Japanese Knotweed Ireland

SiteID	J5006
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:27:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	80.0000
Water volume used per hectare	4l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	< 3" tall, 18-32" tall, > 32" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J5101
Treated by	Aidan Lombard
Treatment date / time	21/06/2019 10:36:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	14 / 18 KPH SSW / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	30.0000
Water volume used per hectare	1.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Aidan Lombard
Description	3-18" tall, 18-32" tall, Scattered individuals
Treatment notes	Signage erected whole area treated

Supplementary photos

Japanese Knotweed Ireland

SiteID	J5101
Treated by	John Walsh
Treatment date / time	14/08/2019 14:56:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	20 / 17 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	35.0000
Water volume used per hectare	1.75l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Regrowth present area has been treated

Supplementary photos	

SiteID	J5101
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:41:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	3-18" tall, Scattered individuals
Treatment notes	Area treated and signage maintained

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J5102
Treated by	Aidan Lombard
Treatment date / time	21/06/2019 10:23:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 18 KPH SSW / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	20.0000
Water volume used per hectare	1l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Aidan Lombard
Description	3-18" tall, 18-32" tall, Scattered individuals
Treatment notes	Signage erected .area is being cut by road maintenance

Supplementary photos

SiteID	J5102
Treated by	John Walsh
Treatment date / time	14/08/2019 08:54:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	16 / 20 KPH W / 31-60 / 21-40 / Cloudy
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	10.0000
Water volume used per hectare	0.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Knotweed is being cut in location whole area has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

SiteID	J5102
Treated by	Colin Hayes
Treatment date / time	18/09/2019 08:33:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	10.0000
Water volume used per hectare	0.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	< 3" tall, Scattered individuals
Treatment notes	Area treated and signage maintained further monitoring required

Supplementary photos	

SiteID	J6A
Treated by	John Walsh
Treatment date / time	14/08/2019 09:49:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	60.0000
Water volume used per hectare	3l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Sporadic regrowth present throughout location whole area has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6A
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:13:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	< 3" tall, 18-32" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6B
Treated by	John Walsh
Treatment date / time	14/08/2019 10:03:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	60.0000
Water volume used per hectare	3l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Sporadic regrowth present throughout location whole area has been treated,the edge of location is being cut which will lead to further infestation, further monitoring and treatment required

Supplementary photos

Japanese Knotweed Ireland

SiteID	J6B
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:16:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	50.0000
Water volume used per hectare	2.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	3-18" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6C
Treated by	John Walsh
Treatment date / time	14/08/2019 10:16:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	60.0000
Water volume used per hectare	3l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Small amount of regrowth present in location whole area has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6C
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:18:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	3-18" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

SiteID	J6D
Treated by	John Walsh
Treatment date / time	14/08/2019 10:31:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	50.0000
Water volume used per hectare	2.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Small amount of regrowth present whole location has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6D
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:20:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	20.0000
Water volume used per hectare	1l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	< 3" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6E
Treated by	John Walsh
Treatment date / time	14/08/2019 10:35:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 61-75 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	60.0000
Water volume used per hectare	3l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Small amount of regrowth present in location whole area has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J6E
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:22:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	< 3" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

SiteID	J7
Treated by	John Walsh
Treatment date / time	14/08/2019 11:03:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	17 / 18 KPH W / 61-75 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	30.0000
Water volume used per hectare	1.5l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	< 3" tall, Scattered individuals
Treatment notes	Small amount of regrowth present whole location has been treated and signage maintained further monitoring and treatment required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J7
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:29:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	18-32" tall, Scattered individuals
Treatment notes	Area treated no signage required further monitoring required

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J9
Treated by	John Walsh
Treatment date / time	14/08/2019 14:58:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	20 / 17 KPH W / 31-60 / 21-40 / Overcast
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	25.0000
Water volume used per hectare	1.25l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	John Walsh
Description	3-18" tall, Scattered individuals
Treatment notes	Area treated regrowth present

Supplementary photos	

Japanese Knotweed Ireland

SiteID	J9
Treated by	Colin Hayes
Treatment date / time	18/09/2019 09:37:00
Weather ConditionsTemp / Wind / Sky / Humidity % / Rain %	13 / 7 KPH SE / 31-60 / 0-20 / Clear
Method of treatment	Foliar Spray
Herbicide Used	RoundUp Biactive
PCS Number	4660
Calibration rate per hectare	4.0l
Total conc. product used (ml)	40.0000
Water volume used per hectare	2l
Nozzle type	110º 0.3
Calibration used in accordance with SUD	Yes
Qualified and registered advisor	Yes
Qualified and registered PU	Colin Hayes
Description	3-18" tall, Scattered individuals
Treatment notes	Area treated signage maintained further monitoring required

Supplementary photos	

Appendix D

Japanese Knotweed Ireland
Validation Report 2020

Japanese Knotweed Ireland

Lower Lee (Cork City) Drainage Scheme – Invasive Species Advance Treatment Stage 2

River Bride Initial Validation Report 2020

Japanese Knotweed Ireland

SiteID	J5201	
Drawing Number	bride_008	
Contractor Name	Japanese Knotweed Ireland Ltd	
Surveyor Name	Aidan Lombard	
Survey Date/Time	25/05/2020 09:09:00	
Recommended Treatmen	Foliar Spray	
Species Recorded	JKT	
Infestation Outside Fenceline	No	
Measured Area	4.28	
ITM X / ITMY	167413.7844	73409.2222
Notes	New location 2020. Two stands of Japanese Knotweed on river bank.Query for inclusion 2020	

Photos

Supplementary photos	N/A
STATUS	NOT INCLUDED

Japanese Knotweed Ireland

SiteID	J5202	
Drawing Number	bride_007	
Contractor Name	Japanese Knotweed Ireland Ltd	
Surveyor Name	John Walsh	
Survey Date/Time	25/05/2020 09:28:00	
Recommended Treatmen	Foliar Spray	
Species Recorded	JKT	
Infestation Outside Fenceline	Yes	
Measured Area	17.55	
ITM X / ITMY	167451.8558	73667.9007
Notes	New location 2020. Japanese knotweed growing near the road. New growth. Query for inclusion 2020	

Photos

Supplementary photos	N/A
STATUS	NOT INCLUDED

Appendix 5G – Bat Survey Report

Bat Survey Report

Blackpool Flood Relief Scheme

October 2020

Prepared for:
Ryan Hanley on behalf of OPW

CIEEM REGISTERED PRACTICE 2020-2021

O'DONNELL ENVIRONMENTAL

Summary

Proposal: Blackpool Flood Relief Scheme, Cork City.

Report by: Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM.

Statement of Competence: Tom O'Donnell is a Chartered Environmentalist and a full member of the Chartered Institute of Ecology and Environmental Management. He was awarded a BSc in Environmental and Earth System Science [Applied Ecology] in 2007 and an MSc in Ecological Assessment in 2009, both from UCC. Tom has over 10 years professional experience in the environmental industry, including working on projects such as windfarms, overhead power lines, roads, cycleways and residential developments. Tom is licensed by NPWS for roost disturbance (Ref: DER/BAT 2019-58) and to capture bats (C185/2019).

Project Reference: 2020/37			
Document Rev. No.	**Status**	**Contributor**	**Date**
A	Draft Issue	TO'D, EOC	12.10.2020
1	Final Issue	TO'D	19.10.2020
2	Final Issue [Rev2]	TO'D	29.10.2020

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Appendices

1 Introduction

O'Donnell Environmental was commissioned by Ryan Hanley on behalf of Office of Public Works (OPW) to undertake a Bat Survey within the zone of influence of the proposed Blackpool Flood Relief Scheme.

The aims of the study were to determine the following:

- The areas and habitats within the zone of influence of the proposed works which are being used by bats (including commuting routes and foraging areas)
- The diversity and relative abundance of bats present
- If bat roosting is occurring or likely to occur in the zone of influence of the proposed works.

The site of the proposed drainage works is within the River Bride catchment, including Blackpool, Cork City. Site location maps are presented in Figure 2.1 and Figure 2.2 of the accompanying Environmental Impact Assessment Report (EIAR)[1]. The watercourses of relevance to the proposed project are the River Bride and its tributaries including Kiln River, Glen River, and Glenamought River.

The scheme is designed to cater for the 1% Annual Exceedance Probability (AEP) flood event (also known as the 100-year flood event). If approved, the proposed scheme will consist of the following works:

- Construction of a new 342m culvert replacing open water channel
- Replacement of existing bridges / culverts
- Construction of new flood walls/ earthen embankments
- Local channel widening of the River Bride
- Other associated works.

