



Carrickmines-Shanganagh River Flood Relief Scheme

Bat Roost & Activity Assessment

Final Report

August 2026

www.jbaconsulting.ie

www.egis-group.com



JBA Project Director

Bernadette O'Connell
2nd Floor
Lincoln House
Lincoln Lane
Arran Quay
DUBLIN

Egis Project Manager

Eoin Dunphy
Classon House
Dundrum Business Park
Dundrum Road
Dublin 14

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Contract

This report relates to the Carrickmines-Shanganagh River Flood Relief Scheme commissioned by Dún Laoghaire-Rathdown County Council (DLRCC), on behalf of the Office of Public Works (OPW). Matt Hosking and William Mulville of JBA Consulting compiled this report.

Purpose

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Table of Contents

1	Introduction	1
	1.1 Background	1
	1.2 Legislative Context	1
2	Project Description	3
	2.1 Project Location	3
	2.2 Project Description	12
3	Methodology	14
	3.1 Desktop Baseline Study	14
	3.2 Recent Field Surveys	14
	3.3 Consideration of Cumulative and In-combination Impacts	15
	3.4 Residual Impacts	15
	3.5 NPWS Consultation	16
	3.6 Competent Persons	16
	3.7 Limitations and Constraints	16
4	Existing Environment	17
	4.1 Desktop Study	17
	4.2 Bat Surveys	17
5	Potential Impacts	47
	5.1 Construction Impacts	47
	5.2 Operational Impacts	47
6	Mitigations	49
	6.1 Introduction	49
	6.2 Mitigation by Design	49
	6.3 Pre-Enabling / Construction Phase Mitigations	49
	6.4 Construction Phase Mitigations	50
	6.5 Operational Mitigations	52
	6.6 Post-construction / Early-operational Ecological Monitoring	52
7	Residual Impacts	54
	7.1 Availability of PRFs	54
	7.2 Bat Foraging and Commuting Habitats	54
8	Conclusion	55

List of Figures

Figure 2-1: Overview of Project Location	3
Figure 2-2: Clon Brugh Site Location	4
Figure 2-3: Belarmine Park Site Location	5
Figure 2-4: Kilgobbin Road Site Location	6
Figure 2-5: Glenamuck Road North Site Location	7
Figure 2-6: Cherrywood Road Site Location	8
Figure 2-7: Lower Brides Glen and Bray Road Site Location	9
Figure 2-8: Commons Road, River Lane and Brookdene Site Location	10
Figure 2-9: Bayview Site Location	11
Figure 6-1: Examples of 1FF Schwegler Bat box (right) and 2F Schwegler Bat box (left).	50

List of Tables

Table 4-1: Bat Roost Potential for the trees scheduled for removal within the scheme	18
Table 4-2: Bat static results for Bray Road	45
Table 4-3: Bat static results for Glenamuck Road North	46

Abbreviations

BAP	Biodiversity Action Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
DLRCC	Dún Laoghaire-Rathdown County Council
DoHLGH	Department of Housing, Local Government, and Heritage
EU	European Union
FI	Further Information
FRS	Flood Relief Scheme
LA	Local Authorities
NBAP	National Biodiversity Action Plan
NBDC	National Biodiversity Centre Ireland
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
pNHA	Proposed Natural Heritage Area
PRF	Potential Roost Feature
RFI	Request for Further Information
RPS	Record of Protected Structures
WFD	Water Framework Directive

1 Introduction

1.1 Background

JBA Consulting Engineers and Scientists Ltd. (hereafter JBA) was commissioned by Dún Laoghaire-Rathdown County Council (DLRCC), on behalf of the Office of Public Works (OPW) as part of a Request for Further Information (RFI) for the proposed Carrickmines-Shanganagh River Flood Relief Scheme at sites in the townlands of Woodside, Kilgobbin, Carrickmines, Brennanstown, Shankill, Loughlinstown, Shanganagh and Hackettsland. See below for the specifics of Item 8a from An Coimisiún Pleanála's RFI:

'7a Undertake bat activity surveys for works at the Glenamuck Road and Bray Road sites. On the basis of the findings, provide mitigation or compensation measures for the reinstatement of the linear habitats impacted in each works areas.'

'7b On the basis of the arborist report, a number of mature trees and trees with dense ivy cover are to be removed. Furthermore, the arborist report identifies 56 trees for removal, while the EIAR states there are 45. The applicant is requested to undertake a revised survey of trees for potential bat roosts features. This shall be carried out in a systematic manner, with photographic evidence provided, and cross referencing the arborist report tree codes.'

1.2 Legislative Context

Policy and legalisation for nature conservation; and protected and priority species relevant to the proposed project is provided below

1.2.1 Biodiversity Policy and Guidance

Ireland's 4th National Biodiversity Action Plan 2023-2030 (NBAP) (DoHLGH, 2024) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature.

The 4th NBAP endeavours for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business (including developers), local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

This NBAP 2023-2030 builds upon the achievements of the previous Plan. It will continue to implement actions within the framework of five strategic objectives, with the first two objectives of particular relevance to the production of this Riparian Bird Conservation Plan:

- Objective 1 - Adopt a Whole of Government, Whole of Society Approach to Biodiversity
- Objective 2 - Meet Urgent Conservation and Restoration Needs
- Objective 3 - Secure Nature's Contribution to People
- Objective 4 - Enhance the Evidence Base for Action on Biodiversity
- Objective 5 – Strengthen Ireland's Contribution to International Biodiversity Initiatives.

The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the National Biodiversity Action Plan.

As part of the Action Plan process Local Authorities (LA) must produce Biodiversity Action Plans (BAP). BAPs highlight local biodiversity issues and set out a series of objectives and action plans for the conservation of priority species and habitats where they occur in each district or county.

1.2.2 Protected Species

In Ireland, all bat species and their roosts are legally protected under the Wildlife Acts 1976-2021 and the Wildlife (Amendment) Act 2023.

Furthermore, the Habitats Directive (European Commission 1992) lists all bat species under Annex IV of the Habitats Directive, and one species, the Lesser Horseshoe Bat *Rhinolophus hipposideros* under Annex II. This directive requires member states to take measures to maintain or restore bats and their habitats to a favourable conservation status. It also mandates strict protection for bat species, prohibiting deliberate disturbance, capture, or killing, as well as the deterioration or destruction of their breeding sites and resting places. *S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011* transposes the Directive into Irish law.

Member states are required to designate Special Areas of Conservation for all species listed under Annex II in order to protect them.

This means that it is illegal to deliberately capture, injure, or kill a bat, or to deliberately disturb a bat. It is also illegal to damage or destroy a breeding site or resting place of a bat, even if bats are not present at the time.

Ireland is also signatory to international treaties, the Bern and Bonn Conventions, respectively the Convention on the Conservation of European Wildlife and Natural Habitats (European Communities 1982) and the Convention on the Conservation of Migratory Species of Wild Animals (European Communities 1983) as well as the Eurobats agreement, that provide further protection for bats.

Where bat roosts exist, application may be made to the National Parks and Wildlife Service (NPWS) for a derogation licence under Regulation 54 of the 2011 Regulations to permit actions affecting bats and/or their roosts that would normally be prohibited by the existing legislation. The applicant must demonstrate that there is no satisfactory alternative and that the action will not adversely affect the favourable conservation status of the bat species. Each case is considered on its particular circumstances, and an application may be refused.

Mitigation to reduce or compensate for any impact of development is generally a condition of the license and should be proportionate to the predicted impact. Mitigation measures may require particular timing of operations, protection of existing roosts or the creation of new roosting facilities to replace ones being lost. Monitoring of the effect of the mitigation is usually required (Marnell, Kelleher, and Mullen 2022).

2 Project Description

2.1 Project Location

The development will consist of a series of flood defences positioned along the banks of the Carrickmines-Shanganagh river system as it flows from the R117 Enniskerry Road towards the Irish Sea, where it discharges at Killiney Bay (Figure 2-1). The defences comprise new and upgraded flood walls, culvert adjustments, and instream works.

The proposed scheme includes interventions on rivers and streams including: Kilgobbin Stream, Ballyogan Stream, Carrickmines River, Brides Glen River and Shanganagh River. The Carrickmines-Shanganagh River catchment is approximately 36km² and encompasses a wide variety of land uses ranging from rural mountainous areas in the west, to urban residential areas in the east. The proposed development will be situated primarily in the built-up residential parts of the catchment. A description of the work areas follows, from west to east (upstream to downstream).

