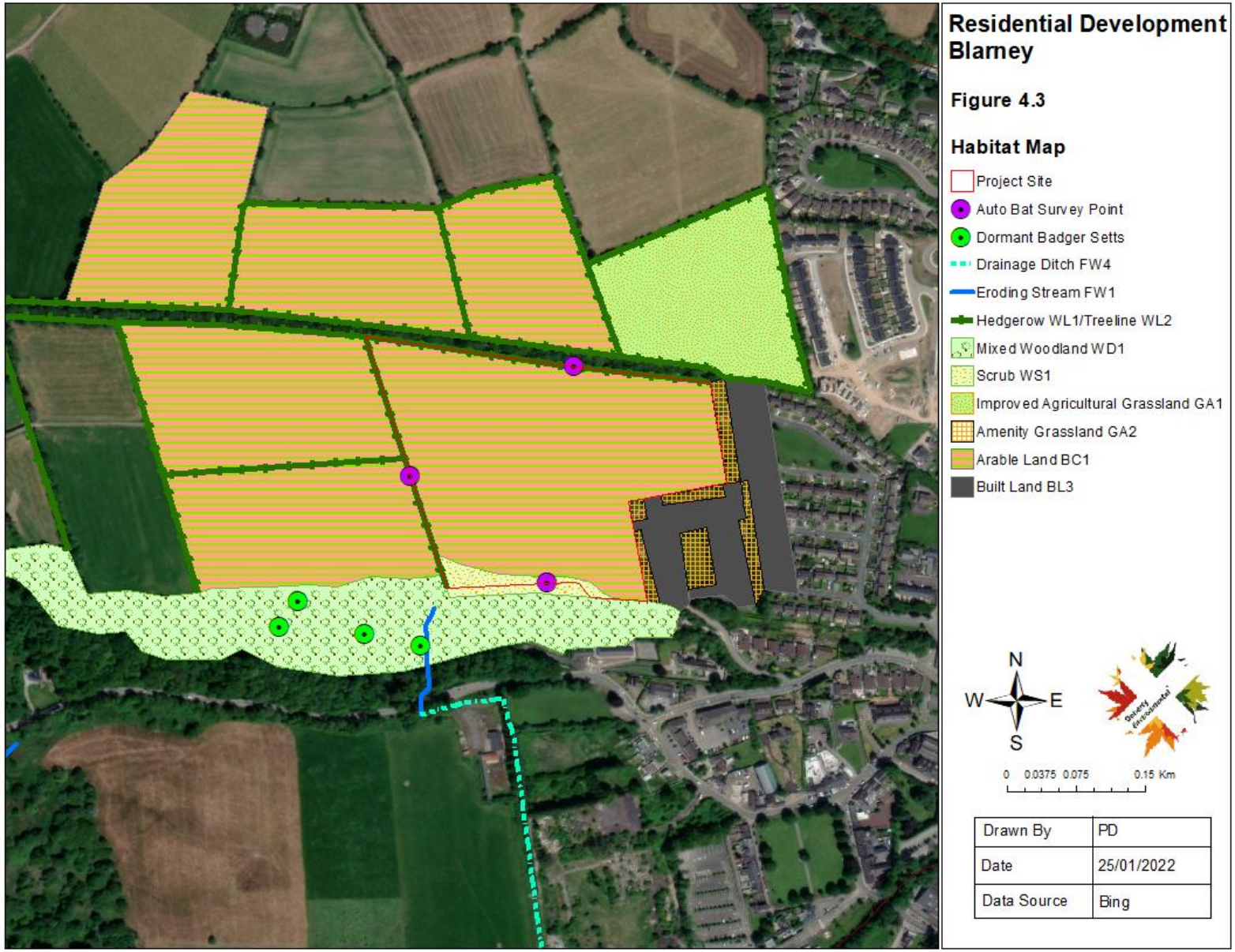
Eurasian Red Squirrel (Sciurus vulgaris)	02/12/2018	Protected Species: Wildlife Acts	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
European Otter (Lutra lutra)	25/11/1980	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	No suitable habitat within or adjacent to the project site.
Lesser Noctule (Nyctalus leisleri)	22/08/2008	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	Limited foraging habitat over the project site. Suitable foraging habitat over woodland habitats bounding the project site.
Pipistrelle (Pipistrellus pipistrellus sensu lato)	22/08/2008	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
Red Fox (Vulpes vulpes)	05/10/2012		No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
Soprano Pipistrelle (Pipistrellus pygmaeus)	22/08/2008	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.
West European Hedgehog (Erinaceus europaeus)	24/04/2017	Protected Species: Wildlife Acts	No suitable habitat within project site. Suitable habitat within woodland habitats bounding the project site.

4.3 SURVEY RESULTS

4.3.1 Habitats

The following Sub-Sections describe the habitats occurring within and immediately adjacent to the project site. Each habitat described below has been identified to Level 3 of Fossit's *Guide*

to Habitats in Ireland. The alpha-numeric code for each habitat is also provided alongside the habitat name (e.g. Treeline WL2). The locations and extent of each habitat described below are illustrated in Figure 4.3: Habitat Map. Appendix 1 provides plates detailing a photographic record of the project site and surrounding area. The habitats described in the following subsections and shown on Figure 4.3 were identified during field surveys during the spring and summer of 2018. Updated habitat surveys completed in 2020 and 2021 have been completed so that all habitats currently occurring at the project site are shown on Figure 4.3. The only habitat change that has arisen between the initial surveys in 2018 and the final survey in


Residential Development
Blarney
Figure 4.3
Habitat Map
Project Site
Auto Bat Survey Point
Dormant Badger Setts
Drainage Ditch FW4
Eroding Stream FW1
Hedgerow WL1/Treeline WL2
Mixed Woodland WD1
Scrub WS1
Improved Agricultural Grassland GA1
Amenity Grassland GA2
Arable Land BC1
Built Land BL3
N
W
E
S
0 0.0375 0.075 0.15 Km
Drawn By PD
Date 25/01/2022
Data Source Bing

September 2021 is the development of scrub habitat along the southern boundary of the project site between a fenceline that runs along the woodland to the south and the arable land that occupies the project site.

The nature conservation value of each of the habitats occurring within the project site is also outlined in the following sub-sections. The nature conservation value of habitats has been determined with reference to the methods outlined in Section 2.3 above.

4.3.1.1 Aquatic Habitats

A minor stream representative of an eroding watercourse (I1) emerges at the southwest boundary of the project site. A stone-search of macroinvertebrates occurring along this stream was completed and the dominant species observed included *Ancylus* I., *Baetidae I., Simulidae I., Gammurus I. And Uncased Trichoptera I.*.

The Knockacorbally Stream is located downstream of the project site and will receive surface water from the project, along the proposed surface water drainage pathway during the operation phase of the project. The Knockacorbally Stream drains into the River Martin (see Figure 2.1 above). The Knockacrobally is a minor stream with low fisheries potential. The River Martin, which occurs further downstream, is of good to high water quality, with Q-values of Q4-5 recorded upstream of Blarney at Putlands Bridge in 2020 and Q4 being recorded downstream of Blarney Bridge to the east of Blarney town. The river is known to support healthy populations of Atlantic salmon and brown trout as well as lamprey species, eel, stone loach and three-spined stickleback. Otters are known to use this river as a foraging habitat.

4.3.1.1.1 Nature Conservation Value

The stream emerging in the woodland to the south of the project site is a minor feeder stream of the Shournagh River catchment. It does not have the potential to support fish species and supports a restricted range of invertebrates. It is of local value (Rating D). the Knockacrobally Stream downstream of the project site is a minor first order watercourse and is of local value (Rating D). The section of the River Martin downstream of the project site that will receive surface water from the project site during the operation phase is representative of a freshwater habitat of county importance (Rating C).