A detailed description of the proposed works is provided within Section 2 of the EIAR.

Elements of the proposed works which have potential to impact on bats include the following:

- Clearance of vegetation to facilitate works
- Loss of 342m of open channel
- Other structural works.

1.1 LEGAL STATUS OF BATS

All bat species and their roosting sites are strictly protected under both national and international law. The purpose of this legislation is to maintain and restore bat populations within their natural range. Where human activities have the potential to compromise bat populations, measures are required to be put in place to avoid impacts or compensate and mitigate for those impacts.

The key legislation which provides protection to bats is as follows:

- Wildlife Act (1976) and subsequent amendments which makes it unlawful to intentionally disturb, injure or kill a bat or disturb its resting place without a licence to derogate from Regulation 23 of the Habitats Regulations 1997, issued by NPWS.

[1] River Bride (Blackpool) Certified Drainage Scheme Environmental Impact Assessment Report. Produced by Ryan Hanley & McCarthy Keville O'Sullivan for OPW & Cork City Council. May 2018.

- The EU Habitats Directive (which has been transposed into Irish law with the European Communities (Birds and Natural Habitats) Regulations 2011) which seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bat species are listed in Annex IV, while Annex II provides additional protection for the Lesser Horseshoe Bat.

2 Methodology

2.1 DESKTOP REVIEW

A desktop review of publicly available relevant data was undertaken on the National Biodiversity Data Centre (NBDC) and National Parks & Wildlife Service (NPWS) websites[2]. The National Biodiversity Data Centre was reviewed for relevant data, specifically i) existing species records for the 10km square in which the study site is located (W67) and ii) an indication of the relative importance of the wider landscape in which the study site is located, based on Model of Bat Landscapes for Ireland (Lundy et al. 2011). In the latter, the index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. Records from the All-Ireland Daubenton's Bat Surveys 2006-2011 (Aughney *et al.*, 2012) were reviewed.

Bat Conservation Ireland (BCI) conducted a search of their records database at the request of O'Donnell Environmental on 12th October 2020. The relevant search area included a 10km radius from a central point within the proposed site. Known roost locations in the target area as well as results from BCI Volunteer based surveys and records submitted by Ecological Consultants were provided. Where roost locations occur in private dwellings the location provided refers to the central point in the relevant 1km grid square.

Consultation was carried out with Kathryn Freeman, NPWS Conservation Ranger, in order to request details of any other relevant records including recent derogation applications.

2.2 VISUAL ROOST SURVEY

Daytime visual assessments were carried out by Tom O'Donnell BSC (Hons) MSc CEnv MCIEEM to identify any bat roosting potential which may exist within the zone of influence of the proposed works. Selected photographs of features surveyed are shown in **Appendix A**.

Potential Roost Features (PRFs) are described according to the scheme outlined in **Table 2.1**, below.

Table 2.1. Scheme for describing the potential suitability of features for bats

Suitability	Description
Negligible	Negligible features which are likely to be used by roosting bats.
Low	A feature with one or more potential roost sites that could be used by individual bats opportunistically. Potential roost sites which do not provide appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.

[2] Accessed 6th October 2020

Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to characteristics and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

After 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)', Collins (2016).

2.2.1 Survey of Structures

Daytime, visual surveys were carried out in July, September and October 2020 and followed guidance set out in Collins (2016). The surveys were non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected to identify any evidence of bat roosting. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc. Bridges were surveyed in September and October 2020 and these are the best months of the year to identify bridge occupation by bats (Billington & Norman, 1997). Bridges were surveyed internally where safe to access. A 5m ladder, torch and endoscope were utilised as required and GPS data was recorded using a Garmin GPSMAP 64x device.

2.2.2 Survey of Trees

Ground-level roost assessments were carried out by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM in October 2020 during daylight hours. Surveys were carried out according to 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)' (Collins, 2016). The surveys were carried out during appropriate weather and light conditions.

While winter is the optimal period for ground level surveys of trees, leaf fall had commenced at the time of survey allowing additional visibility from ground level relative to the summer period. In winter reduced leaf cover maximises light penetration and minimises obstruction of vision (BTHK (2018), Collins (2016)). Inspections of potential roosting features which were safely accessible were carried out using a 5m ladder, torch and endoscope where required.

While ground-level tree surveys can confirm the presence of roosting bats, they often cannot conclusively confirm the absence of roosting bats (Collins, 2016). In trees evidence of recent bat occupation can rapidly disappear. For example, droppings can persist in buildings for many years while they generally do not persist for long in tree roosts.

Tree roosts have been shown to be used in a more transient manner than buildings with many species exhibiting roost switching behaviour (Collins, 2016). For example, Waters *et. al.* (1999) observed roost switching in Leisler's Bats every 2 to 10 days during the active season.

For the above reasons, and in line with Collins (2016), this report takes a conservative approach when considering bat roosting potential of trees. This approach reflects the fact that any tree with bat potential may be used at some point or another and the conservation importance of multiple roosting opportunities is poorly understood. Trees were classified according to the guidelines in Collins (2016), see **Table 2.1**.

2.3 BAT ACTIVITY SURVEY

Bat activity was surveyed using a number of methods. These are outlined below.

2.3.1 Transect Survey

Pre-dawn bat transect (activity) surveys were carried out for 1.5 hours prior to dawn on the 28th and 30th of July, 22nd August and 22nd September 2020 as described in Collins (2016). The surveys were carried out in suitable weather conditions (minimum 10°C, light wind and no precipitation). Ultrasonic detection was carried out using Wildlife Acoustics full spectrum 'Echo Meter Touch Pro' recorders.

The aim of the night-time activity surveys was to investigate bat activity in the zone of influence of the proposed works and to detect any bats which may be re-entering roosts at dawn. While a daytime visual inspection may detect signs of any large aggregations of roosting bats, smaller numbers of bats or bats roosting in discrete locations may not be apparent during daytime visual inspection. The night-time activity surveys primarily utilised visual detection, with the support of ultrasonic detection equipment.

All surveys were carried out on foot, but for safety reasons the survey carried out on the Blackpool Bypass was driven, at a speed of 20km/hr. **Figure 2.1** shows the survey routes used as recorded by a GPS device carried by the surveyor. All transects were walked at least once.

2.3.2 Vantage Point Surveys

Vantage point surveys were utilised in a number of areas where a prominent viewpoint was available or where access to target areas was restricted. The surveys sought to identify and record bat activity by visual means at dawn, utilising ultrasonic detection as a supporting tool. The purpose of the vantage point surveys was to identify foraging and roosting behaviour. **Figure 2.1** shows the locations of vantage points.

2.3.3 Passive Detector Survey

Passive detectors were deployed in two locations along the proposed scheme. Areas chosen had suitable bat habitat and were identified during active surveys as being areas of relatively high bat activity. The locations of passive bat monitoring points are shown in **Figure 2.1**. Details of the survey period including average nightly weather conditions are shown in **Table 2.2**.

Passive detector 'Bat_1' was located in a mature broadleaf woodland where the woodland borders the Glenamought River. The woodland exists in a steeply sloping location. 'Bat_2' was located in the garden of a residence at Golden Villas overlooking riparian vegetation which borders the River Bride. Photos of monitoring points are shown in **Appendix A** (photos A43 and A44).

Monitoring was carried out at 'Bat_1' for 14 nights from the nights of 18th September to 1st October 2020 inclusive and at 'Bat_02' for 9 nights from the nights of 23rd September to 1st October 2020 inclusive. Ultrasonic detection was carried out using full spectrum recorders. Wildlife Acoustics SM4 detectors were utilised for passive surveys.

The purpose of passive surveys was to supplement information gathered during bat activity surveys and to identify any species present in the area which may not have been detected during active surveys. The passive recording results also provide a robust baseline for future monitoring.