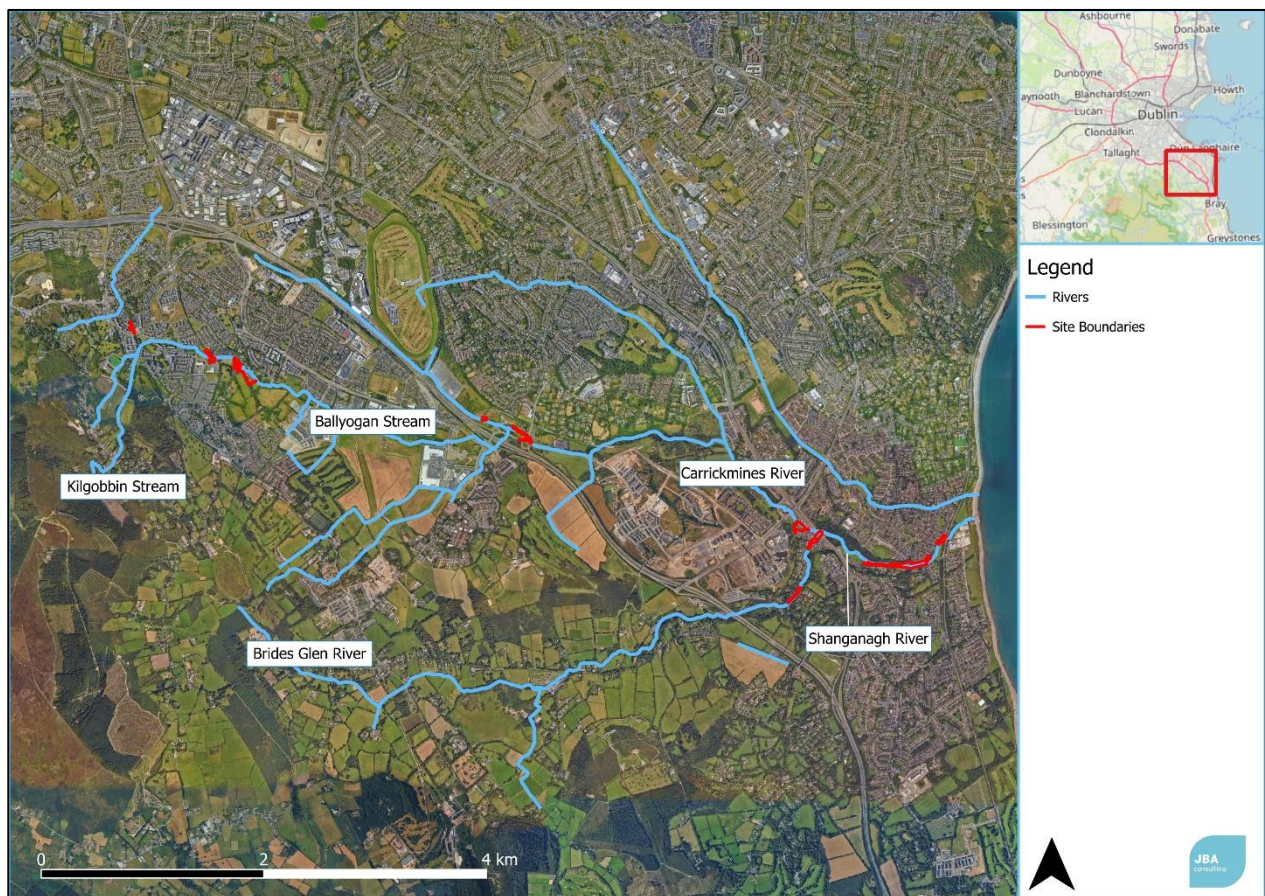


Figure 2-1: Overview of Project Location

Clon Brugh

Clon Brugh (Figure 2-2) is a residential estate situated just east of the R117 Enniskerry Road. It comprises a mix of 3-4 storey apartment blocks and houses, with small green areas, car parking, and footpaths. The proposed works in this area will be located along an area of linear green space and footpath. The area surrounding Clon Brugh is also primarily residential, with green space to the west and south in the Dublin mountains foothills.



Figure 2-2: Clon Brugh Site Location

Belarmine Park

Belarmine Park (Figure 2-3) is a small public park surrounded by residential areas to the north, east, west, and southwest, and a school to the southeast. The Kilgobbin Stream flows through the park from roughly west to east through a wooded area, with grassy areas to the north and south. A small pond or wetland is also within the park. The stream enters a culvert at the eastern end of the park and emerges approx. 80m upstream of Kilgobbin Road. Works will be taking place at the boundary wall between the park and houses to the north in Sandyford Hall Grove and Sandyford Hall Crescent.

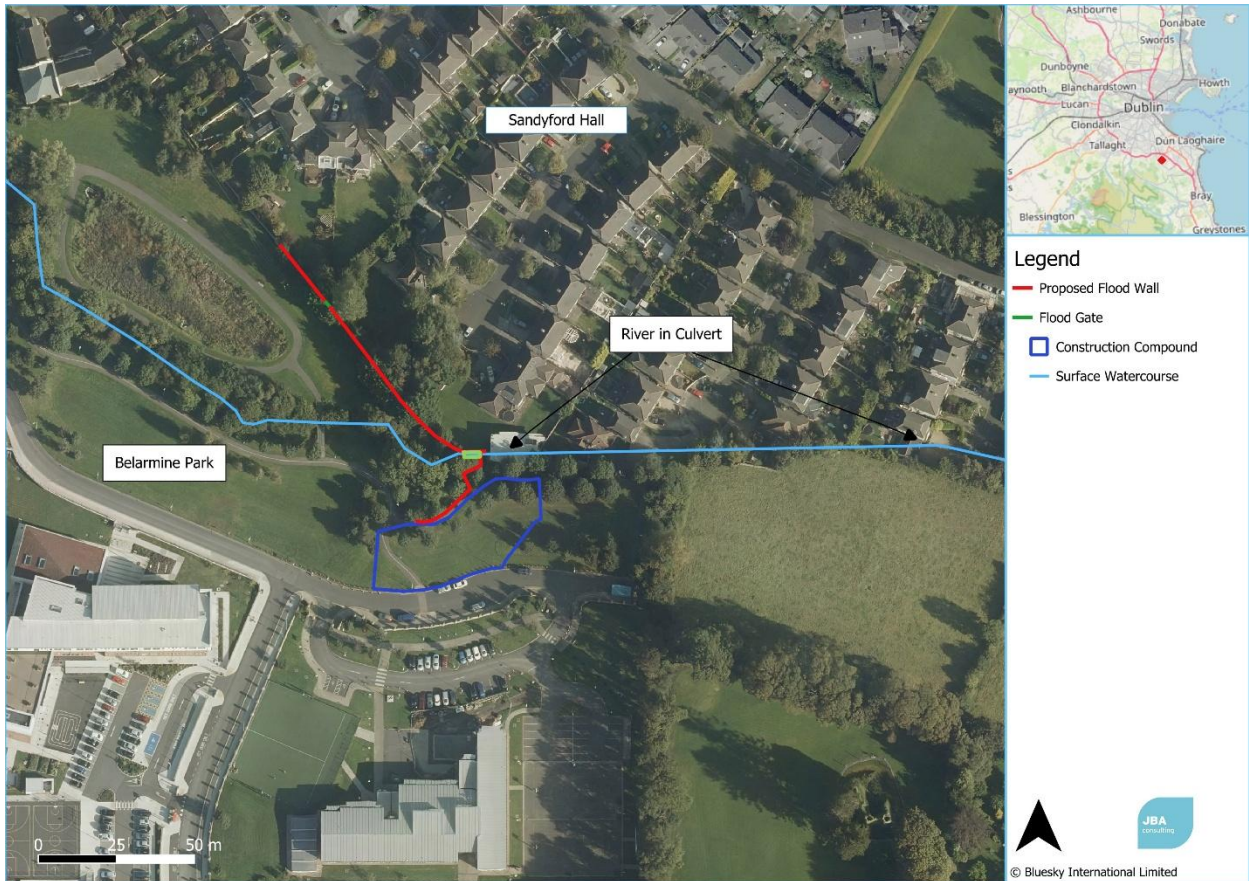


Figure 2-3: Belarmine Park Site Location

Kilgobbin Road

Kilgobbin Road (Figure 2-4) is a small road lined with trees and stone walls, with a narrow footpath on one side for much of its length. The works in this area will take place along the boundaries of two houses on the western side of the road, before running beneath the road and turning east down a narrow laneway, finally running across an area of open space to join back with the river approx. 220m downstream. The houses in this area are all detached, on large plots of land. Kilgobbin House is a protected structure (RPS No.1684) whose stone wall boundary will be removed and reconstructed as a flood wall.



Figure 2-4: Kilgobbin Road Site Location

Glenamuck Road North

The works at the Glenamuck Road North (Figure 2-5) are centred around Glenamuck Road North Roundabout, Ballyogan Grove/Castle View, and Priorsland. Works will be in close proximity to Carrickmines Castle (DU026-005001) and in view of houses along Ballyogan Grove/Castle View and Priorsland. Glenamuck Road North is a busy link road between Carrickmines and the M50 Junction 15, with access also to the Carrickmines Luas Park and Ride, and Leopardstown Racecourse. The proposed works along the northern side of the roundabout are adjacent to an existing footpath and segregated two-way cycle lane, while those along Ballyogan Grove/Castle View are adjacent to the existing road surface, and will replace an existing low stone wall.

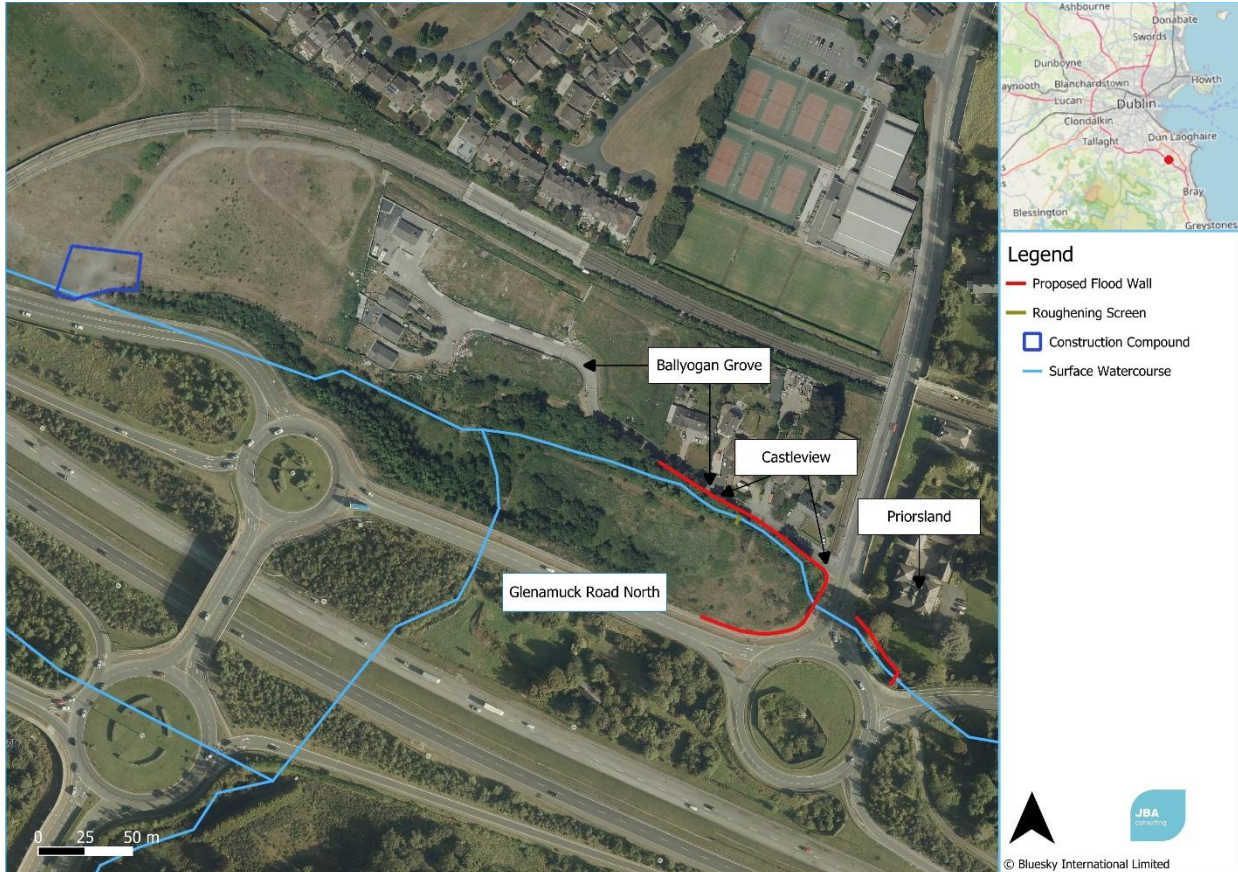


Figure 2-5: Glenamuck Road North Site Location

Cherrywood Road

Cherrywood Road (Figure 2-6) is a tree-lined local road with detached houses on either side. It is situated between the M50 to the west and the N11 to the east, with the Cherrywood Strategic Development Zone (SDZ) to the north. Land use in this area is primarily residential, with large green spaces separating individual houses. The proposed works will take place within the property of three houses, adjacent to the river. The river has a riparian corridor here consisting of mature trees and other vegetation. Immediately downstream of this point, the river flows beneath the Cherrywood Viaduct, which is a protected structure (RPS No. 1783).