4.3.1.2 Linear & Broad-leaved Woodland Habitats

The woodland that bounds the southern boundary of the project site is representative of the Level 3 habitat mixed broadleaved woodland (WD1) and consists of a canopy dominated by mature *Quercus petraea, Fagus sylvatica, Pinus sylvestris* and *Fraxinus excelsior*. *Taxus baccata* occurs in the woodland to the east. *Ilex aquifolium* is the most prevalent tree in the shrub layer. The ground flora in the woodland to the south of the project site include *Ranunculus ficaria, Heracleum sphondylium, Hedera helix, Rubus fruticosus agg., Pteridium aquilinium, Blechnum spicants, Phyllitis scolopendrium, Hyacinthoides non-scripta, Brachythecium rutabulum* and *Isothecium myosuroides*.

A double row hedgerow (WL1) and treeline (WL2) occur along the dismantled railway corridor that forms the northern boundary of the project site. The species occurring along the hedgerow and treeline include *Quercus petraea, Fraxinus excelsior* and *Fagus sylvatica. Crataegus monogyna, Prunus spinosa, Salix cinerea, Salix aurita, Malus sylvestris* and *Ulex europeaus* dominate the shrub layer. Between the hedgerows and treelines along either side of the dismantled railway the ground cover is dominated by spreading *Rubus fruticosus* agg. scrub.

The eastern boundary is characterised by the rear boundaries of existing residential houses and consists of range of ornamental hedgerows and fencing. The western boundary supports a hedgerow and treeline that is dominated by *Quercus petraea, Fraxinus excelsior, Crataegus monogyna* and *Prunus spinosa*.

A number of the mature *Quercus petraea, Fraxinus excelsior* and *Fagus sylvatica* trees occurring within the woodland to the south and along the northern and western boundaries support features, such as crevices and thick ivy cover that provide some roosting opportunities for bat species.

4.3.1.2.1 Nature Conservation Value

The woodland habitat to the south of the project site provides an extensive area of semi-natural woodland in an area otherwise dominated by artificial and intensively managed land cover. It is an example of a mature mixed broadleaved woodland and it supports a range of flora and fauna species and offers shelter and a foraging resource for fauna. The woodland is of ecological value in the wider surrounding and its of high value at the local level (Rating D).

The western and northern hedgerows and treelines bounding the project site provide links to the woodland to the south and connectivity to the wider linear network of hedgerows and treelines in the surrounding area. These linear woodland features support a range of fauna, including foraging and commuting bat species and nesting birds. They are of high local value (Rating D).

4.3.1.3 Cultivated & Built Land Habitats

The project site is used to grow cereal crops and is representative of the habitat arable crops (BC1). It supports little native vegetation and is intensively managed throughout the year.

4.3.1.3.1 Nature Conservation Value

The arable crops habitat dominating the project site consists of a restricted range of species and is considered to be species-poor. It is of low heritage value, representative of a habitat of low importance (lower value, Rating E).

4.3.1.4 Scrub Habitat

An area of scrub habitat occurs along the southern fringe of the project site between the project site and the woodland to the south. The scrub habitat is of recent origin having colonised an area of previously disturbed ground, as identified during field surveys between 2018 and 2021. The scrub habitat consists of immature willow species (Salix aurita, Salix caprea), gorse (Ulex europeaus) and bramble (Rubus fruticosus agg.). *Butterfly bush (Buddleja davidii)* also occurs within this immature scrub habitat. Nettles, bindweed, and great willowherb are also abundant in this habitat.

4.3.1.4.1 Nature Conservation Value

The examples of scrub habitat occurring at the project site is immature and consists of pioneering species. It is considered to be low, local ecological value (Rating E).

4.3.2 Fauna

An overview of the fauna supported by the site is outlined in the following sections. The nature conservation value of the site in supporting populations of fauna is also outlined in the following sub-section.

4.3.2.1 Non-Volant Mammals

No definitive evidence of protected mammals such as otter or badger was noted within or immediately bounding the project site. A number of disused badger setts were recorded within the woodland to the south of the project site. These are considered to be dormant and no evidence to suggest the recent use of these setts by badgers was observed during field surveys in 2018, 2020 and 2021. The location of these badger sett entrances are shown on Figure 4.3.

Rabbit warrens occur throughout the site and particularly along the northern site boundary. Rabbits were also seen on site during field surveys.

4.3.2.2 Volant Mammals – Bat

Detailed bat activity surveys were completed during the bat activity season of 2018 and 2021.

Conditions during the 2018 and 2021 activity surveys were ideal for bat activity with warm, calm and dry nights persisting throughout all survey nights. Sunset during the monitoring session between the 19th and 24th June 2018 was between 21:55 and 21:57, while sunrise was at 05.12 and 05:14. Sunset during the monitoring session between the 30th August and 7th September was between 20:24 and 20:06, while sunrise was between 06:44 and 06:55.

Mature trees in the woodland to the south of the project site and the mature trees occurring along the northern and western field boundaries support features that offer potential roosting opportunities for bats. These trees are adjudged to be representative of Category 1* and Category 1 trees (see Section 3 above for definition of tree roost categories). During the manual bat activity survey completed on the night of the 19th June 2018 a position was taken up along

the northern hedgerow. No bats were recorded emerging from targeted trees during the period of emergence, which lasted for approximately ninety minutes after sunset (i.e. 21:57 to 23:30)[4].

During the manual survey bat activity along hedgerow field boundary to the north of the site was dominated by Common pipistrelles. The first pass was recorded approximately 50 minutes after sunset. Soprano pipistrelle activity was also recorded within the woodland habitat to the south of the project site. The most bats that were visually observed at any one time were two Soprano pipistrelle bats foraging along the southern boundary of the project site. Leisler's bat passes were also detected flying over the project site. These bats were not visually identified and only a limited number of passes (<10 passes) were recorded during the manual survey.

The results of the 2018 automatic surveys completed along the northern, western and southern boundaries of the project site are provided in Tables 4.3 to 4.5 below.

Table 4.3: Results of Bat Activity Recorded along the Northern Boundary of the Project Site

Date	MY I	NYLE	PIPI	PIPY	PLAUR	Total/Night	Nightly Activity Category
20180619	0	3	1	0	0	4	Low
20180620	5	1	163	9	1	179	High
20180621	4	2	562	34	0	601	High
20180622	5	63	354	46	5	473	High
20180623	10	8	450	28	7	502	High
20180624	5	37	286	18	1	347	High
Total	29	114	1816	135	14	2106	

With the exception of the first night of monitoring, bat activity was high during all nights of monitoring along the northern field boundary. The activity was overwhelming dominated by Common pipistrelle, which was recorded at high nightly levels during all nights (apart from the first night of monitoring on the 19th June 2018). Very low levels of Myotis species and Brown

[4] Pipistrelle bats, which dominated bat activity recorded in the vicinity of the project site typically emerge 20 minutes after sunset. Leisler's bat typically emerge at sunset; Myotis species emerge from 30 minutes to 90 minutes after sunset.

long-eared bat activity were recorded while the majority of Leisler's bat activity was restricted to low levels, although higher levels of activity were recorded on the night of the 22nd June 2018. Soprano pipistrelle activity were recorded at medium levels throughout the survey session, with the exception of the first night on the 19th June 2018. Emergence times for the first bat at the monitoring point along the northern hedgerow were between 40 minutes and 60 minutes after sunset.