Table 2.2 - Details of passive monitoring survey period

Date [night of]	Sunrise	Sunset	Temp. °C	Wind km/h	Precipitation
18/09/2020	07:18	19:45	13.5	10	Dry
19/09/2020	07:20	19:43	10	11	Dry
20/09/2020	07:22	19:41	10.5	8	Dry
21/09/2020	07:23	19:38	11.5	5	Dry
22/09/2020	07:25	19:36	11	6	Dry
23/09/2020	07:27	19:33	9	8	Dry
24/09/2020	07:28	19:31	7	11	Dry
25/09/2020	07:30	19:29	8	12	Dry
26/09/2020	07:32	19:26	7	5	Dry
27/09/2020	07:33	19:24	6	7	Dry
28/09/2020	07:35	19:22	14	7	Dry with rain later
29/09/2020	07:37	19:19	8.5	6	Dry
30/09/2020	07:38	19:17	12	16	Rain
01/10/2020	07:40	19:15	6.5	6	Dry

Weather information: https://www.timeanddate.com/weather/ireland/cork/historic?month=9&year=2020
Solar information: https://www.timeanddate.com/sun/@3308068?month=9&year=2020

2.3.4 Emergence Count

An emergence count was carried out at the confirmed roost on the 31st July 2020. The aim of the survey was to establish the size of the roost, and the species present.

The survey commenced at 20:50 and continued until 22:50. Weather conditions were suitable, with a temperature of 17°C and wind speed measuring F1. The survey commenced in light rain but this cleared at 21:10. Light rain commenced again at 22:30.

No bats were handled to confirm if they were locating, due to the potential risk of transmitting Covid-19 to bats (see Section 2.5 below).

2.4 DATA ANALYSIS

Bat activity sonograms were analysed using Wildlife Acoustics Kaleidoscope Professional sound analysis software and identifications were manually verified.

2.5 EVALUATION & IMPACT ASSESSMENT

Evaluation of ecological features follows the NRA (now TII) publication 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (2009). Impact assessment follows 'Guidelines on The Information to be Contained in Environmental Impact Assessment Reports' published by the EPA (2017).

Reporting follows Chartered Institute of Ecology and Environmental Management (2018) 'Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine'.

2.6 SURVEY LIMITATIONS

The following survey limitations occurred.

2.6.1 Seasonality

Surveys were not undertaken in winter and therefore confirming use of certain roost features by bats in winter was not possible. Inferences have been made regarding suitability for bats at this time of year.

2.6.2 COVID-19 Restrictions

Fieldwork for the current project was carried out during the COVID-19 pandemic and in view of public health guidance pertaining at the time, residents proximal to the scheme were not approached for permission to carry out internal surveys of their homes, e.g. those on Commons Road which back onto the River Bride. This restriction limited the opportunity to locate small or occasionally used bat roosts.

2.6.3 Other Access Restrictions

Safe access to certain structures was not available to facilitate detailed survey. These structures are B11, B12 and B14 (see **Figure 3.3**). No work is proposed for B11 and B12 (fencing and security works are proposed nearby) while B14 is positioned beneath a public light which is expected to limit its use by roosting bats. For these reasons access issues are not considered to be a significant study limitation. Access was not available to two derelict residences adjoining 'S06' a commercial premises on Commons Road. No evidence of bat activity was noted proximal to either of these dwellings during active surveys, and ambient lighting in the area at night reduces the likelihood of these buildings being occupied by bats.

Access to the Dulux Factory, Commons Road, at night was not possible. A vantage point was available from the public road which offered unrestricted view of much of the proposed working area here. The site is well lit at night and night-time illumination is expected to significantly curtail any bat activity in this area and no activity was observed. For these reasons lack of access to this site is not considered to be a significant study limitation.

2.6.4 Survey at Height

Survey at height was not carried out at bridges B2 and B3, a road bridge and a railway bridge. No works are proposed for these structures, but temporary works will occur nearby. No evidence of roosting behaviour was noted in either of these locations during active survey. For these reasons lack of survey at height data is not considered to be a significant study limitation.

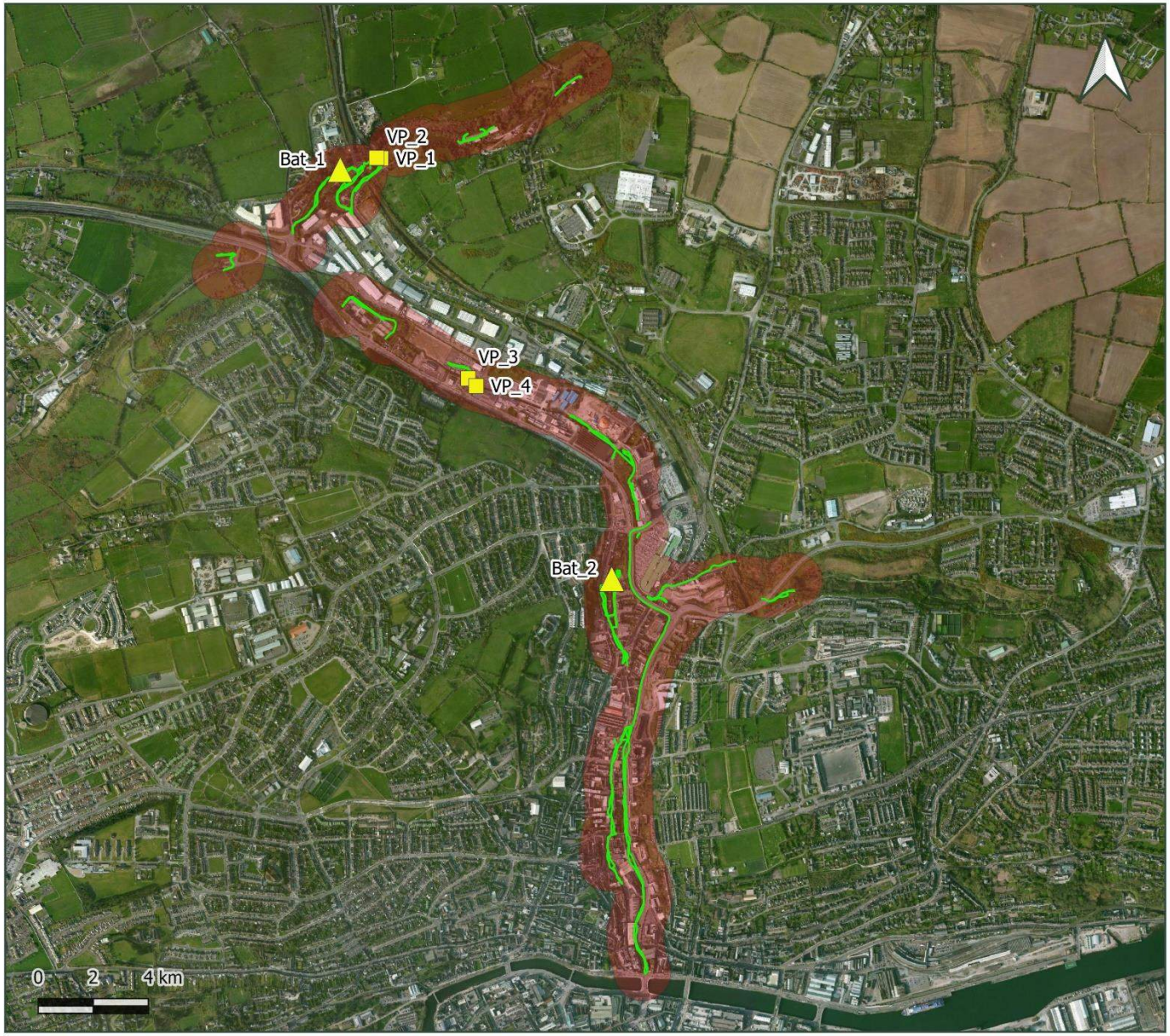


Figure 2.1
Bat Survey Methodology

Project:
Blackpool Flood Relief Scheme

Prepared for:
Ryan Hanley on behalf of OPW

Tom O'Donnell CEnv MCIEEM
D: 08/10/2020

O'DONNELL ENVIRONMENTAL

Legend

- Active Survey GPS Tracks
- Passive Detectors
- Vantage Points

3 Results

The proposed site occurs in an urban and peri-urban context, on the northern side of Cork City. The site contains some limited semi-natural habitat which mostly consists of riparian vegetation associated with the River Bride and its tributaries as well as nearby areas of woodland in the northern section of the proposed scheme.

The urban areas adjoining the scheme (mostly in the southern portion) present abundant bat roosting opportunities, however foraging habitat is suboptimal or absent in these areas. Additionally, these urban areas offer limited landscape connectivity for most bats as a result of a lack of linear landscape features such as treelines and an abundance of artificial light pollution.

Some optimal areas of bat foraging habitat are present in the northern part of the proposed scheme, particularly the Glenamought River valley. Light pollution here is typically low and the area has good landscape connectivity with surrounding habitats.