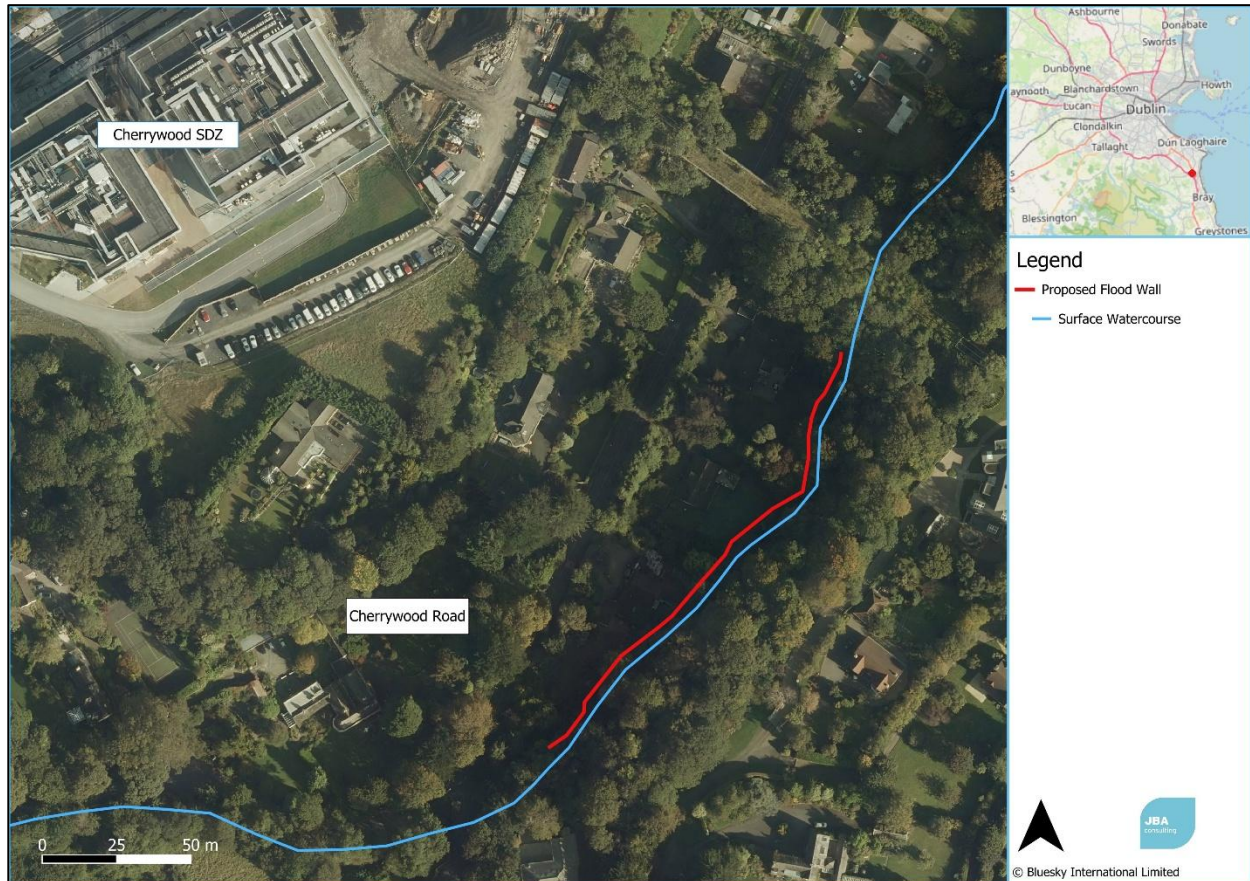


Figure 2-6: Cherrywood Road Site Location

Bray Road

The works at Bray Road (Figure 2-7) will take place on the Carrickmines River, between a green field to the west and the rear of buildings on Bray Road to the east. Bray Road is a cul-de-sac adjacent to the N11 with a mix of commercial and residential buildings. The buildings back on to the river which flows south before crossing under the N11 in a culvert. A mix of trees line the river, with an open green field on its western side.

Lower Brides Glen

Approximately 100m southeast of the Bray Road works at Lower Brides Glen (Figure 2-7), works will take place within the garden of a private residence called Waterfall Cottage, and to the culvert beneath the N11. The N11 is a busy road corridor and changes to the M11 motorway approx. 500m south of the works area. The downstream end of the N11 culvert overflow works is within Loughlinstown Woods, a densely wooded area which is also designated as a proposed Natural Heritage Area (pNHA).

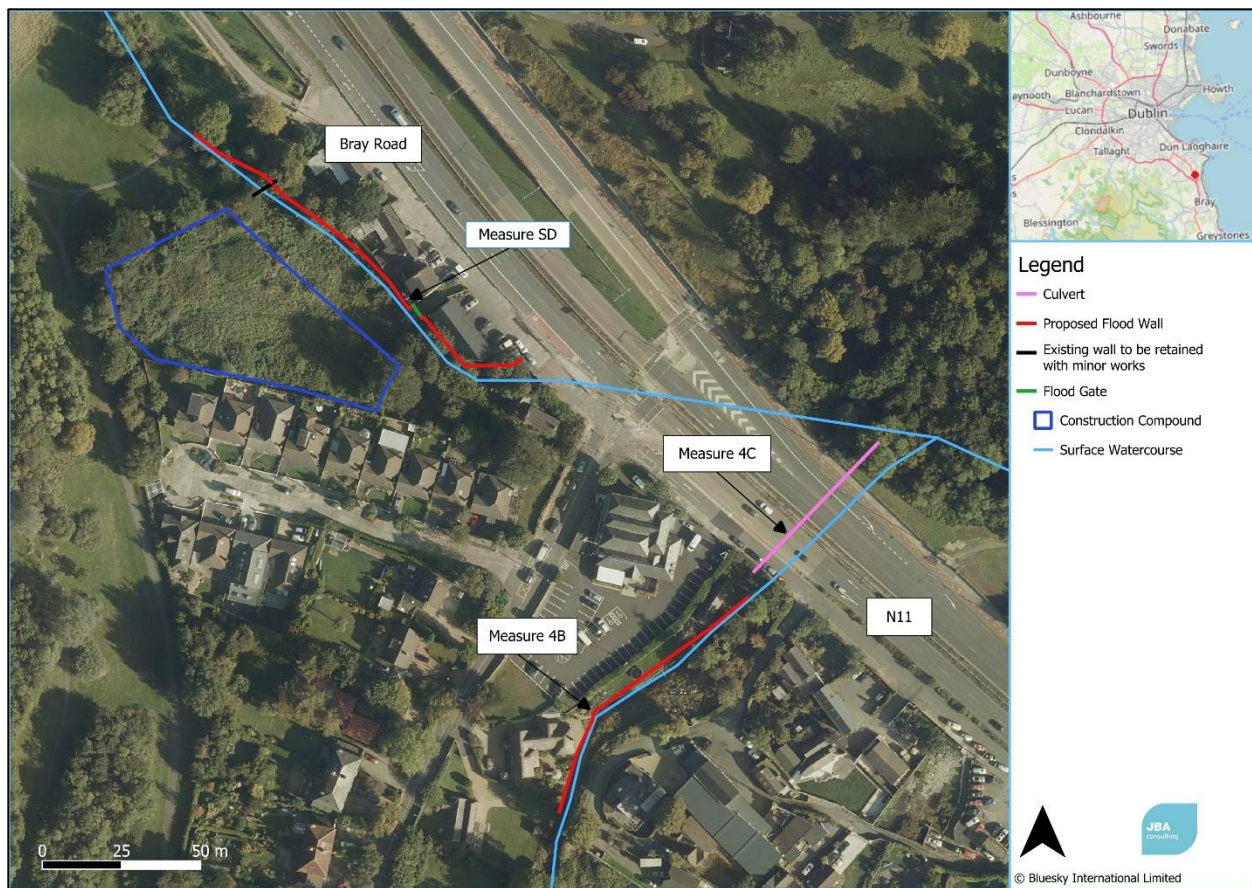


Figure 2-7: Lower Brides Glen and Bray Road Site Location

Commons Road, River Lane and Brookdene

Works at the Commons Road, River Lane and Brookdene Site Location (Figure 2-8) will take place along the Shanganagh River as it flows from west to east along Commons Road, under the Shanganagh Road Bridge, and between River Lane and Brookdene. Upstream of the bridge, Commons Road has residential development along its south side, with the river adjacent to the north. The northern side of the river at this point is wooded, with one house and a bridge providing access at roughly the midway point of the works. North of the wooded area is housing. Shanganagh Road Bridge is a protected structure (RPS No. 1772) and is a narrow two-lane stone arch bridge. Downstream of the bridge, River Lane and Brookdene are both residential roads, with a footpath adjacent to the river along River Lane, and a riparian strip and tree line on the left (north) bank at Brookdene.