Table 4.4: Bat Activity Recorded Along the Southern Boundary of the Project Site

Date	Myotis species	NYLE	PIPI	PIPY	PLAUR	Total/Night	Nightly Activity Category
20180619	4	72	136	1068	8	1288	High
20180620	1	4	82	5	0	92	High
20180621	0	5	38	46	0	89	High
20180622	1	2	92	80	1	176	High
20180623	1	8	94	289	0	392	High
20180624	0	2	36	31	0	69	High
Total	7	93	478	1519	9	2106	

Bat activity along the southern boundary of the project site, at the edge of the woodland habitat was dominated by Soprano pipistrelles, with particularly high levels of activity recorded on the first night of monitoring on the 19th June 2018. For the remainder of the survey sessions Soprano pipistrelle activity levels between medium and high nightly activity levels. The monitoring results from the southern boundary are in contrast to the monitoring along the northern hedgerow field boundary, which recorded low levels of activity on the first night. Also it is notable that Soprano pipistrelle dominated activity in the vicinity of the woodland while Common pipistrelle dominated activity along the northern field boundary.

A high number of Soprano pipistrelle calls were recorded within the first 20 minutes after sunset on the 19th June 2018, however such activity early in the night at sunset was not recorded during the remainder of the nights, suggesting that no major roost is located in the vicinity of the monitoring point along the southern boundary.

Table 4.5: Bat Activity Recorded Along the Western Boundary of the Project Site

Date	MY I	NYLE	PIPI	PIPY	PLAUR	Total/Night	Nightly Activity Category
20180619	6	15	641	87	7	756	High

20180620	3	18	73	35	0	129	High
20180621	2	3	36	21	2	64	High
20180622	2	19	71	21	0	113	High
20180623	8	19	79	50	4	160	High
20180624	2	31	65	109	1	208	High
Total	23	105	965	323	14	1430	

The monitoring along the western hedgerow field boundary of the project site recorded Common pipistrelle as the dominant species, with particularly high levels of activity being recorded on the first night of monitoring on the 19th June 2018. Activity levels for this species were predominantly high throughout the monitoring session. Soprano pipistrelle were recorded at medium activity levels for three nights and at high levels for the other three nights. Leisler's bat activity was recorded at predominantly medium levels during the monitoring sessions while low levels of activity were recorded for Myotis species and Brown long-eared bat.

Leisler's bat was the first bat recorded along the western field boundary on three of the six nights of monitoring. The earliest registration for a Leisler's bat pass was at 21:52 on the 23rd June 2018, approximately five minutes before sunset. Leisler's bat calls were first registered on the 24th June 2018 at 22:04 and on the 20th June 2018 at 22:10. The timing of the calls at or very soon after sunset is an indication that the individual bats emitting these calls were likely to have roosted in close proximity to the monitoring point along the western field boundary.

Common pipistrelle were also recorded early during monitoring along the western field boundary, with first calls being registered at 22:04, 22:30 and 22:20 on the 19th June 2018, 21st June 2018 and 22nd June 2018 respectively. The timing of these calls at, or before, typical emergence times for Common pipistrelle (i.e. circa 20 minutes after sunset) indicate that the individuals emitting these calls were likely to have roosted in the vicinity of this monitoring point.

The results of the 2021 automatic surveys completed along the southern and western boundaries of the project site are provided in Tables 4.6 to 4.7 below.

Table 4.6: Bat Activity Recorded Along the Southern Boundary of the Project Site

Date	Myotis species	NYLE	PIPI	PIPY	PLAUR	Total/Night	Nightly Activity Category
20210830	19	25	235	60	187	761	High

20210831	61	27	163	39	110	563	High
20210901	26	74	144	126	281	795	High
20210902	30	50	162	29	166	599	High
20210903	56	41	183	54	113	630	High
20210904	356	129	2747	207	649	6835	High
20210905	314	286	823	279	538	3063	High
20210906	17	57	126	11	13	350	High
	879	689	4583	805	2057	13596	

Bat activity along the southern boundary of the project site, at the edge of the woodland habitat was dominated by Common pipistrelle, with particularly high levels of activity recorded during one night on the 4th September. For the remainder of the survey session Common pipistrelle activity levels remained at high nightly levels. Activities levels were also consistently high for brown long-eared bat throughout the monitoring session, with particularly high levels of activity recorded on the 4th September. Medium to high levels of activity were also recorded for Myotis species and Leisler's bat, again with peaks in activity recorded on the 4th September as well as on the 5th September. As with the 2018 monitoring the results from the southern boundary are in contrast to the monitoring along the western hedgerow field boundary, which recorded lower levels of activity when compared to the southern boundary.

Table 4.7: Bat Activity Recorded Along the Western Boundary of the Project Site

Date	Myotis species	NYCLEI	PIPPIP	PIPPYG	PLEAUR	Total/Night	Nightly Activity Category
20210830	8	29	202	93	18	552	High
20210831	0	0	0	0	1	1	Low
20210901	0	0	10	4	1	25	Medium
20210902	0	0	0	0	0	0	Low
20210903	0	0	0	0	0	0	Low
20210904	0	0	0	0	0	0	Low
20210905	18	79	207	210	39	760	High
20210906	0	1	1315	4		2635	High
	26	109	1734	311	59	3973	

The monitoring along the western hedgerow field boundary of the project site recorded Common pipistrelle as the dominant species, with particularly high levels of activity being recorded on the last night of monitoring on the night of the 6th/7th September, when approximately 75% of the calls for this species were recorded. Activity levels were predominantly low for all species along the western hedgerow boundary, with no activity being recorded on three of the nights of monitoring, when conditions were suitable for bat foraging

activity. The highest levels of bat activity recorded during 2021 were on the 4th September along the southern woodland edge boundary of the project site at which time no activity was recorded along the western boundary.

The results of the 2018 and 2021 monitoring sessions indicate a wide variation in bat activity levels for species between nights and between monitoring sessions. The 2018 surveys indicated a dominance of pipistrelle species followed by Leisler's bat with lower levels of activity recorded for Myotis species and brown long-eared bat. The 2021 surveys along the western boundary of the project site revealed similar results with pipistrelle species, followed by Leisler's bat dominating activity and generally low levels recorded for Myotis species and brown long-eared bat. While the results of the 2021 surveys along the woodland edge boundary to the south of the project site revealed pipistrelle species to also be the dominant species along this boundary, all other species present along the boundary were also recorded at high activity levels, indicating a reliance on the woodland habitat for foraging during the monitoring session.

4.3.2.3 Birds

A range of passerines were seen and heard on site during the Phase 1 Habitat Survey. Species recorded include robin, blackbird, great tit, blue tit, chaffinch, song thrush, dunnock, magpie, jackdaw and wood pigeon. Yellowhammer, which is a species of high conservation concern (Red-listed species), is the only bird species of conservation concern that could be supported by the hedgerow and woodland habitats bounding the project site. The project site does not have the potential to support any other bird species of conservation concern that are listed in Table 4.2. While hedgerow and woodland edge bounding the project site offer suitable habitat for yellowhammer, this species was not seen or heard on site during the 2018 field surveys.

4.3.2.4 Invertebrates

No invertebrates of conservation concern were recorded at or surrounding the project site during field surveys in 2018 and 2020. Suitable habitat occurs in the woodland to the south of the project site for one invertebrate species of conservation concern, namely *Tandonia rustica*. This slug species was recorded in the woodland habitat to the south of the project site in 2008. Surveys for the presence of this species within the woodland to the south of the project site, within scrub habitat along and to the south of the project site and along the western hedgerow boundary were completed in May and September 2021.

It is noted that this species relies on broad-leaved woodland habitat where it is confined to the woodland floor under leave litter, dead wood and embedded stones and as such was not expected to occur within the scrub habitat to the north of the established woodland. The western boundary hedgerow is also considered to provide sub-optimal habitat for this species. Furthermore given its habitat requirements the arable land habitats occurring within the project site are not suitable for supporting this species.

During the night time searches for this species its continued presence was recorded in the woodland habitat to the south of the project site. A total of three individuals were recorded on trees and within decaying woodland litter. Appendix 1 provides a record of this species within the woodland. No individuals were recorded within the scrub habitat to the north of the woodland or within the western boundary hedgerow.