3.1 DESKTOP SURVEY

3.1.1 Sites of International Importance

Special Areas of Conservation (SAC) and Special Protection Areas for birds (SPA) are those sites that are deemed to be of European (i.e. international) importance. They form part of a network of sites to be designated across Europe in order to protect biodiversity within the community, known as Natura 2000 sites.

The development site is not located within such a site. The only SACs within 15km is Great Channel Island SAC (1058) and Blackwater River (Cork/Waterford) SAC (2170). These sites do not include bats in its conservation interests, and therefore is not relevant to the current assessment. No other internationally designated sites are relevant to the current assessment.

3.1.2 Sites of National Importance

At a national level, the basic unit of conservation is the Natural Heritage Area or proposed National Heritage Area (NHA/pNHA). NHAs are designated to protect habitats, flora, fauna and geological sites of national importance.

There are no NHAs within 15km of the proposed site. A number of pNHAs occur within 15km of the proposed site, the nearest of which is Blarney Bog pNHA (1857). Blarney Bog pNHA is located approximately 2.5km west of closest point of the proposed works (see **Figure 3.1**).

A total of 14 further pNHA sites are located within 15km of the proposed site (see **Table 3.1**). There are no special conservation issues associated with these sites which are of relevance to bats or to the current assessment, and therefore these sites are not considered further in this report.

Table 3.1 - Proposed National Heritage Areas within 15 km of the proposed site

Site Name	Site Code	Site Name	Site Code
Bride/Bunaglanna Valley	0079	Cork Lough	1081
Lee Valley	0094	Dunkettle Shore	1082
Shournagh Valley	0103	Ballincollig Cave	1249
Blarney Castle Woods	1039	Blarney Lake	1798
Douglas River Estuary	1046	Ardamadane Wood	1799
Glanmire Wood	1054	Blarney Bog	1857
Great Island Channel	1058	Monkstown Creek	1979
Lough Beg (Cork)	1066	Cuskinny Marsh	1987
Rockfarm Quarry, Little Island	1074	Owenboy River	1990

3.1.3 Data Search

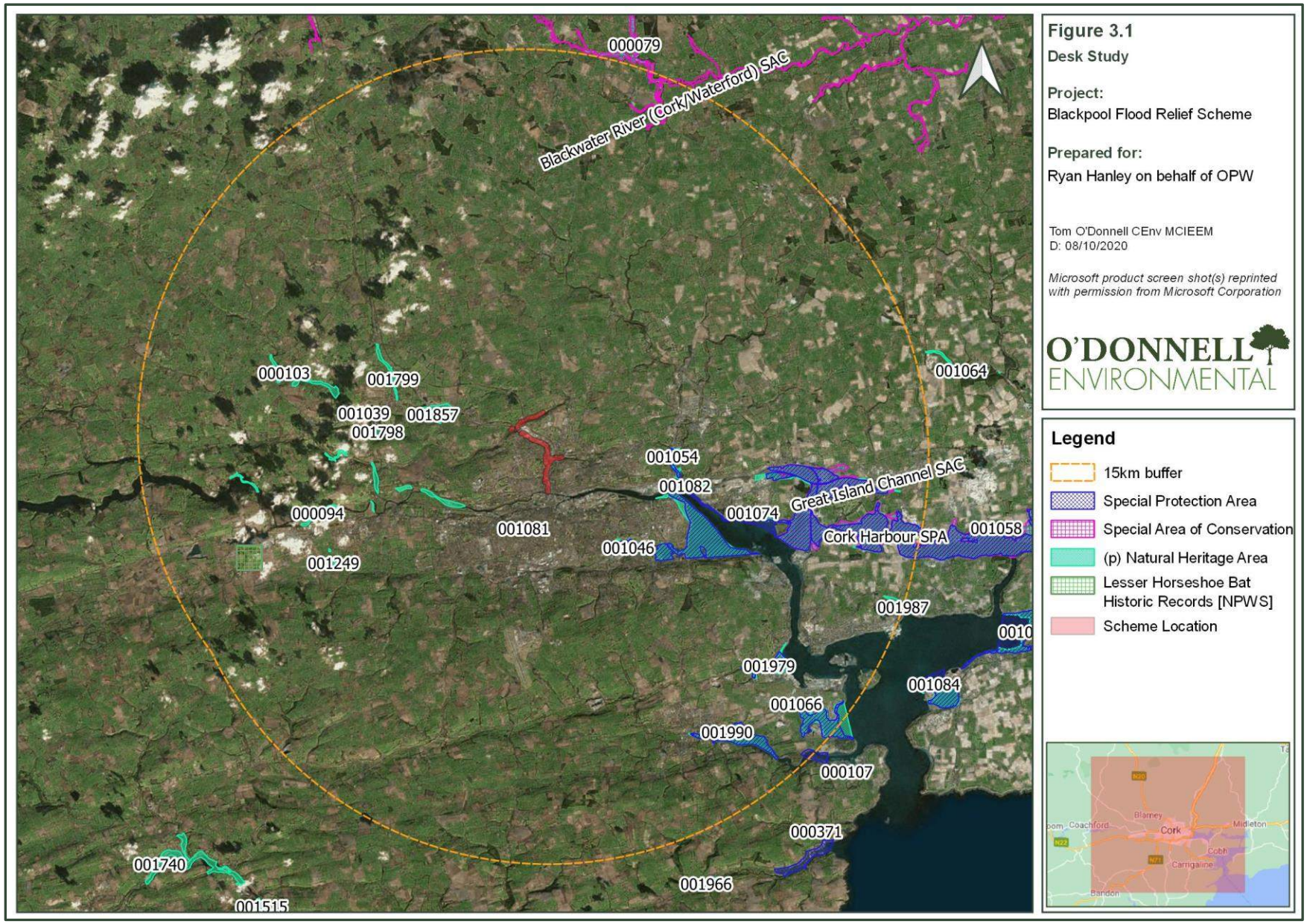
National Biodiversity Data Centre holds previous records of bat presence from within the 10km square (W67) in which the proposed site is located. These records are for Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Daubenton's Bat (*Myotis daubentonii*), Brown Long-eared Bat (*Plecotus auritus*) and Leisler's Bats (*Nyctalus leisleri*). It is important to note that an absence of other bat species records is reflective of a lack of surveys undertaken to date rather than absence of bat species. Lesser Horse-shoe Bat have previously been recorded at Blarney Castle (C. Kelleher, pers. comm.) approximately 5km north west of the proposed scheme. The species has also been recorded at Ovens, approx. 11km west of the proposed scheme.

Bat Conservation Ireland provided records of bat species within 10km of the study area. The locations of these records are shown in **Figure 3.2**, and the records are provided in **Appendix B**. A Leisler's Bat roost was recorded at Grattan Street, Cork City, approximately 500m from the proposed scheme. The current status of this roost is unknown. Leisler's Bats are a relativity large species which fly at a greater height that other Irish bat species and are less likely to follow landscape features. No additional species records, other than those already detected during the current surveys, were held. Bats previously recorded within a 10km buffer zone of the study area were as follows: Whiskered/Brandt's Bat, Brown Long-eared Bat, Common Pipistrelle, Soprano Pipistrelle, Daubenton's Bat, Natterer's Bat and Leisler's Bat. In addition, there were records for 'Myotis species' and 'Unidentified bat'. There were no records for Nathusius Pipistrelle or the Annex II (EU Habitats Directive) listed Lesser Horse-shoe Bat.

The overall bat suitability index value (35) according to 'Model of Bat Landscapes for Ireland' (Lundy *et at.* 2011) suggests the landscape in which the proposed site is located is of moderate to high suitability for bats in general. Species specific scores are provided in **Table 3.2**. The Annex II (EU Habitats Directive) listed bat species, Lesser Horseshoe Bat, is assigned a score of zero as the proposed site is outside the known range for this species.

Table 3.2 - Suitability of the study area for the bat species according to 'Model of Bat Landscapes for Ireland' (Lundy *et al.* 2011).