Figure 2-8: Commons Road, River Lane and Brookdene Site Location

Bayview

Bayview (Figure 2-9) is a residential area bound to the east by the railway line and a green area through which the Shanganagh River flows. Bayview comprises semi-detached and detached houses with front and rear gardens. Downstream of this point, the river flows beneath the railway line and past Shanganagh Wastewater Treatment Plant to the south, before discharging into the sea at Killiney Bay.

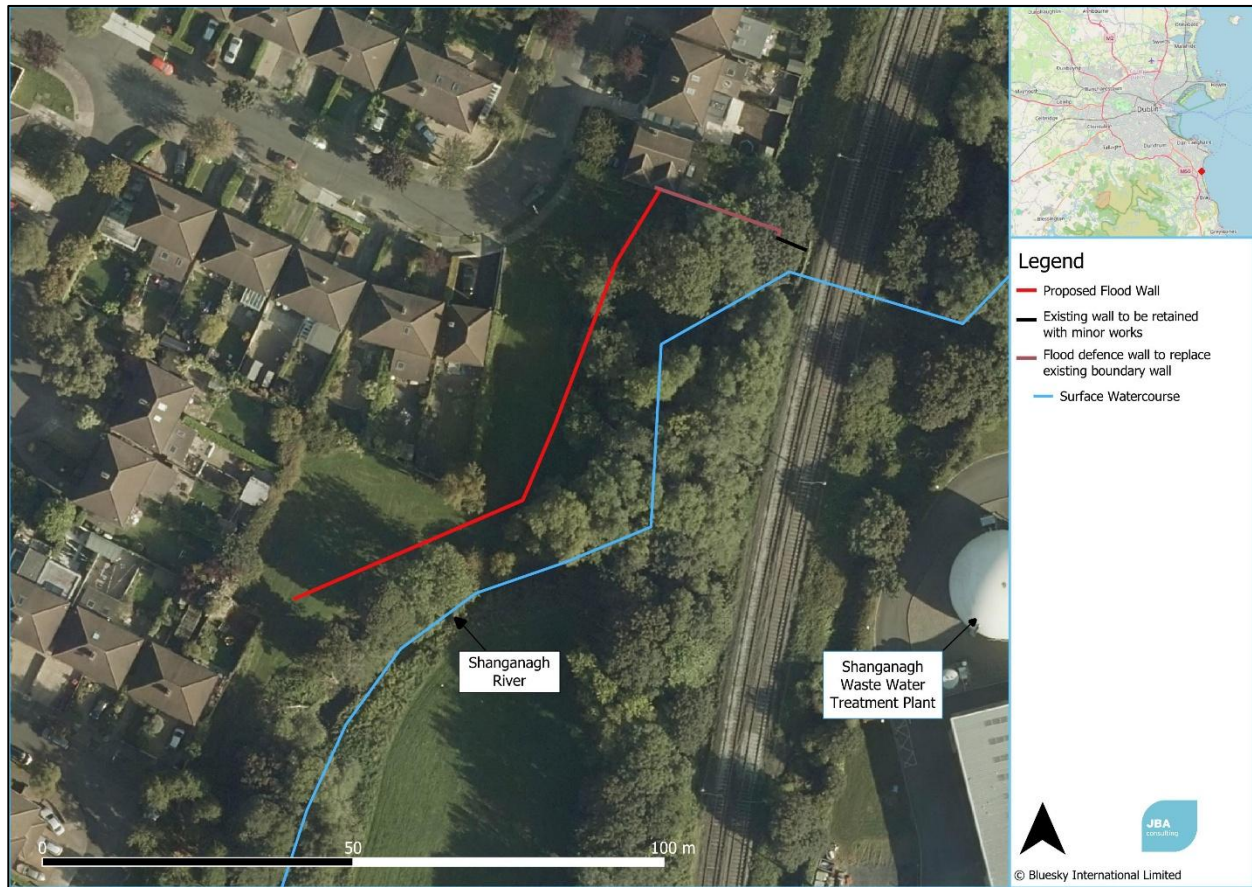


Figure 2-9: Bayview Site Location

2.2 Project Description

The characteristics of the proposed development are described in detail in this section.

Clon Brugh

- Construction of c. 113m of flood defence walls up to 1.35m high adjacent to the existing overland flow path from the Carysfort Maretimo Stream.
- Demolition of c. 16m of existing masonry walls and realignment works to the existing footpath.

Belarmine Park

- Replacement of c. 100m of the Sandyford Hall boundary wall with a new concrete flood defence wall up to 2.6m high.
- Construction of c. 36m of new flood defence walls in Belarmine Park up to 1.65m high to tie into the existing culvert inlet.
- Minor upgrade works to the existing culvert inlet structure.

Kilgobbin Road

- Replacement of c.69m of existing stone boundary wall to a protected structure Kilgobbin House (RPS Ref: 1684) and construction of c.100m of stone finished flood defence walls up to c.1.7m upstream of Kilgobbin Bridge.
- Installation of c. 298m of culvert from a proposed flow control weir at Kilgobbin Bridge to a discharge point adjoining Meadowbrook downstream.

Glenamuck Road North

- Demolition and removal of c. 128m of existing masonry walls.
- Construction of c. 259m of stone finished flood defence walls up to 1.9m high, including flood gate, along Castle View/Ballyogan Grove and the upstream face of the bridge at Glenamuck Road roundabout.
- Construction of c. 90m of flood defence wall up to 1.5m high adjacent to the river immediately downstream of Glenamuck Road roundabout.
- Installation of a new in-channel debris screen immediately upstream of the existing bridge.

Cherrywood Road

- Construction of c. 178m of concrete flood defence wall ranging from 1.1m to 2.7m high, including demountable barriers and railings, on the bank of the Brides Glen River adjoining the existing properties and upstream of the Cherrywood Viaduct (RPS Ref. 1783).

Bray Road

- Construction of c. 133m of concrete flood defence wall ranging from 1.1m to 3.1m high, including flood gate, on the Carrickmines River to the rear of existing properties on Bray Road.
- Circa 75m of river channel realignment, replacement of the existing access bridge and strengthening works to the existing masonry arch.

Lower Brides Glen

- Construction of c. 129m of flood defence walls ranging from 1.2m to 2m in height. The walls are to be located along the north bank of Brides Glen River, within the curtilage of existing properties including a protected structure Waterfall Cottage (RPS Ref: 1770) and immediately upstream of the N11 culvert. Works include demountable barriers and decorative railings.

N11 Overflow Culvert

- Installation of c. 53m of new 2.4m diameter overflow pipe beneath the N11 dual carriageway including an inlet upstream of the N11 and an outlet structure in Loughlinstown Park.

Commons Road, River Lane and Brookdene

- Construction of c.209m of flood defence walls up to 2.4m high on Commons Road adjoining the river.
- Structural works to upgrade c. 324m of existing flood defence walls upstream of Shanganagh Road Bridge to an overall height of up to c.3.6m.
- Structural remedial works to the existing Protected Structure, Shanganagh Bridge (RPS Ref: 1773) including underpinning, scour protection and reinforcement of the masonry parapet.
- Upgrading of c.113m of existing flood defence wall on River Lane to a height of up to c.1.8m and construction of c.185m of flood defence wall to a height of up to c.1.2m in the Brookdene Estate.

Bayview

- Construction of c. 95m of stone finished flood defence walls up to 1.8m high in the green area adjacent to Bayview Grove/Lawns.
- Replacement of c. 17m of existing boundary wall at 20 Bayview Lawns with a new flood defence wall to match existing wall height and finishes and replacement of remaining c. 10m of wall tying into the culvert under the railway with a concrete flood defence wall.

2.2.1 Duration of Works

The construction phase is anticipated to last approximately 18-24 months. Operations of the site are expected to be permanent.

3 Methodology

This Bat Roost and Activity Assessment report examines the ecological features of value to the local bat populations that are present within the site and its surrounding area in relation to the proposed development. This allows for identification of the potential impacts of the proposed development upon the ecological features associated with local bats. The assessment is based on a desk-based assessment, which determines the baseline conditions at the site of the proposed development, and site surveys, which provided information on the bat population and associated habitats present within and adjacent to the proposed site.

This Bat Roost and Activity Assessment outlines the findings of the desk-based assessment and the surveys and identifies any potential impacts of the proposed development on ecological features associated with the local bats; and propose mitigation measures to avoid or reduce impacts where necessary.

3.1 Desktop Baseline Study

A desktop study was conducted of available published and unpublished information, along with a review of data available on the National Parks and Wildlife Service (NPWS), and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats for the local bat populations, that may be present within ecologically relevant distances from the proposed project site. The data sources below were consulted for the desktop study:

- Bat Conservation Ireland (BCI) bat and roost records;
- NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland;
- NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessment. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland;
- Aerial photography available from www.osi.ie, Google Maps <http://maps.google.com/>;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie;
- NBDC, 2026 – Species Distribution Maps; Available online at www.biodiversityireland.ie;
- All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians and fish; and
- DLRCC Planning Portal.

3.2 Recent Field Surveys

Ecological surveys examining Potential Roost Features (PRFs) for bats and monitoring bat activity within these target areas (as requested by ACP) were conducted by JBA ecologists on the following dates:

- 10th February 2026;
- 21st May 2026;
- 15th June 2026; and
- 22nd June 2026.

The surveys recorded bat habitat suitability; PRFs; and bat activity (emergence and transect) within target areas, following best-practice guidance outlined within the documents below:

- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition) (Collins 2024).

- The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC (NPWS, 2019).
- Bats and Appropriate Assessment Guidelines. Bat Conservation Ireland (Bat Conservation Ireland, 2012).
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Roads Authority (NRA, 2018).
- Bat Mitigation Guidelines For Ireland – V2. (Marnell, Kelleher, and Mullen 2022)
- A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland (McAney, 2006).
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Roads Authority (NRA, 2018).

Habitats utilised by local bats have been named and classified following A Guide to Habitats in Ireland by Fossitt (2000). Nomenclature for higher plants follows that given in The New Flora of the British Isles 4th Edition (Clive Stace, 2019). Identification of Irish plants generally follows Webb's - An Irish Flora (Parnell and Curtis, 2012).