5.0 IMPACT ASSESSMENT

5.1 CONSTRUCTION PHASE

5.1.1 Designated Conservation Areas

There will be no direct impacts to designated conservation areas occurring in the surrounding area. The potential impact of the project to European Sites occurring in the wider surrounding area has been assessed as part of a Screening Report for Appropriate Assessment and an Natura Impact Statement, both of which are provided under separate cover. A highly precautionary approach was adopted during the examination detailed in these documents and it was found that, in the absence of appropriate mitigation measures, the construction phase of the project will have the potential to combine with other existing sources of water quality pressures to the River Lee catchment and result in additive adverse effects to the status of the River Lee Estuary of the Cork Harbour SPA downstream.

In terms of NHA and pNHA designations, the nearest of these conservation areas to the project site is the Ardamadane Wood pNHA, approximately 0.5km to the east of the project site. This woodland pNHA is separated from the project site by existing residential housing estates and the construction phase is not predicted to have the potential to influence the status of this woodland.

Two other conservation areas, sections of the Shourangh River Valley pNHA and the Lee Valley pNHA occur approximately 4.5km, 7km and 10km respectively downstream of the project site. A hydrological pathway connects the project site to the Shournagh Valley pNHA. The Shournagh Valley is proposed as a NHA for its role in supporting wet woodland and dry broadleaved woodland habitats on the slopes of the river valley. The hydrological pathway between the project site and the sections of the Shournagh River flowing through the pNHA does not connect the project to the broadleaved woodland habitats of the pNHA downstream of the project site. As noted in Section 4.2.1 above these woodland habitats are dry broadleaved woodlands that occupy the slopes above the river. As such there will be no potential for the construction phase of the project to result in negative impacts to the woodland features of interest of the pNHA downstream of the project site.

The Lee Valley pNHA is located approximately 10km downstream from the project site. The Lee Valley is proposed as a pNHA for its role in supporting a number of habitats including river bank habitats that could be influenced by water quality and the hydrological pathway. The hydrological pathway linking the project site to Lee Valley pNHA is established by its presence in the River Lee Catchment and the proposed discharge of surface water runoff to a minor stream that feeds the Knockacorbally Stream to the south of the project site. This stream drains to the Martin River, which in turn drains to the River Shournagh and on to the River Lee. As detailed in the accompanying Natura Impact Statement the Water Framework Directive status of the River Lee catchment downstream of the project site is classified as ‘at risk’. Urban surface water runoff has been identified as the existing land use pressure to the water quality of this catchment. In the event that the construction phase of the project results in the discharge of contaminated materials to the River Lee there will be potential for it to combine with existing water quality pressures to the River Lee and the fringing habitats that form part of the Lee Valley pNHA features of interest. Mitigation measures are provided in Section 6 below that aim to ensure the construction phase of the project does not result in negative impacts to water quality and thereby eliminates the potential for the project to combine with other existing water quality pressures to result in cumulative negative effects to the Lee Valley pNHA.

5.1.2 Habitat Loss & Disturbance

The land cover changes associated with the proposed scheme will be the loss of areas of arable land and scrub within the project site.

Each of these habitats occurring within the project site has been evaluated as being of low nature conservation importance (Rating E). The loss of these habitats to the footprint of the project will represent a high magnitude impact to these habitats. A high magnitude impact to these habitats of low nature conservation value will represent an impact of minor negative significance.

It is noted that there will be no loss of hedgerow and treeline habitat along the western and northern field boundaries and there will be not loss of woodland habitat to the south of the project.

There will be no loss of freshwater habitats as a result of the project. Site clearance and construction works could result in the generation of silt-laden surface water or otherwise contaminated surface water runoff as a result of the cement-based products, hydrocarbons or other construction-related solutions required on site. The discharge of such contaminated surface water runoff to the minor eroding stream to the south of the project site, or to the drainage pathway upstream of the River Martin during worst case scenario works to the Tower Road R617 culvert, will have the potential to result in local perturbations to this watercourse and downstream along the Knockacorbally Stream and the River Martin. The release of such materials to these freshwater receptors has the potential to result in a moderate magnitude effect to the minor stream, Knockacorbally Stream and the River Martin downstream. Such an effect to these receptors of local to county value will represent a potential impact of minor to moderate negative significance.

5.1.3 Emissions to Aquatic Habitats

The construction phase of the development will generate surface water and wastewater on site. All wastewater generated at the project site during the construction phase will be contained within impermeable bunded areas and will be collected from the project site for appropriate treatment at a licenced wastewater treatment plant prior to discharge to the receiving environment. As such the wastewater generated on site during the construction phase wll not pose a risk to aquatic habitats and water quality.

Surface water runoff will be generated during the construction phase and will eventually drain from the project site, either to ground to downslope to the Knockacorbally Stream and the Shournagh River sub-catchment. There is potential for this runoff to contain contaminants such

as excessive silts, hydrocarbons, cement-based products or other construction related materials and, in the absence of appropriate treatment, the discharge of these contaminant to the Shournagh River sub-catchment downstream. The emission of such surface water runoff from the project site will have the potential to perturb water quality downstream of the project site.

Construction phase measures will be incorporated into the project to eliminate or minimise the potential for the discharge of polluting substances to watercourses downstream of the project site during the construction phase. These design measures are further detailed in Section 6 below.

5.1.4 Disturbance to/Loss of Habitat for Terrestrial Fauna

No breeding sites or resting places of protected terrestrial non-volant mammals such as badgers were noted within or immediately adjacent to the project site. As such the construction phase of the project will not have the potential to result in significant disturbance to non-volant terrestrial mammals.

There will be no physical loss of high value bat foraging habitat during the construction phase of the project. There will be a loss of areas of immature scrub occurring along the southern boundary of the project site. The loss of this habitat will represent a minor negative impact to the bat foraging habitat occurring within and adjacent to the project site.

There will be no loss of habitat for the slug *Tandonia rustica*, which is of vulnerable conservation status. This species has been recorded in the woodland habitat to the south of the project site and is restricted to this habitat. The project will not result in any loss or disturbance to the woodland habitat upon which this species relies.

5.1.5 Impacts to Birds

The vegetation to be lost within the project site is of low value to bird species and there will be minimal loss of bird foraging habitat as a consequence of the proposed development. All hedgerow and woodland field boundaries to the north, west and south of the project site will be retained. The immature scrub habitat that has developed along the southern boundary of the project site provides some nesting habitat for breeding birds and the loss of this habitat will

represent a low magnitude impact to the conservation status of breeding bird populations in the surrounding area and an effect of minor significance.

5.1.6 Impact to Aquatic Fauna

The stream occurring immediate to the south of the project site has no fisheries value. It supports a range of macroinvertebrate species. The River Martin further downstream and the Shournagh and Lee all support important stocks of Atlantic salmon and brown trout as well as lamprey species, otters and other fish species. In the event of the emission of deleterious surface water runoff from the project site to the Shournagh River sub-catchment and further downstream to the River Lee there will be potential for such emissions to combine with existing pressures to water quality to result in additional cumulative pressures to aquatic fauna supported by the watercourses downstream of the project site.

5.1.7 Spread of Invasive Plant Species

During site surveys the only non-native species recorded on site was *Buddleja davidii*. The construction phase of the project has the potential to result in the spread of this species in the wider vicinity of the project site. In addition, the potential exists for site operatives and machinery to result in the inadvertent spread of non-native plant species on site, should clothing, plant and machinery be contaminated with these species prior to entry on site.