Common name	Scientific name	Suitability index
All bats		*35*
Soprano pipistrelle	*Pipistrellus pygmaeus*	49
Brown long-eared bat	*Plecotus auritus*	51
Common pipistrelle	*Pipistrellus pipistrellus*	48
Lesser horseshoe bat	*Rhinolophus hipposideros*	0
Leisler's bat	*Nyctalus leisleri*	50
Whiskered bat	*Myotis mystacinus*	47
Daubenton's bat	*Myotis daubentonii*	30
Nathusiius pipistrelle	*Pipistrellus nauthusii*	11
Natterer's bat	*Myotis nattererii*	33


000079
Blackwater River (Cork/Waterford) SAC
000103
001799
001039
001857
001798
001064
001054
001082
Great Island Channel SAC
000094
001074
001081
Cork Harbour SPA
001058
001046
001249
001987
001979
001084
001066
001990
000107
000371
001740
001966
001515
Figure 3.1
Desk Study
Project:
Blackpool Flood Relief Scheme
Prepared for:
Ryan Hanley on behalf of OPW
Tom O'Donnell CEnv MCIEEM
D: 08/10/2020
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O'DONNELL ENVIRONMENTAL
Legend
15km buffer
Special Protection Area
Special Area of Conservation
(p) Natural Heritage Area
Lesser Horseshoe Bat Historic Records [NPWS]
Scheme Location
Blarney
Cork
Coachford
Midleton
Cobh
Carrigaline
Bandon

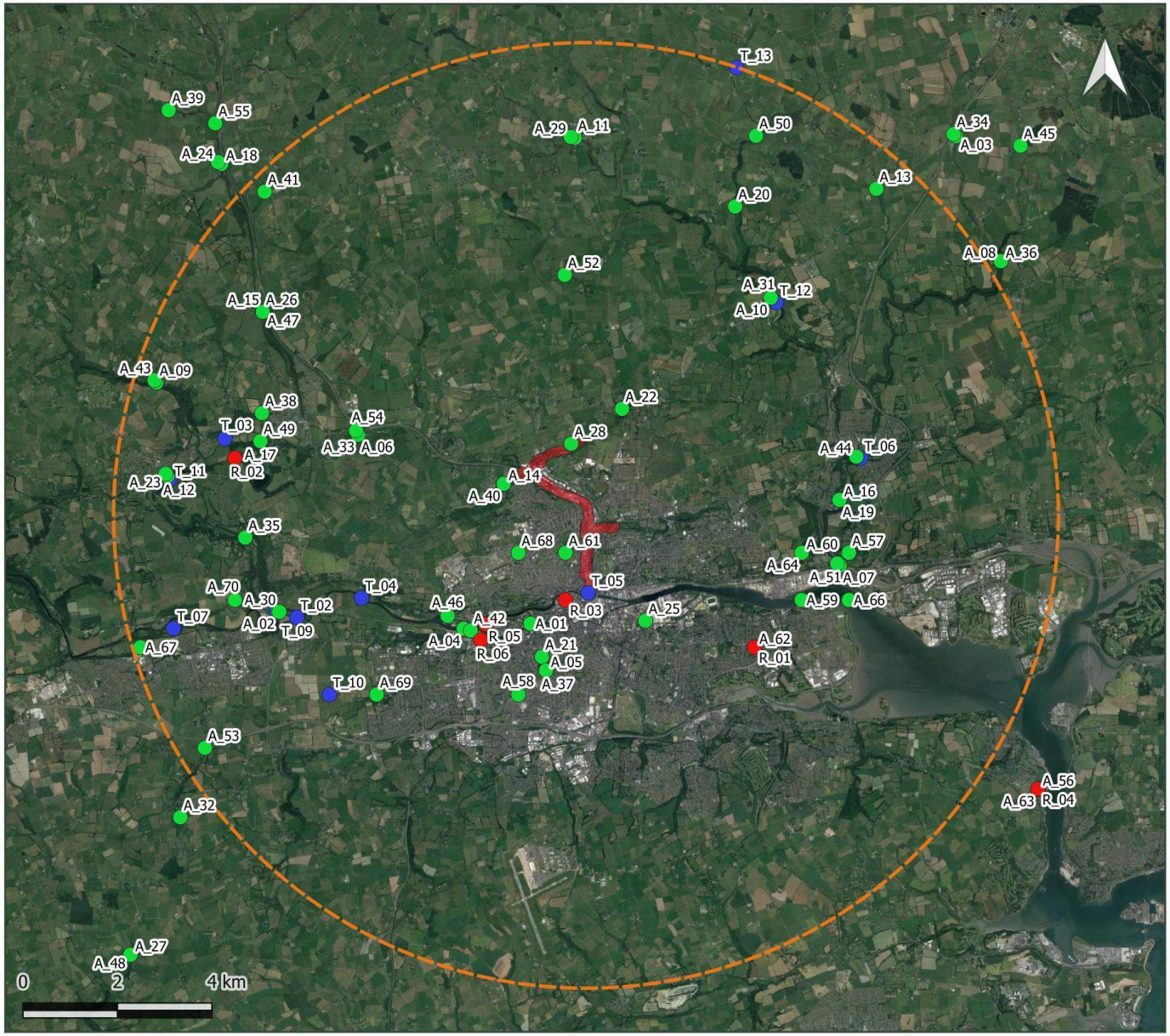

Figure 3.2
Bat Conservation Ireland Records

Project:
Blackpool Flood Relief Scheme

Prepared for:
Ryan Hanley on behalf of OPW

Tom O'Donnell CEnv MCIEEM
D: 12/10/2020

O'DONNELL ENVIRONMENTAL

Legend

BCI roost records

- Roost Records
- AdHoc Records
- Transects
- 10km Buffer
- Scheme Location

3.2 VISUAL ROOST SURVEY

Daytime visual inspections were carried out with the aim of identifying bat roosts by either the presence of bats or the presence of signs of past bat roosting. Surveys of man-made structures such as bridges, buildings and walls were carried out where the proposed works had potential to cause disturbance should a roost be present. Surveys of trees were also carried out where the proposed works had potential to cause disturbance should a roost be present. Photographs of the selected features are shown in **Appendix A**.

3.2.1 Survey of Structures

The proposed scheme will involve works affecting or in close proximity to structures such that disturbance to roosting bats would be caused should they be present. The locations of structures inspected is shown in **Figure 3.3** and **Figure 3.4**.

A number of bridges (and culverts) were surveyed, and these vary in composition. Older masonry bridges can offer bat roosting potential when gaps are present in the stonework. A number of more recent bridges / culverts are also present which consist of concrete pipe sections, corrugated steel and concrete bridges and precast concrete bridges. Such structures often lack roosting opportunities.

In an Investigation into bridge usage by roosting bats within the Sullane & Laney River Catchments, Co. Cork, Masterson *et al*. (2008) found that (11%) of bridges were confirmed as bat roosting sites. Similarly, Aughney (2008) investigated bridge usage by roosting bats in a survey of 80 bridges in 15 counties across the country and found 13% of bridges were confirmed as bat roosting sites with traditional stone built bridges significantly more likely to have bats roosting within than modern concrete bridges.

Bats were not confirmed to be roosting in any relevant bridges and no evidence of historic roosting was found. Three bridges were identified which had 'moderate' potential to support roosting bats. The roosting potential of all bridges present in the study area is described in **Table 3.3**.

A variety of other structures were surveyed including residences and other buildings, walls etc. A significant Soprano Pipistrelle roost was detected in a residence in Woodpark when 'dawn-swarming' behaviour was observed during bat activity surveying. This roost is discussed further below in Section 3.3. Five structures present in the study area were considered to have 'low' potential for bat roosting. They consist of stone or boulder walls and a commercial premises and are described in **Table 3.3**.