3.2.1 Assessment of PRFs

A bat PRF survey along the proposed scheme was conducted on 10th of February 2026. During this survey, every tree scheduled for removal was assessed for potential bat roosting features, and the suitability of the impacted habitats for bat commuting and foraging activity. Each tree was cross referenced with its labelled number within the Tree Removal Plan document; and photos were taken of each tree and notable PRFs.

3.2.2 Surveying at PRF Sites

Combined emergence and transect surveys were carried out on 21st May 2026, 15th June 2026, and 23rd June 2026 by six JBA ecologists. Staff engaging in the emergence surveys utilise thermal camera (with recorded footage) to monitor the low to moderate PRFs identified along the scheme. These surveys were carried out using a Magenta 5 Heterodyne, Elekon Batscanner and Echo Meter Touch 2 Active bat detectors, as well as visual observations noted throughout the surveys to identify usage of the site. Static recording devices (Anabat Chorus) were also deployed to monitor bat activity over the course of 5+ days at the two main target locations, i.e., Bray Road and Glenamuck Road as outlined within RFI item 7a.

3.3 Consideration of Cumulative and In-combination Impacts

Potential sources of cumulative and in-combination impacts were identified based on the infrastructural design of other local development sites. Potential sources of cumulative and/or in-combination impacts of potential significance for the local bat population were identified within the locality of the Carrickmines-Shanganagh FRS.

3.4 Residual Impacts

The project is assessed including mitigation by design measures. This is done where mitigation is proven to be effective and will be implemented effectively with a high certainty. Where significant residual impacts are still identified, further mitigation measures will be proposed as part of the Bat Roost and Activity Assessment to avoid, reduce or minimise them.

3.5 NPWS Consultation

JBA ecologists held a meeting with NPWS's Terry Doherty on the 23rd of July 2026, to discuss the results of the bat surveys and the mitigations proposed to alleviate negative impacts of the local bat populations. Terry Doherty stated that he was 'satisfied' with both the survey effort and resulting data, as well as the proposed mitigation measures for local bats.

3.6 Competent Persons

The assessment was prepared by Matt Hosking BSc (Hons) Wildlife Biology. Matt is an Ecologist with JBA Consulting, with 3 years' experience in ecological consultancy.

The assessment was reviewed by William Mulville BSc (Hons) Zoology, MSc, MCIEEM. William is a Senior Ecologist with JBA Consulting, with over 9 years' experience in environmental and ecological research, outreach and reporting; and with over 8 years in ecological consultancy. William is a full Member of the Chartered Institute of Ecological and Environmental Management.

3.7 Limitations and Constraints

This Bat Roost and Activity Assessment is based on existing data from the above-mentioned sources. The assessment necessarily relies on some assumptions and is inevitably subject to some limitations as detailed below:

- The assessment cannot account for potential future developments within the locality that are not currently registered within DLRCC's planning systems.
- Data from biological record centres or online databases is historical information, and datasets may be incomplete, inaccurate, or missing. The absence of bat records for an area may be due to the under recording in the area and not necessarily imply a lesser species density. These records are therefore to be treated as minimum information available for the area.
- Weather conditions may affect bat activity, i.e., a short period of light precipitation during the transect survey. The occurrence of potential adverse weather or sub-optimal conditions for bats prior to survey were noted and borne in mind during the interpretation of survey results, as these conditions may have disturbed typical bat activity.
- Static detectors may have been recording in sub-optimal conditions, and this may have resulted in negative or positive impacts upon activity survey data from static detectors.
- Transect surveys are a snapshot in time and some species of bats can be flexible in their foraging and commuting habitats. Bat surveyors are in one location at any given time and could miss activity elsewhere.
- Bat detectors can only provide an index of activity rather than absolute numbers of bats.
- Visibility at night may not allow for complete accurate counting of numbers of bats present during in-person activity surveys.
- The precautionary principle is used at all times when determining potential ecological sensitivity of roosting sites, and their immediate surrounds.

4 Existing Environment

4.1 Desktop Study

Eight Bat species protected under the Wildlife Act and the EU Habitats Directive were recorded in the vicinity on NBDC records (2026). The species recorded were:

- Brown Long-eared Bat *Plecotus auritus*
- Common Pipistrelle *Pipistrellus pipistrellus sensu stricto*
- Daubenton's Bat *Myotis daubentonii*
- Leisler's Bat *Nyctalus leisleri*
- Nathusius's Pipistrelle *Pipistrellus nathusii*
- Natterer's Bat *Myotis nattereri*
- Soprano Pipistrelle *Pipistrellus pygmaeus*
- Whiskered Bat *Myotis mystacinus*

These records do not provide a certainty of the absence/presence of bats in these locations. Bat Conservation Ireland has provided a 'habitat suitability' index over the whole of Ireland. The upstream portion of the scheme to Clon Brugh is located within a 10km grid square with a suitability index of 17.44. The central portion of the scheme, from Belarmine to Glenamuck Road North, is located within a grid square with a suitability index of 26.56. The remaining portion of the scheme to the coast, is located within a square with a suitability index of 32, on a scale from 0-100 where 100 is the most favourable for bats.

4.2 Bat Surveys

4.2.1 Habitat Assessment and Ground Level Roost Assessment

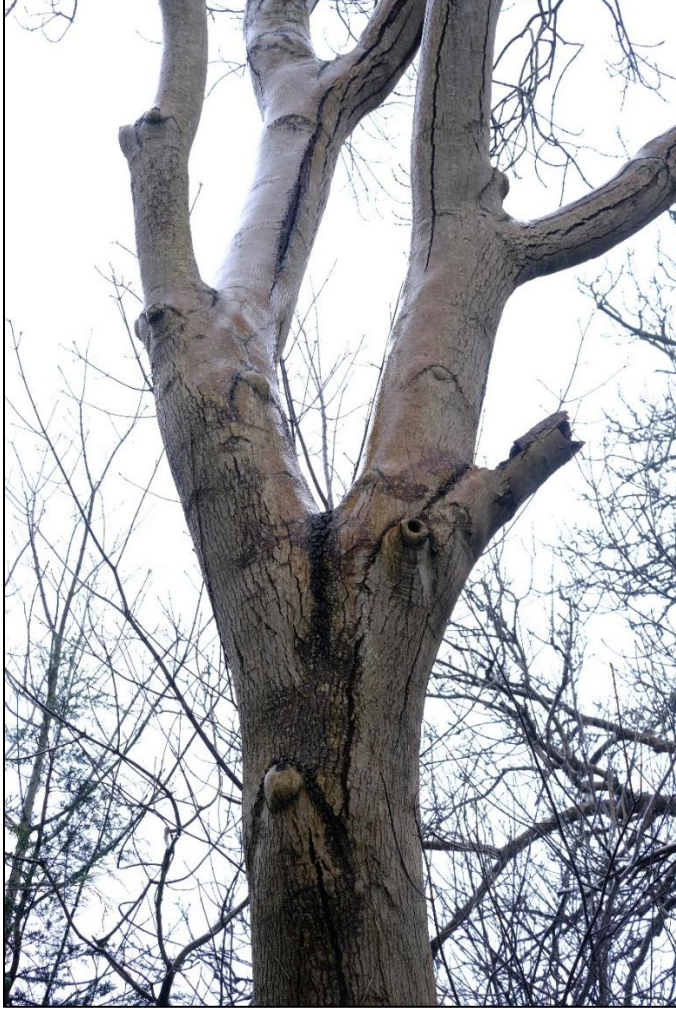
A bat roost potential survey of the proposed scheme was conducted on 10th February 2026. During this survey, every tree scheduled for removal was assessed for potential bat roosting features, and suitability of habitat for bats for commuting and foraging purposes. Following on from this emergence surveys were carried out on 21st May 2026, 15th June 2026, and 23rd June 2026, this was to determine the utilisation of the potential roosts features which were identified within the trees that are to be felled as part of the proposed scheme. Table 4-1 details the trees to be felled, along with notes on their respective numbers, location, PRFs, general health and photos. The table contents start at the furthest downstream tree to be felled and then continues upstream along the scheme length.

Table 4-1: Bat Roost Potential for the trees scheduled for removal within the scheme

Tree No. & Location	Bat Roost Potential	Notes	Photos
1821	No features rated above Negligible suitability for roosting	Mature Ash in rear Mature Ash – healthy No large wounds or fissures present Sparse, young ivy	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1822	No features rated above Negligible suitability for roosting	Alder in foreground	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1823	No features rated above Negligible suitability for roosting	Mature Ash – in decline Ivy cover – some semi-mature Ivy, mainly on main trunk. No suitable pockets formed for roosting. Small fissures present, but with no notable depth for insulated roosting Bird nests present in fork	
1831 – 1832 x9 (northern most two trees)	No features rated above Negligible suitability for roosting	Semi- mature Cherry with shallow peeling bark / fractured bark, as is standard with Cherry trees.	