5.2 OPERATION PHASE

5.2.1 Designated Conservation Areas

There will be no direct impacts to designated conservation areas occurring in the surrounding area. The potential impact of the operation phase of the project to European Sites occurring in the wider surrounding area has been assessed as part of a Screening Report for Appropriate Assessment and an Natura Impact Statement, both of which are provided under separate cover. A highly precautionary approach was adopted during the examination detailed in these documents and it was found that, in the absence of appropriate mitigation measures, the operation phase of the project will have the potential to combine with other existing sources of water quality pressures to the River Lee catchment and result in additive adverse effects to the status of the River Lee Estuary of the Cork Harbour SPA downstream.

The nearest designated conservation area to the project site is the Ardamadane Wood pNHA, approximately 0.5km to the east of the project site. This woodland pNHA is separated from the project site by existing residential housing estates and the construction phase and operation phase is not predicted to have the potential to influence the status of this woodland.

The sections of the Shourangh River Valley pNHA downstream of the project site will not result in negative impacts to the features of interest of this pNHA, which are not reliant on water quality and are located over 2.5km (as the crow flies) to the south of the project site.

The operation phase of the project has the potential to result in emissions to streams and rivers downstream of the project site and along the hydrological pathway that links the project site to the Lee Valley pNHA. Further consideration of the impact of emissions to aquatic receptors is detailed in Section 5.2.3 below. As detailed in Section 5.1.1 above the Water Framework Directive status of the River Lee catchment downstream of the project site is classified as 'at risk'. Urban surface water runoff has been identified as the existing land use pressure to the water quality of this catchment. The operation phase of the project will have the potential to generate urban surface water and in the absence of appropriate mitigation measures such runoff could result in the emission of contaminant to surface water runoff and their conveyance downstream to the hydrological pathway and the Lee Valley pNHA. Such emissions could combine with existing surface water pressures from urban surface water runoff to result in cumulative negative impacts to the features of interest of the Lee Valley pNHA downstream of the project site. Mitigation measures are provided in Section 6 below that aim to ensure the operation phase of the project does not result in negative impacts to water quality and thereby eliminates the potential for the project to combine with other existing water quality pressures to result in cumulative negative effects to the Lee Valley pNHA.

5.2.2 Habitat Loss & Disturbance

The operation phase of the development will not result in any loss of woodland habitats bounding the project site. It will result in increased lighting at the project site. Inappropriately designed lighting will have the potential to reduce the likelihood of potential bat commuting and foraging habitat to function as such habitat for bats.

The operation phase will not result in the loss or disturbance of broad-leaved woodland habitat to the south of the project site. The project has been designed to avoid disturbance to the woodland to the south as a result of increased access from the proposed residential area to the north. This has been achieved by positioning the rear gardens of dwellings along the southern boundary as well as providing for a 2m high weldmesh fence on a retaining structure immediately to the north of the site's southern boundary. This will restrict movements to the south of the project site and into the woodland habitat and minimise any potential for future disturbance in the woodland as a result of the project.

There will be no loss of freshwater habitats as a result of the project. The minor eroding stream to the south of the project will not be altered by the project. A hydrological examination of the stream and the proposed surface water discharge to the stream has been completed by Irish Hydrodata Ltd. and is presented under separate cover as part of the planning documentation. This examination found that the proposed surface water discharges to the stream will not have the potential to result in a negative impact on the existing stream and the proposed drainage pathway south of the stream.

5.2.3 Emissions to Aquatic Habitats

The operation phase of the development will generate surface water and wastewater on site. All wastewater generated at the project site will be directed to the Blarney/Tower wastewater treatment plant where sufficient capacity is available to treat all wastewater.

Surface water will be generated during the operation phase and the replacement of existing surfaces with built land and runoff will be generated on these surfaces that will be directed to the minor stream and the Shournagh River sub-catchment. There is potential for this runoff to contain contaminants such as hydrocarbon and, in the absence of appropriate treatment, the discharge of these contaminant to the river will have the potential to perturb water quality downstream of the project site.

Design measures have been incorporated into the project to eliminate the potential for significant increases to runoff downstream and eliminate or minimise the potential for the discharge of polluting substances to watercourse downstream of the project site during the operation phase. These design measures are further detailed in Section 1.5 above and Section 6 below.

5.2.4 Impacts Terrestrial Fauna

The operation phase of the project is not predicted to have the potential to result disturbance to protected terrestrial non-volant mammals or bird species. This is due to the absence of any evidence of protected terrestrial non-volant mammals within the project site during field surveys and the low value habitats within the project site for bird species.

Bat species occurring in the vicinity of the project site are known to be sensitive to artificial lighting. The project has been designed to minimise disturbance from artificial night time lighting to the existing boundary vegetation associated with the hedgerows, treelines and woodland. This has been achieved by setting back housing, access roads and lighting columns from these boundaries. This approach will minimise the potential for lighting to alter foraging habitat along the boundary corridors used by bats. Further measures for reducing the effects of lighting on bats are outlined in Section 6 below.

Given the design of the project site and the restricted access to the woodland habitat to the south of the project site, the operation phase is not predicted to have the potential to result in disturbance to habitat upon which the vulnerable species *Tandonia rustica* relies.

5.2.5 Impact to Aquatic Fauna

In the event of the emission of deleterious surface water runoff from the project site to the Shournagh River sub-catchment and further downstream to the River Lee there will be potential for such emissions to combine with existing pressures to water quality to result in additional cumulative pressures to aquatic fauna, including salmonids, lamprey, otters and other fish species supported by the watercourses downstream of the project site.

5.3 CUMULATIVE IMPACTS

A review of Cork County Councils On-line map-based planning portal, E-Plan was undertaken to identify other planning approved or planning applications for projects, within the last five years, in the vicinity of the project site. The following projects were identified:

16/7122: The demolition of an existing dwelling house and construction of 88 no. residential units, a crèche and all ancillary site development works. A Screening for Appropriate

Assessment was completed for this project and it was found that the project will not have the potential to result in likely significant effects to European Sites in the wider surrounding area. The Screening Assessment outlined a range of measures that have been included within the design of this project to minimise adverse effects to the baseline ecological resource of the site. As such this project will not have the potential to combine with the proposed project to result in likely significant effects to water quality in the Shournagh River catchment.

Both projects will result in the loss of the intensively managed agricultural habitats that are of low ecological value and the combine footprint of both developments will not result in the loss of semi-natural habitats of ecological value.

Construction is underway for this project since 2019 and the construction phase of this project will not overlap with that of the currently proposed project. The operation phase of this project includes best practice design features (such as surface water and wastewater design management measures) to avoid impacts to the surrounding environment.

Planning Reference No.: 14/4879: Retention of a single storey utility room to the rear of an existing dwelling. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

Planning Reference No.: 15/5689: Extension to an existing two storey house. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

Planning Reference No.: 15/5448: Extension to an existing two storey house. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

Planning Reference No.: 15/6413: Extension to an existing house. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

Planning Reference No.: 17/6849: Extension to an existing house. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

Planning Reference No.: 20/39502 /An Bord Pleanála Reference No.: 308670: This planning application which has been refused by Cork County Council but is currently the subject of an appeal to An Bord Pleanála consists of a 3-storey primary care centre with 5 no. ground floor retail units and café at St. Ann's road, Monacnapa. The proposed development site is located approximately 100m to the south of the current project site and is buffered from it by existing roads, woodland and residential housing. In the event that planning approval is granted for both projects the potential will exist for the construction phase of both to overlap. The current project will include the implementation of measures to avoid significant negative impacts to receiving watercourses downstream of the project site; will implement measures to minimise construction noise so that significant disturbance is avoided; and will implement measures to minimise construction related air emissions in the form of dust so that the potential for significant nuisance to surrounding receptors is avoided. With the implementation of these measures the project will not have the potential to combine with this other project result in cumulative negative construction phase impacts to biodiversity. The design measures included for the operation phase of the project to manage and treat surface water and wastewater will ensure that such emissions from the project site will not result in negative impacts to receiving waters and will not have the potential to combine with this other project to result in cumulative negative impacts to receiving waters and aquatic biodiversity.