Table 3.3 – Results of visual surveys carried out on man-made structures

Structure ID	Type	Watercourse	Roosting Potential	Item Reference*	Comment
Bridges					
B01	Bridge	Glenamought River	Moderate	C08_L02	Old single arch stone bridge. Good structural repair but some minor crevices present within barrel. Gaps are present also where buttresses meet spandrel walls, particularly on the upstream side (east). No evidence of bats or historic usage by bats.
B02	Bridge	Glenamought River	Moderate	C08_R02	Three arch roadway bridge. Considered to have moderate potential for bats due to sheltered location proximal to suitable foraging habitat and the presence of crevices within the bridge arch. Survey at height not undertaken but no evidence of roosting was observed during activity surveys.
B03	Bridge	River Bride	Low	n/a	Large multi-span Railway Bridge. In good structural condition. No evidence of PRFs visible but survey at height not undertaken. No roosting behaviour detected during activity surveys.
B04	Bridge	Glenamought River	Low	C08_B01	Masonry bridge. Gaps in stonework and where stone piers meets concrete deck provide PRFs. No evidence of roosting was detected during activity surveys. Tree roots entwined in bridge structure on downstream side. Low level of this bridge reduces its likelihood of bat occupation (e.g. Billington & Norman, 1997).
B05	Culvert	Glenamought River	Negligible	C08_B02	Precast concrete pipe culverts with masonry walls.
B06	Bridge	River Bride	Moderate	C06_B01	Two span masonry bridge with some gaps in stonework. Evidence of historic repairs. Numerous gaps present where pointing has fallen away and where cracks have emerged. No evidence of current or historic bat roosting.
B07	Bridge	River Bride	Negligible	C06_L10	Concrete and steel construction - appears to provide few roosting opportunities. Experiences significant light pollution at night.
B08	Bridge	River Bride	Negligible	C06_L13	Concrete and steel construction - appears to provide few roosting opportunities. Experiences significant light pollution at night.
B09	Bridge	River Bride	Negligible	C06_B02	Modern cast concrete bridge which presents few opportunities for bats. Occurs in a location which experiences significant light pollution at night.
B10	Bridge	River Bride	Negligible	C06_B04	Modern bridge with cast concrete interior which presents few opportunities for bats.
B11	Culvert	Glen River	-	C04_G07	Two culverts under railway line. Not safely accessible for survey. Unlikely to have any value to bats due to its low level relative to level of watercourse (photo taken at low flow levels). No works are proposed but fencing works taking place adjacent.
B12	Underpass	Glen River	-	C04_G05	Disused railway underpass. Not accessible for survey. A replacement security gate is proposed.
B13	Bridge	River Bride	Negligible	C06_B05	Footbridge. Steel and concrete construction. Occurs in a location which experiences significant light pollution at night.

B14	Bridge	River Bride	Low	C06_B06	Steel and masonry construction. Roosting opportunities present but occurs in a location which experiences significant light pollution at night.
B15	Culvert	River Bride	Low	C06_B09	Culvert entrance. No evidence of bat activity in culvert system. Receives occasional inundation and occurs in a location which experiences significant light pollution at night.
B16	Culvert	Kiln River	Low	G02_G01	Culvert exit. No evidence of bat activity in culvert system. Receives occasional inundation and occurs in a location which experiences significant light pollution at night.
B17	Culvert	Kiln River	Low	G02_G01	Culvert entrance. No evidence of bat activity in culvert system. Receives occasional inundation and occurs in a location which experiences significant light pollution at night.
Other Man-made Structures					
S01	Stone wall	Glenamought River	Low	C08_E01	Stone wall of shed. Crevices are present in the stonework. Close proximity to suitable foraging habitat and unlit at night.
S02	Stone wall	Glenamought River	Low	C08_L02	Gaps in stonework present some roosting opportunities. Proposed concrete wall to tie-in.
S03	Stone wall	Glenamought River	Low	C08_L03	Stone wall of shed adjoining river. Crevices are present in the stonework. Close proximity to suitable foraging habitat and unlit at night.
S04	Residence	Glenamought River	Confirmed	C08_L04	Confirmed Soprano Pipistrelle roost. Assumed to be a maternity roost.
S05	Structure	River Bride	Low	C06_L05	Boulder wall with gaps which present some roosting opportunities. Proposed floodwall to replace
S06	Structure	River Bride	Low	C06_B04	Commercial premises adjoining River Bride. Roosting opportunities present but likelihood of occupation diminished by public lighting front and back. Internal survey carried out and no signs of bats evident. Two derelict dwellings adjoin which were boarded up and not accessible for survey.

** River Bride Certified Drainage Scheme - Confirmation Drawings. July 2018.*

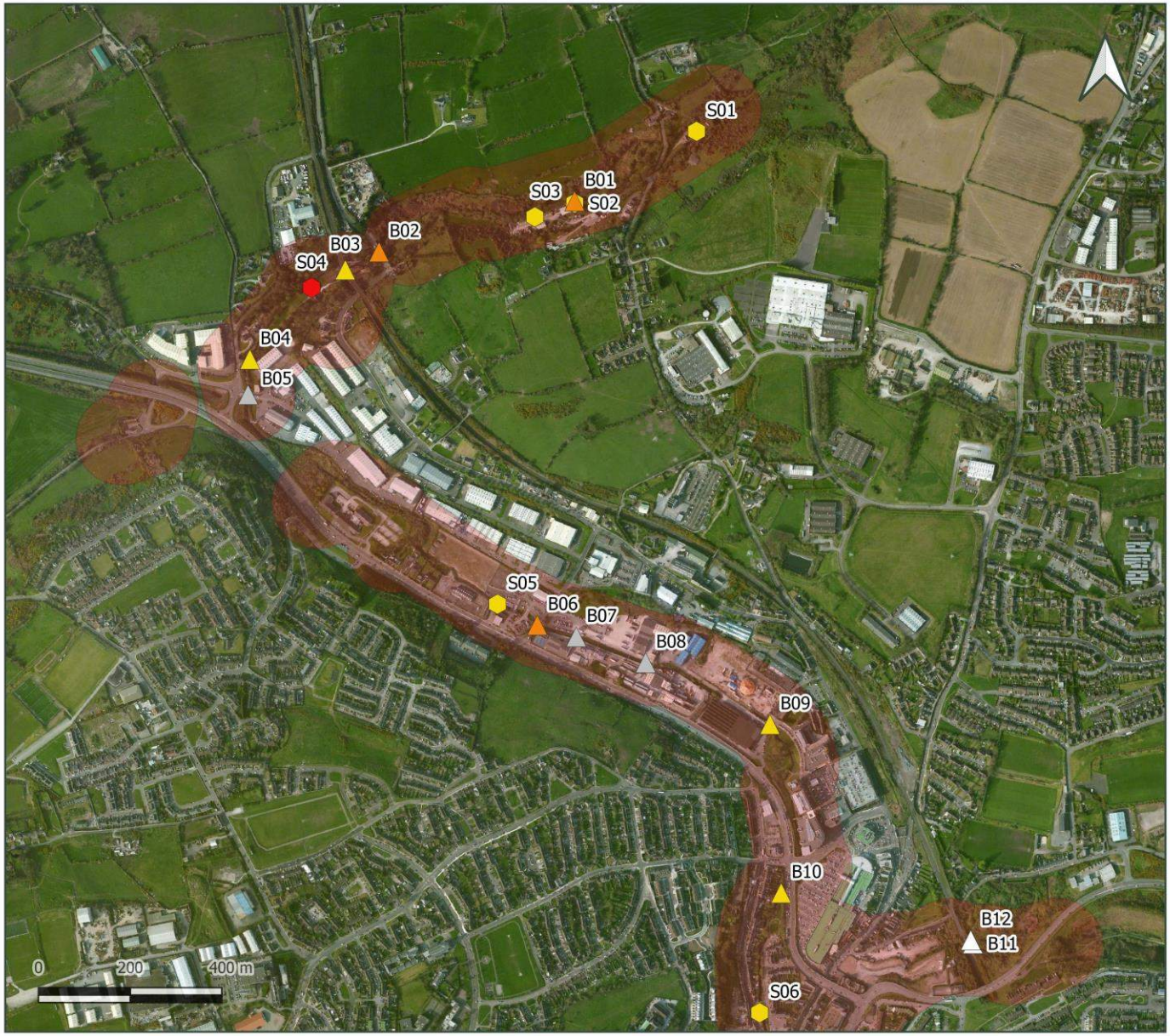

Figure 3.3
Visual Survey Results [Man-made Features]

Project:

Blackpool Flood Relief Scheme

Prepared for:

Ryan Hanley on behalf of OPW

Tom O'Donnell CEnv MCIEEM
D: 08/10/2020

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O'DONNELL ENVIRONMENTAL

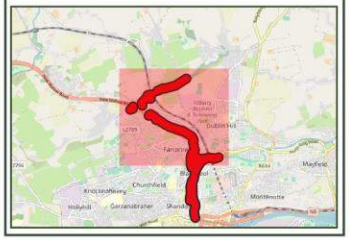
Legend

Bridges

- Moderate Potential
- Low Potential
- Negligible Potential

Other Structures

- Confirmed Roost
- Moderate Potential
- Low Potential



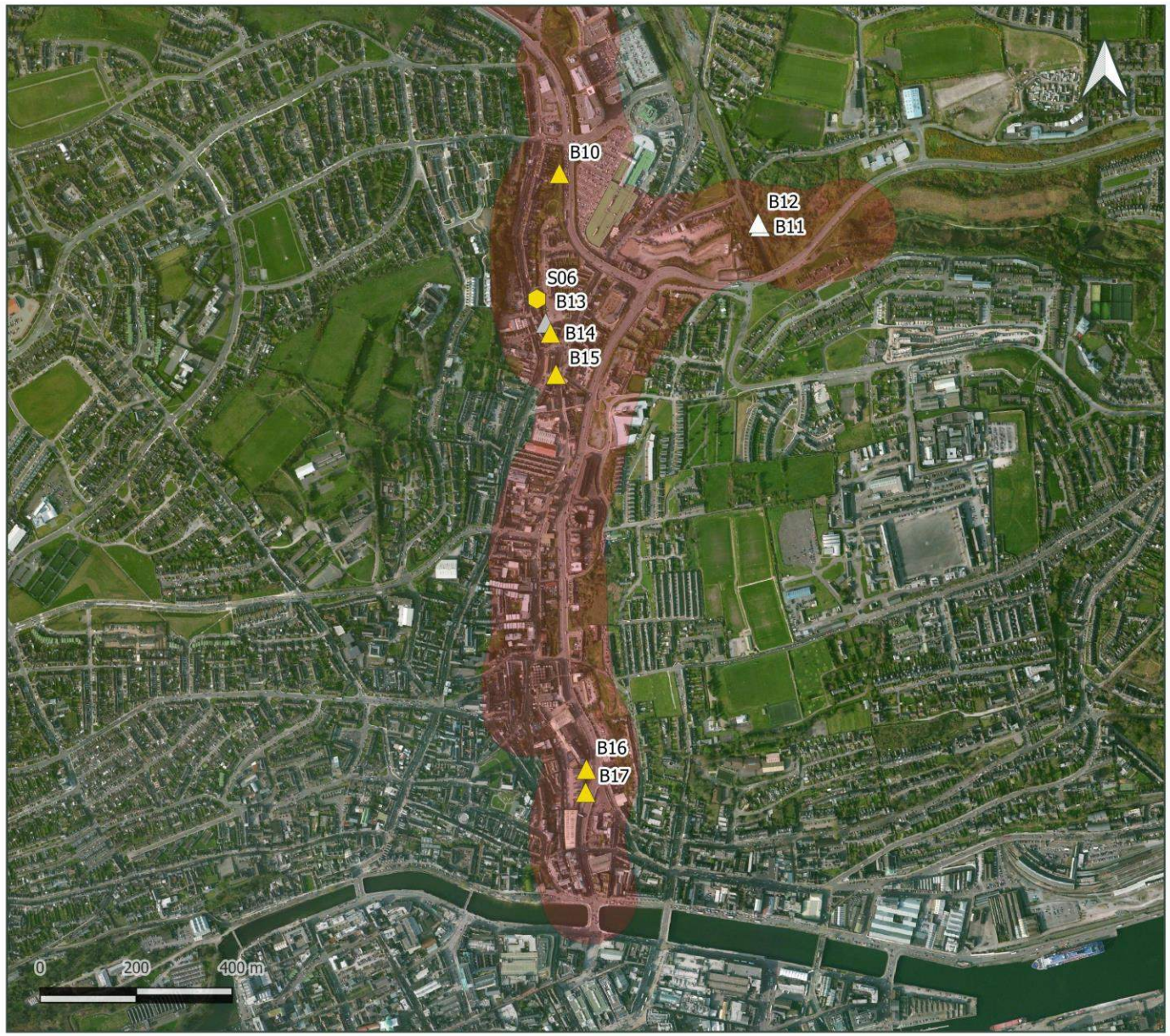


Figure 3.4
Visual Survey Results [Man-made Features]

Project:

Blackpool Flood Relief Scheme

Prepared for:

Ryan Hanley on behalf of OPW

Tom O'Donnell CEnv MCIEEM
D: 08/10/2020

O'DONNELL ENVIRONMENTAL

Legend

Bridges

- Moderate Potential
- Low Potential
- Negligible Potential

Other Structures

- Confirmed Roost
- Moderate Potential
- Low Potential

3.2.2 Survey of Trees

Most Irish bat species roost in trees where suitable roosting opportunities are present. A number of Irish bat species, including Leisler's Bats and Soprano and Common Pipistrelles roost in trees all year round (Collins, 2016).

In Ireland potential roosting features for bats in trees are often associated with decay. While trees of any age can contain suitable bat roosting features, typically roosts are found in mature and veteran trees. Decay in trees often begins with damage, where a limb tears off for example or where damage is caused by an external factor such as badly executed limb removal. Where trees are well maintained, from an arbocultural perspective, they often do not contain these features, and therefore typically do not present many optimal roosting opportunities for bats. Equally, young and vigorously growing trees often do not contain decay associated with rot holes, tear-outs etc. and when damage occurs the trees are generally capable of self-healing.

Tree species present in the study area include Alder (*Alnus glutinosa*), Ash (*Fraxinus excelsior*), Beech (*Fagus sylvatica*), Hawthorn (*Crataegus monogyna*), Lawsons Cypress (*Chamaecyparis lawsoniana*), Oak (*Quercus sp.*), Sycamore (*Acer pseudoplatanus*), Scots Pine (*Pinus sylvestris*) and Willow (*Salix sp.*). No over-mature or veteran trees are present in the study area, however a number of mature specimens are present. Mature trees tend to occur in the northern, less urbanised areas of the scheme.

Suitable bat roosting features were recorded in this study which are associated with trees included dense Ivy (*Hedera helix*), lifting bark, tear-outs (where the limb has torn off from the main stem) and knot holes (naturally occurring holes in trees where a limb has died but rots back rather than tearing out). Examples of potential roosting sites recorded are shown in **Appendix A**.

No roosting bats were encountered in trees, and no unoccupied roosts which contained signs of bat occupation were encountered. None of the potential roosting features in trees inspected during the current survey had potential as a maternity roost for any bat species.

No trees in the study area were considered to have 'high' potential to support roosting bats. A total of 21 trees were identified which were considered to have 'moderate' potential for roosting bats. **Table 3.4** provides a description of trees with 'low' and 'moderate' potential for roosting bats. Trees (or groups of trees) with 'low' potential are described where they are within or immediately adjoining the proposed works area. Trees with 'negligible' potential for roosting bats are not included here. The locations of trees described in **Table 3.4** are shown in **Figure 3.5** and **Figure 3.6**.

Potential roosting features may be present but not visible during a ground level survey, particularly in Ivy covered trees and larger trees. A number of potential roosting features were identified, and these were considered to be of sub-optimal quality in general. However, it is highly likely that some of these features may be used at least occasionally by bats and their value to bats may increase over time. Most of Irelands bat species are known to exploit a wide variety of roosting opportunities with some being used infrequently. The roosting ecology of bats in Ireland and the importance of multiple roosting opportunities are poorly understood.