Tree No. & Location	Bat Roost Potential	Notes	Photos
			
1830	Moderate potential – however due to light spillage from neighbouring lampposts, the tree is considered to have Low potential for bat roosting	Mature Ash – sub-optimal condition A number of wounds are present with a significant presence of fissures, which are mostly shallow. One fissure is suitable for summer roosting. More fissures and peeling bark are present higher up the tree, although no deep hollows are present. Small holes are present on tree although these have limited suitability for bats. Later during the summer bat surveys, the tree had developed further developed	

Tree No. & Location	Bat Roost Potential	Notes	Photos
		existing fissures which had low-moderate bat roosting potential. However, this tree has is impacted by light spillover from surrounding street lighting, making it unsuitable for roosting bats.	 Example of hole present on mature Ash 

Tree No. & Location	Bat Roost Potential	Notes	Photos
			Example of fissures and peeling on trunk of mature Ash  Fissure with summer roosting potential for bats  Light pollution trunk and main limbs from two neighbouring lampposts

Tree No. & Location	Bat Roost Potential	Notes	Photos
T10	No features rated above Negligible suitability for roosting	Cluster of mature Ash and Willow Young ivy coverage present amongst cluster Small wounds and slight peeling though none pronounced enough to accommodate insulated roosting	

Tree No. & Location	Bat Roost Potential	Notes	Photos
T8	No features rated above Negligible suitability for roosting	Cluster of 4 early mature Sycamore – good condition Ivy is present and widespread, mostly semi-mature. No fissures are present	

Tree No. & Location	Bat Roost Potential	Notes	Photos
T13	No features rated above Negligible suitability for roosting	Group of young trees including Beech, Sycamore, and Elm Young Ivy, some peeling but not very deep	

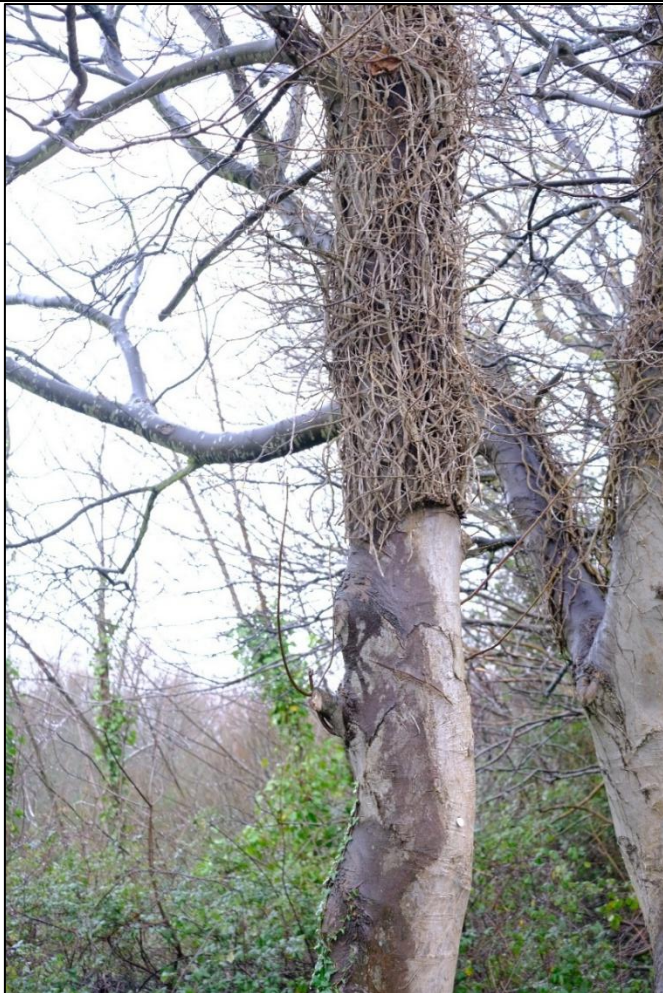
Tree No. & Location	Bat Roost Potential	Notes	Photos
			

Tree No. & Location	Bat Roost Potential	Notes	Photos
1850	No features rated above Negligible suitability for roosting	Cluster of Willows – early mature Young Ivy is present with patches of mature Ivy Minimal peeling	 Example of young Willow in foreground
1849	No features rated above Negligible suitability for roosting	Early mature Sycamore in good condition Tree has been recently trimmed; remaining Ivy present is young and sparse	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1848	No features rated above Negligible suitability for roosting	Early mature Ash tree in poor condition Peeling is present, and semi-mature Ivy is growing along the main trunk.	
1847	No features rated above Negligible suitability for roosting	Mature Sycamore in good condition Sparse ivy cover which has been cut Two holes are present – not deep enough for bats	 Example of one hole present on trunk

Tree No. & Location	Bat Roost Potential	Notes	Photos
			 Example of secondary hole on trunk
1846	No features rated above Negligible suitability for roosting	Mature Sycamore in good condition Very limited Ivy cover, which has been cut	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1844	No features rated above Negligible suitability for roosting	Mature Sycamore in good condition Sparse immature Ivy growth	
1843	No features rated above Negligible suitability for roosting	Mature Ash in decline, fair condition Young Ivy, recently cut	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1842	Low potential	Dead Ivy present on trunk with gap available for bats to roost in No fissures or peeling	 Base of Ivy on tree which has been cut
1841	Low potential	Dead Ivy present on trunk with gap underneath, suitable for bats	

Tree No. & Location	Bat Roost Potential	Notes	Photos
			
1840	Low potential	Dead Ivy with gap present from main trunk.	 Dead Ivy on trunk that has been cut at its base

Tree No. & Location	Bat Roost Potential	Notes	Photos
			
1839	No features rated above Negligible suitability for roosting	Cluster of Hornbeams and Elder. Young ivy present, no real fissures present	

Tree No. & Location	Bat Roost Potential	Notes	Photos
			

Tree No. & Location	Bat Roost Potential	Notes	Photos
1855	No features rated above Negligible suitability for roosting	Semi-mature Hawthorn – in decline	

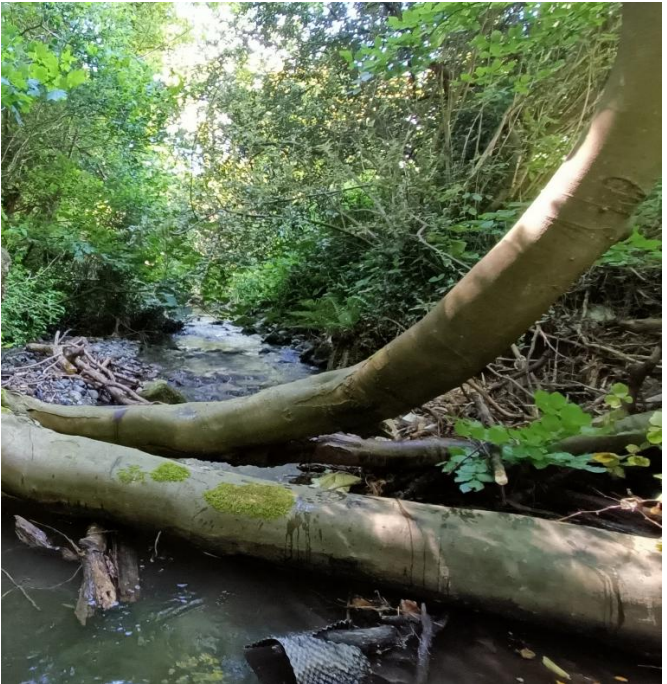
Tree No. & Location	Bat Roost Potential	Notes	Photos
T20 x 2	Low potential	Hawthorn on right, Sycamore on left. Extensive Ivy growth present on both, some of which is mature and thick. Low suitability on hawthorn due to ivy growth and interwoven branches – hard to be certain due to visibility issues Bird box (Robin/Spotted Flycatcher) present on Sycamore – needs to be relocated. Healed wounds also present – no features present on Sycamore	 Hawthorn on right

Tree No. & Location	Bat Roost Potential	Notes	Photos
			 Sycamore on left  Ivy growth on Sycamore

Tree No. & Location	Bat Roost Potential	Notes	Photos
1854	No features rated above Negligible suitability for roosting	Early mature Ash – few wounds present with minimal ivy growth. No suitable cavities for bats.	 

Tree No. & Location	Bat Roost Potential	Notes	Photos
1853	No features rated above Negligible suitability for roosting	Early mature Ash – good condition Minor wounds, some of which have healed Minor ivy growth	
T19	No features rated above Negligible suitability for roosting	Early mature tree Limb breaks present with minor wounds – however none are suitable for roosting bats as they are all vulnerable to rainfall and are partially healed, leaving no cavities	

Tree No. & Location	Bat Roost Potential	Notes	Photos
1851 x 2	No features rated above Negligible suitability for roosting	Sycamore on left, Ash on right – no features in either	
1814	No PRFs	Good condition, early mature	N/A

Tree No. & Location	Bat Roost Potential	Notes	Photos
1815x2 1816x2 1817x2 1818	No features rated above Negligible suitability for roosting	Two mature Ash in decline Two large Laurel shrubs in fair condition Two early-mature Beech in good condition Mature Sycamore in good condition	 Clustered environment resulted in group photo of trees along left bank.

4.2.2 Emergence Activity Survey

The data (on-site observations and thermal camera footage review) gathered from the emergence surveys conducted on the 21st May 2026, 8th June 2026 and 16th June 2026, confirmed that there were no active roosts present within the trees due to be felled as a result of the FRS works (see Table 4-1), or the trees adjacent to works that contained PRFs.

However, the loss of potential roosts features should be mitigated as the removal of these trees will result in a temporary loss in roost features. Other trees being retained will continue to provide potential roosts features; however, it may take 10+ years for younger trees to emulate some of the features being lost due to the tree removal associated with the works.

4.2.2.1 Transect Activity Survey

The transect activity surveys at the Bray Road and Glenamuck Road sites confirmed the habitats within these sites that are utilised for foraging, and commuting. All three of the survey dates had a level of bat activity, however; Bray Road and Glenamuck Road had low bat activity levels with some individual bats showing moderate fidelity for the site. The majority of the trees assessed for emergence were located along the foraging and commuting routes for local bat populations, therefore they were continually observed during the transect surveys.

Bray Road had Soprano Pipistrelle, and Common Pipistrelle recorded during the surveys of the site. Within this area, the bat activity was solely recorded southeast of Whelan's Wine, this is due to the semi-dark corridor that is present along the Kilbridge Stream. Foraging in low numbers of Common Pipistrelle and Soprano Pipistrelle was observed on all three survey dates on the edge of the light pollution zone. The foraging and commuting in this area are impacted from the light pollution of the N11 and R116 resulting in low numbers of bats utilising this area. However, those that were foraging in the area showed fidelity to the site, this was observed during surveying as individual bats would fly in a loop in the area for the duration of the surveying period.

Glenamuck Road has less light pollution compared to the Bray Road work areas, however; it also has low activity levels. The N11 and residential areas surrounding the works areas impact activity levels due to commuting barriers from light pollution, noise pollution and other disturbances. Soprano Pipistrelle, Common Pipistrelle, Leisler's Bat, and a Nathusius's Pipistrelle was recorded within the Glenamuck Road site. Foraging Common Pipistrelle and Soprano Pipistrelle were recorded along the riparian treeline and woodland section within this site. However, numbers were low and frequency of recording of these individuals foraging was relatively low.

Overall, if the transect results were only used then the two sites are of low local significance for local bat populations, as only a small number of bats show that they utilise the site, however; they do show fidelity to these sites due to the recording of their presence during every site visit.