Planning Reference No. 20/39597/An Bord Pleanála Reference No.: 309152: Proposed mixed use development, Blarney Town Centre: This planning application which has been refused by Cork County Council but is currently the subject of an appeal to An Bord Pleanála consists of a mixed-use development including supermarket at the former Blarney Park Hotel site to the south of the current project site. The proposed development site is located approximately 250m to the south of the current project site and is buffered from it by existing roads, agricultural grassland and residential housing estates. In the event that planning approval is granted for both projects the potential will exist for the construction phase of both to overlap. The current project will include the implementation of measures to avoid significant negative impacts to receiving watercourses downstream of the project site; will implement measures to minimise construction noise so that significant disturbance is avoided; and will implement measures to minimise construction related air emissions in the form of dust so that the potential for significant nuisance to surrounding receptors is avoided. With the implementation of these measures the project will not have the potential to combine with this other project result in cumulative negative construction phase impacts to biodiversity. The design measures included for the

operation phase of the project to manage and treat surface water and wastewater will ensure that such emissions from the project site will not result in negative impacts to receiving waters and will not have the potential to combine with this other project to result in cumulative negative impacts to receiving waters and aquatic biodiversity.

Planning Reference No. 20/39101: planning approval for the demolition of an existing single storey sunroom and the construction of a two-storey extension to the rear of an existing dwelling. This is a small-scale project that will not have the potential to combine with the proposed project to result in significant cumulative effects to biodiversity.

6.0 MITIGATION MEASURES

The mitigation measures outlined in the following sections aim to ensure that all potential negative impacts associated with the project are avoided or minimised to an insignificant level.

6.1 MEASURES TO MINIMISE IMPACTS TO HABITATS

Habitat disturbance during construction work will be confined strictly to within the direct land-take of the proposed scheme.

Construction machinery will be restricted to site roads and the footprint of the proposed scheme.

Tree planting will be undertaken within the project site. The landscaping design proposes to plant additional specimen and small/medium woodland trees along the northern boundary of the proposed project layout. The specimen woodland trees and small/medium woodland trees will include native species such as *Quercus petraea, Betula pendula, Corylus avellana, Alnus glutinosa, Sorbus acuparia* and *Pinus sylvestris*. The enhancement tree planting will augment the extent of woodland habitat occurring within the footprint of the project site and will provide additional foraging habitat for birds and bats.

An area of land between the northern boundary of the net developable area of the project site and the northern boundary of the project site will remain undeveloped. The width of this area will be up to approximately 95m in places. This area of undeveloped land within the project site will be managed as meadow grassland. A native, species-rich seed mix suitable for neutral to acid soils will be sown in this area of the project site prior to the completion of the

construction phase. The seed mix will include yellow rattle (*Rhinanthus minor*) which is a particularly useful species for meadow grassland as well as a mix of native wildflowers that provide foraging for pollinators (Appendix 2 provides a list of pollinator wildflower species). The meadow grassland will be managed as a species-rich hay meadow grassland throughout the operation phase of the project. This initial years during the establishment of the hay meadow are likely to require frequent mowing given the past use of this area for the growth of arable crops and the likely high nutrient content in the soils. During this time the meadow grassland will be managed as a short-cut meadow (with mowing every six weeks) during the growing season for the first two years of the operation phase. Following this and once a species-rich wildflower meadow becomes established it will be managed as a hay meadow with one annual cut at the end of the growing season in September/October. The mowing regime during the establishment of the hay meadow and during the annual cut once established will be based on a cut and lift mowing regime with all cut plant material being removed from the meadow and disposed of off-site.

The provision of a pollinator friendly species-rich hay meadow in the undeveloped area to the north of the net developable area will have the potential to result in a positive impact for local biodiversity. The provision of a semi-natural grassland habitat within woodland habitats to the north and south will provide a mix of habitats that have the potential to function as a high value foraging resource for birds, bats and non-volant mammals as well as a variety of invertebrate species. The provision of semi-natural guidelines habitat and native woodland habitat along the northern boundary of the net developable area will have the potential to result in an overall net increase in the area of semi-natural habitats occurring within and bounding the project site and will offset the loss of any habitats, such as arable land and immature scrub, to the footprint of the project.

6.2 MANAGEMENT OF WASTEWATER

All wastewater generated during the operation phase will be directed to the Irish Water sewer network and then to the existing Irish Water Wastewater Treatment Plant (WWTP). Irish Water and Cork County Council have confirmed that sufficient capacity is available at the WWTP to treat any additional loads generated by the project.

6.3 MANAGEMENT OF SURFACE WATER

In order to minimise the potential for pollution to surrounding surface waters the proposed approach to surface water management as outlined in Section 1.3 above will be implemented in full.

The construction management of the site will take account of the recommendations of the CIRIA guides *Control of Water Pollution from Construction Sites* (2001) and *Control of Water Pollution from Linear Construction Projects* (2006) and Inland Fisheries Ireland's (IFI's) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works*.

During construction key requirements for the prevention of perturbations to surface water quality will include:

- The open land drain that is to be constructed to the north of the net developable area shall be installed as the first item of works of the construction phase. This will provide for a "catch-drain" to the north of the project site during the construction phase and minimise the runoff, from sloping ground to the north of the developable area, over the footprint of the construction site. The clean surface water runoff collected in the catch drain will be directed to the west to an existing field drain and will be allows to drain along the field drain to the south.

- Storage – all equipment, materials and chemicals will be stored away from any watercourse. Chemical, fuel and oil stores will be sited on impervious bases and within a secured bund of 110% of the storage capacity, within the lay down area;

- Any excavations to be stored on site will be stored in a designated stockpile area located in the construction site compound or other suitable location on site for the storage of segregated wastes prior to their transport for recovery/disposal at suitably licensed/permitted facilities. . Topsoil will be stockpiled on site for reuse in soft landscaping and will be stored separately to subsoils. Stockpiles will be graded to a <1:4 profile Stockpiles will be covered with plastic sheeting during wet weather and a temporary berm will be constructed around the stockpile area to prevent runoff to watercourses or drainage channels. Excess inert spoil material, not to be reused on site,

will be transported off site for deposition. All waste spoil material arising from the construction phase will be inert, non-hazardous spoil material and will be disposed at an approved facility.

- Any stockpiles of spoil or waste material generated from the construction process is to be temporarily stored at a remote distance (i.e. greater than 50m) from the un-named minor stream to the southwest of the project site or the field drain along the western boundary of the project site and will be separated from any drainage channels associated with the construction phase surface water management system by a minimum of 25m, before being removed to an accepting licensed waste disposal facility.

- Waste material arising on site during the construction phase will be managed in accordance with the waste management hierarchy detailed in the Construction Environmental Management Plan (CEMP) prepared for the project and provided under separate cover.

- As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in the dedicated site compound. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage and features.

- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall also be tested and demonstrated.

- All fuel oil fill areas will have an appropriate spill apron.

- Vehicles and refuelling – standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out on an impermeable surface in designated areas, well away from any surface watercourse and surface water drains;

- Maintenance – maintenance to construction plant will not be permitted on site, unless vehicles have broken down necessitating maintenance at the point of breakdown. All necessary pollution prevention measures will be put in place prior to commencement of maintenance in this instance;

- Concrete - Wet concrete operations would not be carried out within watercourses or adjacent to watercourses or surface drains. Runoff from wastewaters or contaminated storm water will be directed to drains installed as part of the surface water management plan;

- Weather conditions and seasonal weather variations will also be taken account of when planning excavations, with an objective of minimizing soil erosion.

- Concrete batching will take place off site or in a designed area with an impermeable surface.

- Concrete wash down and wash out of concrete trucks will take place off site or in an appropriate facility.