4.2.2.2 Static Activity Surveys and Analysis

Anabat Chorus static bat detectors were installed within meadow and scrub habitat at Bray Road and Glenamuck Road North, respectively. The bat static detector at Bray Road was installed from May 21st 2026 to June 8th 2026, and then again from June 16th 2026 to June 22nd 2026. The bat static detector at Glenamuck Road North was installed from May 21st 2026 to May 27th 2026, and then again from June 15th 2026 to June 22nd 2026.

Common Pipistrelle, Leisler's Bat, *Myotis* sp. and Soprano Pipistrelle were recorded utilising both Bray Road and Glenamuck Road sites. Table 4-2 and Table 4-3 displays the number of passes recorded for each bat species during the survey periods. These results show local bat populations frequent these locations on a regular basis, with variations of activity likely due to optimal vs sub-optimal weather. *Myotis* species which are associated with foraging over waterbodies were infrequent; however, they likely utilise the riparian areas for commuting to preferable foraging areas within the locality.

The static deployed in the Bray Road site was the other side of the N11 from where the transect survey was carried out, it was placed on the edge of the woodland where the culvert is located. The difference in bat activity levels between the transect and static survey show that the woodland northeast of the N11 hosts a moderate bat population, however; the N11 and the wider urbanised landscape do not provide favourable conditions for this population to cross over to Bray Road.

Overall, the static activity surveys show that the two sites have regular occurrence of low to moderate levels of bat activity. However, the Bray Road static results are higher due to being adjacent to more favourable habitat (riparian woodland) than the transect surveys. The two sites are considered to be of high local importance for local bat populations based on the static activity surveys.

Table 4-2: Bat static results for Bray Road

Date	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Myotis sp.	Daily Total
21/05/2026	2	3	0	1	6
22/05/2026	7	5	2	1	15
23/05/2026	7	2	12	0	21
24/05/2026	13	0	31	0	44
25/05/2026	36	5	14	0	55
26/05/2026	58	2	33	1	94
27/05/2026	40	2	19	1	62
28/05/2026	47	9	27	0	83
29/05/2026	41	5	20	0	66
30/05/2026	23	3	25	0	51
31/05/2026	25	5	22	1	53
01/06/2026	13	5	45	6	69
02/06/2026	20	6	15	0	41
03/06/2026	1	2	1	0	4
04/06/2026	7	18	1	0	26
05/06/2026	2	5	0	0	7
06/06/2026	18	3	14	2	37
07/06/2026	5	9	2	0	16
08/06/2026	11	6	3	1	21
16/06/2026	132	8	11	0	151
17/06/2026	40	5	39	0	84
18/06/2026	42	6	89	0	137
19/06/2026	19	1	0	0	20
20/06/2026	67	9	36	0	112
21/06/2026	74	10	3	0	87
22/06/2026	153	4	1	0	158
Species Total	903	138	465	14	1520
Overall Total					

Table 4-3: Bat static results for Glenamuck Road North

Date	Common Pipistrelle	Soprano Pipistrelle	Leisler's Bat	Myotis sp.	Daily Total
21/05/2026	29	11	0	1	41
22/05/2026	23	11	0	1	35
23/05/2026	29	4	6	1	40
24/05/2026	17	2	2	7	28
25/05/2026	6	1	1	2	10
26/05/2026	19	5	0	12	36
27/05/2026	21	7	4	3	35
15/06/2026	15	2	0	0	17
16/06/2026	22	4	0	0	26
17/06/2026	80	3	14	0	97
18/06/2026	22	1	11	1	35
19/06/2026	21	2	0	0	23
20/06/2026	8	1	0	0	9
21/06/2026	4	2	0	0	6
22/06/2026	28	1	0	0	29
Species Total	344	57	38	28	467
Overall Total					

5 Potential Impacts

5.1 Construction Impacts

5.1.1 Roost Disturbance / Loss

The proposed project will require tree removal to facilitate the flood defences to be installed, trees that are to be removed were assessed for roosting potential (Table 4-1). Low to moderate potential roosts features were identified, although the emergence surveys showed that none of these potential roost features were in use, the loss of these trees removes the potential for these features to be utilised.

Therefore, in the absence of mitigation during the construction phase, there will be a long-term adverse impact of slight significance on roosting potential during the construction phase.

5.1.2 Lighting Disturbance - Foraging and Commuting Activities

The construction phase will require the installation of work compounds; these work compounds will have associated security lighting. In absence of mitigation, the lighting from these compounds will have a negative impact on the commuting and foraging habitats for local bat populations.

The removal of trees along the watercourse will result in more exposure to light pollution on the commuting routes of the local bat populations. The largest change in lighting levels will occur within the Glenamuck Road North site, as one side of the riparian corridor is to be removed due to the required tree removal for the proposed works. The Bray Road and Lower Brides Glen sites, where foraging was observed along existing trees, will also require tree removal. The removal of these trees will increase light pollution to these foraging areas, as well as a decrease in vegetation that support the local bats' prey base.

Therefore, in the absence of targeted mitigation during the construction phase, it is anticipated that there will be a medium to long-term adverse impact of slight significance on foraging and commuting activities for local bat populations due to lighting disturbance for the construction phase.

5.1.3 Habitat Loss and Fragmentation

The removal of trees along the riparian corridor sections will result in a loss of commuting habitat for local bat populations. Additionally, the removal of trees and other riparian vegetation will increase light pollution to these foraging areas, as well as a decrease in vegetation that support the local bats' prey base.

Therefore, in the absence of mitigation measure during the construction phase, the proposed scheme is anticipated to have a moderate to long-term negative impact of slight significance for local bat populations due to habitat loss and fragmentation during the construction phase.

5.2 Operational Impacts

5.2.1 Roost Disturbance / Loss

The proposed scheme will require tree removal to facilitate the flood defences to be installed, trees that are to be removed were assessed for roosting potential (Table 4-1). Low to moderate potential roosts features were identified, although the emergence surveys showed that none of these roost features were in use, the loss of these trees removes the potential for these features to be utilised in the future.

Therefore, in the absence of mitigations during the operational phase, it is predicted that there will be a long-term adverse impact of slight significance for local bat populations in regard to roosting potential during the operational phase.

5.2.2 Lighting Disturbance on Foraging and Commuting Activities

The removal of trees along the Shanganagh and Carrickmines rivers will cause more exposure to light pollution on the commuting routes of local bat populations, the largest change in lighting pollution will be within the Glenamuck Road North site, one side of the riparian corridor is to be removed due to the required tree removal for the proposed works. The Bray Road site will also require tree removal, foraging activity in the Bray Road site was recorded predominantly around trees that are to be removed. The removal of these trees will increase light pollution to these foraging areas.

As part of the proposed scheme works three sections of the existing walls along the Commons Road will be heightened to provide improved flood defences; which will also extend their capacity to fully block lower elevation light from entering the riparian zone. This will have a slight positive impact on the commuting and foraging for local bat populations along the Commons Road Section, as the reduction of lighting pollution along the watercourse will create more attractive habitat to commute through and forage within, as reduced lighting impacts will also be beneficial for bats' prey (winged invertebrates), increasing the numbers available to hunt.

During the initial operational phase, the newly planted riparian landscaping will lack the structural height and density to block most street lighting from entering the core riparian zone.

Therefore, in the absence of targeted mitigation during the operational phase, it is anticipated that there will be a medium to long-term adverse impact of slight significance on foraging and commuting activities for local bat populations due to lighting disturbance across the scheme.

5.2.3 Habitat Loss and Fragmentation

During the initial operational phase, the newly planted riparian landscaping will lack the maturity required to replicate the invertebrate hosting capacity of the existing riparian vegetation, ultimately resulting in a decrease in prey diversity and abundance for local bats, which frequently forage within the affected works areas.

Therefore, in the absence of mitigation measure the impact from the proposed project will have a medium to long-term negative impact of slight significance for local bat populations due to habitat loss and fragmentation during the operational phase.

6 Mitigations

6.1 Introduction

This section covers the mitigation by design elements within the proposed scheme, that have been produced by JBA.

6.2 Mitigation by Design

6.2.1 Landscaping

As part of the proposed project there will be native trees planted along the riparian corridor to replace the trees to be removed during the works, this includes species such as Pedunculate Oak *Quercus robur*, Goat Willow *Salix caprea*, Grey Willow *Salix cinerea*, Alder *Alnus glutinosa*, Downy Birch *Betula pubescens* and Silver Birch *Betula pendula*. The benefit of this remedial riparian planting will be four-fold. Firstly, these native tree species will largely be replacing non-native and invasive species currently present, such as Spotted Laurel *Aucuba japonica* and Sycamore *Acer pseudoplatanus*. Secondly, the growth rate, planting density and growth structure of these tree species within a riparian corridor will reduce the ecological lag in regard to the shading (dark corridor condition) of the affected stream and river sections along the proposed scheme. Thirdly, these native trees will be better able to support native terrestrial and semi-aquatic invertebrate species, leading to an increase in their diversity and total frequency, which will benefit the local bats in terms of prey diversity and total availability within the proposed scheme area. And fourthly, the tree species such as Pedunculate Oak, Alder will develop bat roost features as they mature. These features will replace those that were lost, however; this will take a significantly long time so other mitigations will be utilised to ensure the impact is mitigated at all stages.

Other areas of native planting for flowering patches will increase the foraging available for local terrestrial invertebrate populations, which will have the knock-on effect of increasing foraging for local bat populations. Overall, the remedial riparian planting will enhance these riparian stretches through the provision of additional foraging and suitable commuting habitat for local bat populations.

6.2.2 Proposed Defences

As part of the proposed scheme works three sections of the existing walls along the Commons Road will be heightened to provide improved flood defences; however, this will also have the effect of blocking streetlights that currently spill into the core riparian zone / watercourse. This will have a positive impact on the commuting and foraging for local bat populations, as the reduction of lighting pollution along the watercourse will create more attractive habitat to commute through and forage within, as reduced lighting impacts will also be beneficial for bats' prey (winged invertebrates), increasing the numbers available to hunt.

6.3 Pre-Enabling / Construction Phase Mitigations

6.3.1 Roost Box Installations

As the proposed FRS will result in the reduction of potential roosts features, as well as additional trees which may have developed roosts features in the near future, 2 bat boxes are to be installed at each works area, prior to any tree removal to mitigate for the losses that are expected. This will ensure that during the construction and operational phase there is no loss of roosting potential for local bat populations.