- A designated impermeable cement washout area will be provided. The washout area will be located within the project site at a remote distance (i.e. greater than 50m) from the un-named minor stream to the southwest of the project site and will be separated from any drainage channels associated with the construction phase surface water management system by a minimum of 25m.

- A silt fence will be erected on site to prevent the release of silt-laden waters to the minor stream or woodland to the south of the project site. The silt fence will be implemented prior to the commencement of construction and will remain in place throughout the construction phase. The silt fence will be maintained in line with the

requirements detailed in the accompanying CEMP throughout the construction phase. The location of the silt fence to be installed is shown on Figure 6.1.

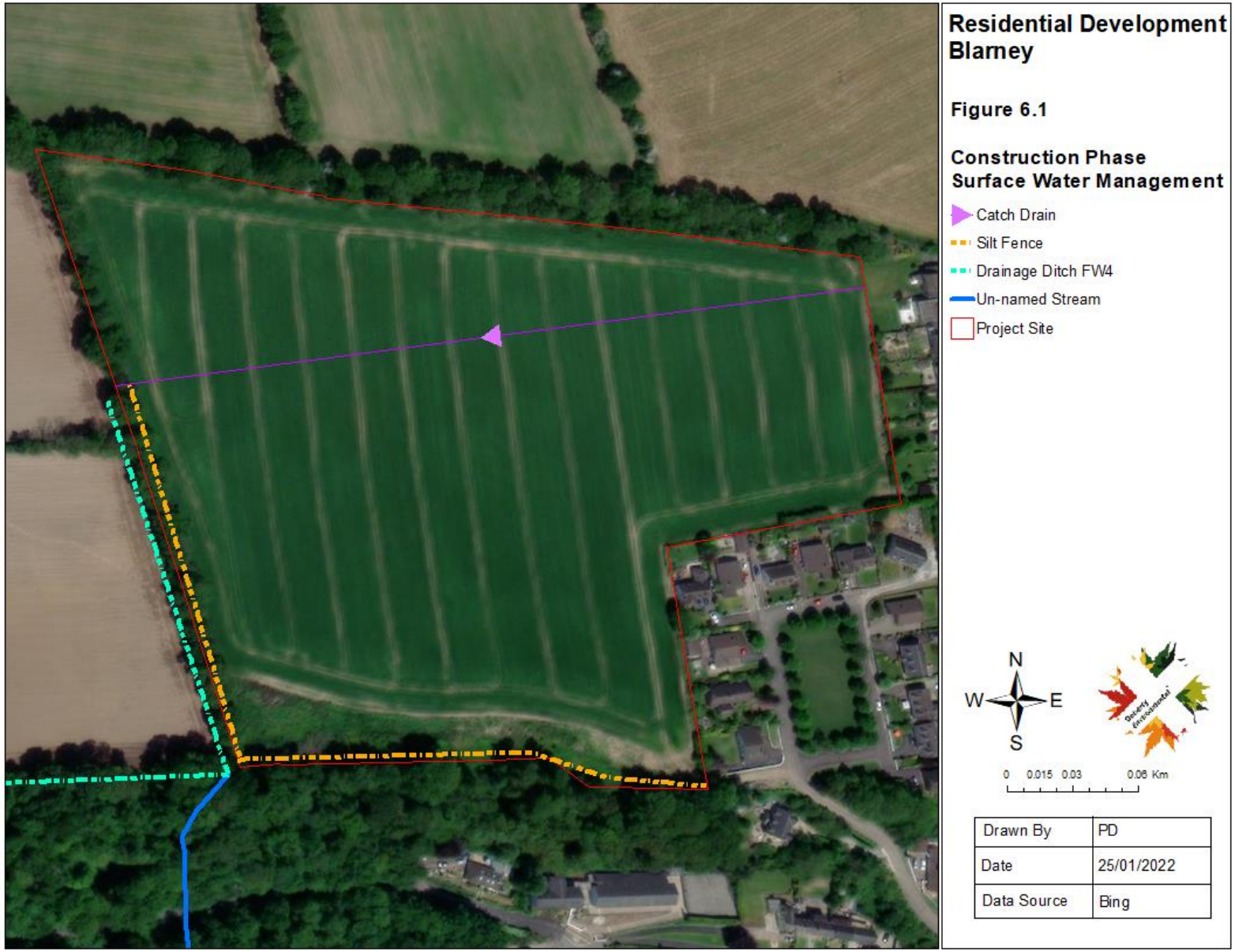
- Any in-situ concrete work to be lined and areas bunded (where possible) to stop any accidental spillage.

- All new infrastructure is to be installed and constructed to the relevant codes of practice and guidelines.

- All surface water infrastructure is to be pressure tested by an approved method during the construction phase and prior to connection to the public networks, all in accordance with Local Authority Requirements.

- Connections to the public network are be carried out to the approval and / or under the supervision of the Local Authority prior to commissioning.

All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase.


Residential Development
Blarney
Figure 6.1
Construction Phase
Surface Water Management
Catch Drain
Silt Fence
Drainage Ditch FW4
Un-named Stream
Project Site
N
W
E
S
0 0.015 0.03 0.06 Km
Drawn By PD
Date 25/01/2022
Data Source Bing

- The worst-case scenario works to the culvert along the Tower Road R617 will be completed in line with the details outlined for these works in Section 1.5.3 above and the accompanying Engineers Report (provided under separate cover). The approach to these works will ensure that the new replacement culvert is installed under dry conditions with contact to the existing minor stream waters being avoided. Only after the new culvert is in place will the stream be connected to the newly installed culvert. This will ensure that the potential for pollution to these waters as a result of the culvert installation is eliminated.

- Care will be required for the environmental management of the site to ensure that no potential contamination issues are experienced.

- Mess, sanitation and welfare facilities will be required during construction and will be located at the construction compound. Foul effluent will make use of chemical facilities with periodic removal for offsite disposal.

Surface water generated at the project site during the operation phase will be discharged via the operation phase surface water management system as described in Section 1.3 above. The surface water management system has been designed to capture surface water generated at the project site and discharge water at greenfield runoff rates. A suitable level of surface water attenuation has been catered for within the management system. Following attenuation and prior to release all surface water will be treated via a combine silt and hydrocarbon interceptor so that only treated surface water is discharged to the receiving stream and storm water network.

The provision of these design features will ensure that surface water emitted from the project site during the operation phase is adequately treated and will eliminate any risk of polluted surface water being discharged from the project site during operation.

6.3.1 Measures to Reduce the Spread of Invasive Species

Stands of Buddleja davidii occurring within the project site will be cut and removed from the project site outside the seed bearing season, between the months of December and May. This will prevent the spread of this species during vegetation removal.

All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) must be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese knotweed, Rhododendron and Himalayan Balsam.

All works during the construction phase will be carried out in accordance with the following guidelines:

- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010);
- NRA (2008). Guidelines for the Management of Waste from National Road Construction Project. National Roads Authority;
- Biosecurity protocols available for aquatic and riparian species available on the Control of Aquatic Invasive Species and Restoration of Natural Communities in Ireland (CAISIE) www.caisie.ie, and
- All maintenance operators will carry out their works under the guidance of the Inland fisheries Ireland Biosecurity Protocol for Field Survey Work. (2011) to ensure no negative impacts are caused to other watercourses. http://www.fisheriesireland.ie/fisheries-research-1/73- biosecurity-protocol-for-field-survey-work-1.