Example of suitable bat boxes include the 1FF Schwegler Bat Box with Built-in Wooden Rear Panel and the 2F Schwegler Bat Box (General Purpose) (Figure 6-1).

Simple bat boxes suitable for pipistrelles and Leisler's bats can be bought online or constructed. Note that some bat box designs (that are enclosed at the base) require annual cleaning out, which must be carried out by a Bat Specialist or NPWS ranger.

Guidance on installing bat boxes is detailed in the following resource document:

http://www.batcon.org/images/InstallingYourBatHouse_Building.pdf

The approach for installing bat boxes can be summarised as:

- Suggested locations include areas with mature trees within treelines.
- All bat boxes will be mounted at least 4 metres above the ground.
- Mount on the south facing site of the tree where the box is exposed to the sun for part of the day.
- Do not install bat boxes on a tree that is near any lighting column.
- If erecting a bat box on a building, erect as close as possible to the eaves of the building, and on building located adjacent or close to a treeline.
- If erecting on a mature tree, the placement must be free from Ivy with no branches within a 1m radius around the location of the box.

These specifications are generalised; and a bat specialist or suitably qualified ECoW will need to be consulted to provide more definitive advice on how and where to appropriately install these bat roost boxes along the scheme sections.



Figure 6-1: Examples of 1FF Schwegler Bat box (right) and 2F Schwegler Bat box (left).

6.4 Construction Phase Mitigations

6.4.1 Lighting

The lighting for the proposed work compounds will be required to be cowed and directed away from commuting corridors used by local bat populations; this includes all compound security lighting, as well as interior lighting of units installed within the compounds. This is to ensure that the dark corridors along the river and streams are safeguarded from unnecessary light spillage during the construction phase.

Lighting for works will be limited as the works are to be carried out during daylight hours and there will be limited requirement for lighting besides work for the N11 culvert which will be designed in a bat friendly manner.

Clon Brugh

The street lighting baseline of the Clon Brugh works area already contains high levels of light spillage within the and adjacent to the works area. Given the sub-optimal lighting baseline, any additional lighting from the construction works in the area will need to strictly be turned off at dusk during April through to September, in order to prevent any unnecessary cumulative lighting impacts within this area, which will maintain the current lighting baseline along this landscaped corridor.

Belarmine Park

The construction lighting around Belarmine Park will encroach on the dark corridor that is currently preserved by the shading of the outer riparian corridor; however, this can be avoided with cowling and directional lighting to only illuminate the ground around the works where required. This will limit the spill to other sections of the riparian corridor and will ensure the dark corridor stays intact. Following the same principle of turning off the lighting when construction is not occurring from dusk onwards, from April through to September, will also ensure that the dark corridor remains functional for local bat populations during the construction phase.

Kilgobbin Road

Any construction lighting in this area will result in an increase of lighting pollution as it is adjacent to green spaces which do not have any existing lighting. However, with precise cowling and lighting orientation, generated luminance can be limited to the construction area only; and leave the adjacent green spaces as an alternative dark corridor for local bat populations.

Glenamuck Road North

The commuting route for the riparian corridor in this section will predominantly be along the southern side of the river. Through the use of cowling and directed lighting, illumination of the southern bank of the watercourse will not occur, and thus, preserve the dark corridor for local bats during the construction phase of the proposed scheme. Following the timings outlined previously will also ensure the dark corridor remains functional during the construction phase.

Cherrywood Road

Given the dense woodland along the right bank of the stream in this location a dark corridor is likely to be preserved throughout construction as long as lighting does spill beyond the left bank of the stream. However, it is still recommended to utilise cowed lighting and orientate it away from the right bank to ensure the dark corridor remains intact. No lighting should be impacting the viaduct which likely acts as an important corridor for local bat populations to freely cross over the populated Cherrywood Road.

Bray Road

A construction compound will be located in this area and as such will have notable lighting associated with it for security purposes. All lighting must be directed away from the stream and cowed to ensure that no spill is encroaching on the riparian corridor to allow for the commuting route and observed foraging grounds to be maintained for local bat populations. Light spill (lux levels) within the riparian corridor must be inspected by a suitably qualified Ecological Clerk of Works (ECoW) once the compound is established to ensure that the measures pertaining to the lighting orientation and cowling are adhered to. Additionally, a baseline for existing lux levels will have to be obtained prior to the compound setup so the ECoW can identify areas that have increased as a result of light spillage. If light spillage is identified within an area adjustments to the lighting setup are to be made accordingly, in order to best preserve the dark corridor of the stream for bat activity.

Lower Brides Glen

Lower Brides Glen is already subject to high levels of light pollution from the N11 and nearby residential buildings; however, the lighting for this area must also follow the previously outlined measures of cowl and orientation away from the stream so as not to contribute further to the existing levels of light pollution.

Commons Road, River Lane and Brookdene

There are sections of intact dark corridors in this section as commuting and foraging bats were recorded frequently in this area. To ensure the functionality of this area for commuting and foraging bats, the lighting will be cowed and directed away from the river. The small compound that will be present north of the Shanganagh Bridge will also require the same lighting setup and ECoW checks as the compound at Bray Road.

Bayview

The Shanganagh River at the Bayview section currently provides a highly suitable dark corridor, with little light penetration from the neighbouring residential areas. Given its high suitability for bat commuting and foraging, lighting will need to be orientated away from the river and heavily cowed to maintain this and allow for bats to commute and forage within this river section.

6.5 Operational Mitigations

This section outlines the monitoring strategies that will be implemented during the operational phase of the proposed development. These strategies are being put in place in order to ensure no reduction in potential roosts features that are available along the length of the proposed scheme to the local bat population.

Riparian habitat enhancements will be implemented to ensure optimal foraging, commuting and future potential roosting within natural features for the local bat populations.

6.5.1 Riparian Habitat Enhancement

Along the route for the proposed project there will be landscaping as part of the project, this will involve the planting of native vegetation some of which will enhance the existing riparian corridor and provide additional foraging and commuting habitat.

The most important areas within the proposed project are Glenamuck Road North, Bray Road, Commons Road, and Bayview. These locations will have significant alterations to their riparian corridor due to the tree removal required for the proposed project. The planted riparian vegetation in the Glenamuck Road North, and Commons Road areas will ensure that there is no long-term disruption or loss to local bat populations foraging and commuting habitats during the operational phase. However, the vegetation in the Bayview area will be disturbed or removed to facilitate the installation of the flood defence wall. The Bayview area is to be landscaped with meadows and native hedgerows, as well as replacement planting for trees removed. This will provide additional habitat for local invertebrate populations, leading to an increase in foraging potential for local bat populations. The native hedgerow planting will provide an additional foraging habitat for bat populations.

6.6 Post-construction / Early-operational Ecological Monitoring

To determine the success of the proposed mitigations for the proposed scheme in regard to local bat populations, it is required that follow up surveys to monitor bat activity levels and any utilisation of the artificial roosts are carried out. Monitoring of the landscape planting by a suitable ECoW must be undertaken to notify of any required additional planting in case of failing or fallen trees.

The activity surveys will give an indication of any short-term or long-term impact on any change in suitability of the proposed project areas, whether positive or negative from the project and associated mitigations. This

will involve monitoring species present, level of activity and frequency of visits to areas where the works are to take place. The methodology will be the same as that carried out for the assessment outlined in this report (Section 3). Activity surveys should take place for at least three years to determine any impact, positive or negative, on the local bat population.

Monitoring of installed bat boxes should also be carried out, to determine whether the installations have made a positive impact for local bat populations. If the bat boxes are utilised by local bat populations it will also be possible to do DNA analysis on droppings found beneath the boxes, this will give certainty on the bat species that are within the local area of the proposed project. This will help inform any future baseline for future projects within the area.

7 Residual Impacts

7.1 Availability of PRFs

The removal of trees to facilitate the works will result in a loss of roosting potential; however, by installing two artificial bat roost boxes at each works location, the new roosting availability will more than compensate for the loss of PRFs removed through felling. The planting of replacement trees for the ones removed will also create potential for future roosts to be developed within the trees planted.

Overall, following the installation of artificial roosts and planting of replacement trees; there will be a long-term positive residual impact of slight significance on local roosting potential for the local bat populations.

7.2 Bat Foraging and Commuting Habitats

To facilitate the works for the proposed scheme trees will need to be removed, this will alter the structure of the existing commuting routes and foraging grounds for local bat populations. However, in many of the locations the tree removal is limited to one side of the river and vegetation beneath the trees will be retained. This will maintain an effective commuting corridor for local bat populations. The retention of vegetation along the proposed works will also stop any adverse impact on local invertebrate populations, this will have a knock-on impact of maintaining foraging potential for local bat populations. This will ensure that there is no adverse impact from the proposed work on the foraging potential for local bat populations, especially along the Glenamuck North Road, Commons Road, and Bayview areas which had high levels of bat activity during the activity surveys carried out by JBA ecologists. Additional landscape planting for meadow species will create more resources for local invertebrates to utilise which will have the benefit of increasing local invertebrate numbers, providing more foraging for local bat populations.

Overall, following the replacement planting and landscaping mitigation; there will be a permanent positive impact of slight significance for foraging and commuting habitats for local bat populations.

8 Conclusion

The proposed FRS will require the removal of trees which contain PRFs and contribute to commuting corridors and foraging grounds for local bat population. The installation of artificial bat roosts will mitigate the loss of PRFs immediately, the tree replacement planting will ensure the commuting corridor is restored immediately after the proposed works are carried out. The retention of existing vegetation and planting of new meadows outlined in the landscaping will ensure that there is no loss of foraging potential for local bat populations during the operational and construction phases.

Overall, with the proposed mitigations and time for the replacement trees to mature and the meadows to establish; there will be a long-term positive impact of imperceptible significance.

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Offices at:

Dublin
Limerick
Cork
Castlebar

JBA Registered Office

24 Grove Island
Corbally, Limerick
Ireland
+353 61 345463
info@jbaconsulting.ie
www.jbaconsulting.ie

Egis Registered Office

Classon House
Dundrum Business Park
Dundrum, Dublin 14
Ireland
+353 1 485 1400
Info.ireland@egis-group.com
www.egis-group.com