6.3.2 Measures to Control Light Spill & Night Time Illumination

The following measures will be incorporated into the lighting design for the project so that night time illumination is minimised along the western, northern and southern boundaries of the project site:

- No street lighting will be installed adjacent to the western, northern and southern boundaries. The southern and western boundaries will be abutted by the rear gardens of proposed dwellings. This design approach will ensure that no street lighting occurs along these boundaries. An area of meadow grassland will be set aside along the northern boundary of the net developable area of the project site. The meadow grassland will be retained between the net developable area and the northern boundary

of the project site. In addition woodland and parkland tree planting will be provided along the northern boundary of the net developable area. The provision of the woodland and parkland tree planting and the meadow grassland buffer will provide a buffer between the developable area of the northern hedgerow field boundary and will ensure that this field boundary is not illuminated at night by the project. In addition it is noted that the provision of the meadow grassland and the additional woodland and parkland tree planting bounded the northern boundary of the developable area will have the potential to enhance the footprint of potential foraging habitat for nocturnal species such as bats. Furthermore the proposed woodland planting that will be provided as part of the landscape plan along the northern boundary of the developable area will also be kept free from elevated night time lighting so as to enhance the potential for this new habitat on site to function as foraging habitat for bats. The associated lighting plan (provided under separate cover) illustrates the lighting contours and the position of this proposed woodland habitat outside the 1 lux lighting contour. The provision of this new woodland habitat as well as the meadow grassland habitat to the north will have the potential to result in an overall net increase in the extent of potential bat foraging habitat within the project site.

- Along the southern boundary of the project site the project has been designed to minimise the potential for light spill and illumination of the edge of woodland habitat to the south. The back gardens of residential houses will buffer the houses from the southern boundary and will by design eliminate the requirement for public lighting to the rear of the houses. Similarly no public lighting will be provided to the rear of the apartment buildings towards the western side of the southern boundary. In addition, a continuous treeline of Koster columnar oaks will be provided as part of the landscaping of the site to the south and rear of the apartment buildings. This tall growing tree, which reaches heights of approximately 15m, will provide for a screening tree line to the south of the apartment buildings, thereby minimising the potential for light spill from the apartment building and south facing windows to the woodland edge. The Koster oak will be planted as semi-mature trees. The establishment of the treeline will provide for a sheltered corridor between the treeline and the woodland edge to the south, which in itself will provide ideal foraging habitat for bats.

- The spacing between lights along access roads will be maximized to reduce light intensity.

- In order to reduce light spill, street lighting will be directed to areas only where it is needed. The upward spread of light above the horizontal plane will be avoided by installing low beam angle lights, less than 70 above the horizontal plane and baffling light columns.

- Blue-white short wavelength lights will not be used on site; and

- Lights with a high UV content will be avoided. Instead narrow spectrum lighting with a low UV content will be used on site.

- Low intensity lighting will be used on site.

The above measures have informed the development of the proposed lighting design for the project site. These measures are in line with best practice recommendation of minimizing the impact of artificial lighting to bats, as outlined by the Institute of Lighting Professional's Guidance Note *08/18 Bats and Artificial Lighting in the UK* (ILP, 2018); the Bat Conservation Ireland in their 2010 guidance document *Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers* and Bat Conservation Trust in their 2008 guidance document *Bats and Lighting in the UK – Bats and the Built Environment*.

6.4 EVALUATION OF MITIGATION MEASURES

The mitigation measures outlined above for the construction and operation phase of the project are taken from established best practice guidelines that have been successfully implemented for a wide range of project-level infrastructural developments. These measures have undergone extensive and rigorous monitoring for their effectiveness at development sites where they have previously been applied to ensure adverse environmental impacts are avoided.

The results of this monitoring and the recommendation of these measures as standard best practice guidelines is based upon their high degree of success in ensuring negative environmental impacts are avoided.

The best practice guidance that have informed the mitigation measures proposed in this assessment and that will be adhered to throughout the construction and operation of the proposed development include:

- PPG 1: Understanding your environmental responsibilities - good environmental practices
- GPP 2: Above ground oil storage tanks
- PPG 3: Use and design of oil separators in surface water drainage systems
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer
- GPP 5: Works and maintenance in or near water
- PPG 6: Working at construction and demolition sites
- PPG 7: Safe storage - The safe operation of refuelling facilities
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 8: Safe storage and disposal of used oils
- GPP 19: Vehicles: Service and Repair
- GPP 21: Pollution incident response planning
- GPP 22: Dealing with spills
- GPP 26 Safe storage - drums and intermediate bulk containers
- PPG 27: Installation, decommissioning and removal of underground storage tanks
- CIRIA Environmental Good Practice on Site.
- CIRIA Control of Water Pollution from Construction Sites. Technical Guidance C648.
- CIRIA SuDS Manual Technical Guidance C697.
- Development on Unstable Land. Department of Environment (DOE), UK.
- Bat Conservation Ireland: Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers
- Bat Conservation Trust: Bats and Lighting in the UK – Bats and the Built Environment

7.0 RESIDUAL IMPACTS

As outlined in the baseline and impact assessment sections above no high-value habitat receptors have been identified within the project site and the loss of these habitats will represent at most a negligible residual impact.

A range of construction phase and operation phase design measure have been formulated and will be implemented in order to avoid or minimise to an insignificant risk, the potential for negative impacts to the minor stream and the River Martin to the south of the project site. The implementation of these measures will ensure that the project does not result in any potential significant negative residual impacts to these aquatic receptors.

The principal risks associated with the project relate to disturbance to fauna associated with the boundary woodland habitats during the construction and operation phase.

A sensitive design approach has been adopted for the development so that impacts to these boundaries and their potential to support fauna is minimised. The implementation of these measures will ensure that likely significant effects to fauna are avoided and that these boundaries will continue to have the potential to support fauna.

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APPENDIX 1: SITE PHOTOGRAPHS

Plate 1: View east along the northern field boundary

Plate 2: View south along the western field boundary

Plate 2: View southeast from the northwest Corner of the site

Plate 4: View east throught the northern boundary of the footprint of the devleopment

Plate 5: View of bat detector monitoring point along the northern side of the Woodland to the south of the site.

Plate 6: View of the northern boundary of The site. Bat monitoring microphone is Indicated by the arrow.

Plate 7: View west northwest across from the project site from the southeast corner, Sept. 2020

Plate 8: View of northern project site boundary, Sept. 2020

Plate 9: View south along western project site boundary, Sept. 2020

Plate 10: View northeast across project site from the southwest corner, Sept. 202

Plate 11: View of woodland habitat along the southern boundary, Sept. 2020

Plate 12: View of recolonising vegetation along the southern boundary, buffering woodland, Sept 2020

Plate 13: View of Tandonia rustica on tree limb

Plate 14: View of Tandonia rustica on tree limb

Plate 15: View of Tandonia rustica in decaying woodland litter

APPENDIX 2: POLLINATOR WILDFLOWER SPECIES MIX

Anthyllis vulneraria (Kidney vetch)
Campanula rotundifolia (Harebell)
Centaurea scabiosa (Greater knapweed)
Conopodium majus (Pignut)
Crepis capillaris (Smooth hawksbeard)
Daucus carota (Wild carrot)
Erigeron species (Fleabane)
Galium verum (Lady's Bedstraw)
Geranium pratense (Meadow cranesbill)
Geum urbanum (Herb Bennet)
Knautia arvensis (Field Scabious)
Leaucanthemum vulgare
Lotus corniculatus (Bird's-foot Trefoil)
Lychnis flos-cuculi (Ragged Robin)
Lythrum salicaria (Purple Loosestrife)
Malva moschata (Musk mallow)
Origanum vulgare (Wild marjoram)
Papaver rhoeas (Poppy)
Persicaria bistorta (Bistort)
Plantago lanceolata
Primula vulgaris (Primrose)
Prunella vulgaris
Taraxacum agg. (Dandelion)
Trifolium hybridum
Trifolium pratense
Tripleurospermum inodorum (Scentless mayweed)
Vicia species (Vetches)
* Species mix is based on recommendations outlined by Nichols et al. (2019) and the National Biodiversity Data Series No. 13.