Table 3.4 – Results of visual tree surveys

Tree No.	Species	Bat Potential	Reference	Comments
T01	Ash	Moderate	C08_E01	Mature specimen. Heavy ivy cover.
T02	Ash	Moderate	C08_E01	Mature specimen. Heavy ivy cover.
T03	Ash	Moderate	C08_E01	Mature specimen. Heavy ivy cover.
T04	Alder	Moderate	C08_E01	Mature specimen. Heavy ivy cover.
T05	Alder	Moderate	C08_E01	Semi-mature specimen. Minor PRFs visible at approx. 6m height, facing south.
T06	Various	Low	C08_E01	Treeline of multi-stemmed, semi-mature, Alder, Hawthorne, Willow. Formerly a hedgerow.
T07	Various	Low	C08_L03	Treeline on opposite bank from proposed works. Semi-mature trees mostly Alder and Cherry Laurel.
T08	Various	Low	C08_E01	Treeline on opposite bank from proposed works. Cherry Laurel with one multi-stem sycamore leaning across to proposed works area.
T09	Ash	Low	C08_L02	Mature specimen, single stem. Moderate ivy cover may conceal PRFs. Some evidence of decay at height.
T10	Sycamore	Moderate	C08_L03	Mature specimen. Moderate ivy cover.
T11	Sycamore	Moderate	C08_L03	Mature specimen. Moderate ivy cover.
T12	Sycamore	Moderate	C08_L03	Mature specimen. Moderate ivy cover.
T14	Ash	Low	C08_R02	Mature, multi-stem specimen. Heavy ivy cover on one stem. Decay evident at base. No PRFs visible.
T15	Alder	Low	C08_T01	Single stem. No ivy cover. No PRFs visible.
T16	Ash	Low	C08_T01	Multi-stem specimen with main stem tall and vigorous. No ivy cover. No PRFs visible.
T17	Sycamore	Moderate	C08_T01	Multi-stem specimen. Minor PRFs present including loose bark and shallow rot-holes. Moderate ivy cover.
T18	Willow	Low	C08_T01	No PRFs visible.
T19	Alder	Low	C08_T01	Single-stem with straight vigorous growth. No PRFs visible.
T20	Ash	Moderate	C08_T01	Multi-stemmed specimen. Low ivy cover. Evidence of decay and some minor rot holes present.
T21	Willow	Low	C08_T01	Multi-stem mature tree which has split and collapsed.
T22	Ash	Moderate	C08_T01	Double-stemmed mature specimen. Rot hole present with potential for bats.
T23	Alder	Low	C08_T01	Single-stemmed specimen. No ivy cover. No PRFs visible.
T24	Alder	Low	C08_T01	Tall single stemmed mature tree. No ivy cover. No PRFs visible.
T25	Alder	Moderate	C08_T01	Tall single stemmed mature tree. Moderate ivy cover and thick interweaved ivy stems provide PRFs.
T26	Alder	Moderate	C08_T01	Mature multi-stemmed specimen. Moderate ivy cover. Some decay apparent including rot holes.
T27	Alder	Moderate	C08_T01	Single stemmed specimen with thick ivy cover and some decay features present.

T28	Ash	Moderate	C08_T01	Mature specimen. Appears vigorous and lacks visible signs of decay. Low ivy cover may obscure PRFs given the large size of the tree.
T29	Black Poplar	Moderate	C06_C01	Mature multi-stemmed specimen growing on riverbank. Heavy ivy cover.
T30	Various	Moderate	C06_B04	Immature Pedunculate Oak with rot hole present at 1.5m, associated with a historic tear-out.
T31	Sycamore	Low	C08_R02	Double-stemmed, semi-mature specimen. No ivy cover. No PRFs visible.
T32	Various	Low	C08_E03	Group of trees including mature Lawsons Cypress, Spruce and Copper Beech. Trees are of low potential as roosts themselves but may play an important role in the viability of a nearby roost.
T33	Ash	Low	C08_L04	Mature specimen in a relatively exposed location. No PRFs visible.
T34	Various	Moderate	C08_B01	Treeline on downstream side of proposed bridge. Trees immediately adjoin bridge and roots growing through structure of existing bridge. Species present include Beech, Scots Pine, Sycamore. PRF present on mature Beech tree.
T35	Various	Low	C06_R01	Group of immature broadleaf trees including Beech, Silver Birch and self-seeded willow. No PRFs visible. Likely play a role in landscape connectivity for bats.
T36	Various	Low	C06_C01	Broadleaf woodland consisting of a mix of planted and self-seeded trees. Species include Ash, Sycamore, Black Poplar, Willow and Alder. Mostly semi-mature and immature trees with mature trees occurring occasionally on riverbank. Trees are generally young and vigorous and lack PRFs.
T37	Sycamore	Moderate	C06_L05	Mature specimen. Close access not possible so tree is conservatively classified as moderate.
T39	Sycamore	Moderate	C06_L05	Mature specimen with heavy ivy cover.
T42	Various	Low	C06_E02	Recently planted trees including ornamental species. No PRFs visible.
T43	Various	Low	C06_B04	Broadleaf woodland adjoining river, mostly on eastern side. Species present mainly Sycamore with occasional Hawthorne and Pedunculate Oak.
T44	Various	Low	C06_B04	Sycamore, Willow, Black Poplar and ornamental trees on eastern bank of river. Buddleia also abundant. No PRFs visible.
T45	Sycamore	Low	C04_L05	Multi-stem specimen. Health and vigorous. No ivy cover.

Figure 3.5
Visual Survey Results [Trees]

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Blackpool Flood Relief Scheme

Prepared for:
Ryan Hanley on behalf of OPW

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O'DONNELL ENVIRONMENTAL

Legend

Trees

- Moderate Potential
- Low Potential

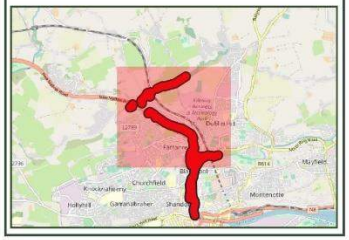

Figure 3.6
Visual Survey Results [Trees]

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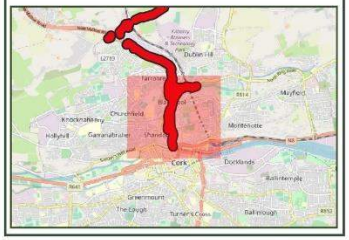
O'DONNELL ENVIRONMENTAL

Legend

Trees

- Moderate Potential
- Low Potential



3.3 BAT ACTIVITY SURVEY

Bat activity was surveyed using a number of methods. Pre-dawn bat activity (transect) surveys and vantage point surveys were carried out to investigate bat activity in the zone of influence of the proposed works and to detect any bats which may be re-entering roosts at dawn. Two passive detectors were deployed at key locations on the scheme to provide a larger dataset and detect species which may not have been recorded during active surveys.

Bat echolocation detections are quantified here as bat "registrations". A registration for the relevant species is attributed when any bat echolocation signal occurs in one recording, which are up to 15 seconds in length. Bat registrations do not equate to numbers of bats as individual bats of the same species cannot be differentiated. A single bat continuously foraging in proximity to the detector can generate a large number of registrations in one night. Variability occurs in the likelihood of detection between species. For example, Leisler's Bats emit a loud low frequency call which travels further and is more easily detected than the quiet higher frequency calls of Brown Long-eared Bats.

Over 80 individual registrations of bats were recorded during the course of the bat activity surveys, the locations of all registrations are shown in **Figure 3.10** and **Figure 3.11**. Seven (possibly eight) species bat species were recorded (discussed below). The Annex II (EU Habitats Directive) listed Lesser Horseshoe Bat was not recorded.

Two primary areas of bat activity were found. The first was in the vicinity of Woodpark in the Glenamought Valley on the northern section of the proposed scheme where woodland adjoins the proposed scheme and good landscape connectivity exists along the Glenamought Valley. The second was in the Orchard Court area where trees overhang the River Bride (providing screening from public lighting) and some unlit sections of open-water and vegetation exist, downstream of the Blackpool Bypass.

Species diversity was highest in the Glenamought Valley where seven (possibly eight) species were recorded during active and passive surveys. This valley is considered to present more foraging opportunities and ecological niches than other areas of the scheme. The following species were recorded in the Glenamought Valley:

- Soprano Pipistrelle
- Brown Long-eared Bat
- Common pipistrelle
- Leisler's Bat
- Whiskered/Brandt's Bat
- Daubenton's Bat
- Natterer's Bat.

Two registrations were recorded by 'Bat_01' on the 21st September at 20:00 and 20:01 which broadly match the parameters descried for Nathusius Pipistrelle in Russ (2012). Nathusius pipistrelle is a migratory species in Europe, and little is known about their ecology in Ireland. Their echolocation calls can be indistinguishable from those of Common Pipistrelle. The calls had a peak frequency of approximately 38kH with start frequency of 47kHz and end frequency of 36.7kHz. The interpulse interval was 117ms. The call length was higher than the range described for both Nathusius and Common Pipistrelle, at 8.7ms. It is

possible that these calls were from a Nathusius Pipistrelle in which case eight species would have been recorded at Glenamought Valley.

In the Orchard Court area of the scheme, where it is proposed to replace the open river with culverted channel, the number of bat registrations recorded was relatively high but species diversity was lower, likely reflecting the lower quality habitat available and a lesser number of ecological niches. Here the following species were recorded:

- Soprano Pipistrelle
- Common Pipistrelle
- Leisler's Bat
- Daubenton's Bat
- Brown Long-eared Bat.

Figure 3.7 and **Figure 3.8** present the result of the passive bat detection survey at 'Bat_1' and 'Bat_2' respectively. Brown Long-eared Bat was additionally recorded during transect surveys In Glenamought Valley. 'Pipistrelle 50 kHz' describes a registration from either a Soprano or Common Pipistrelle where the peak frequency occurs at approximately 50 kHz and the species cannot be accurately determined.

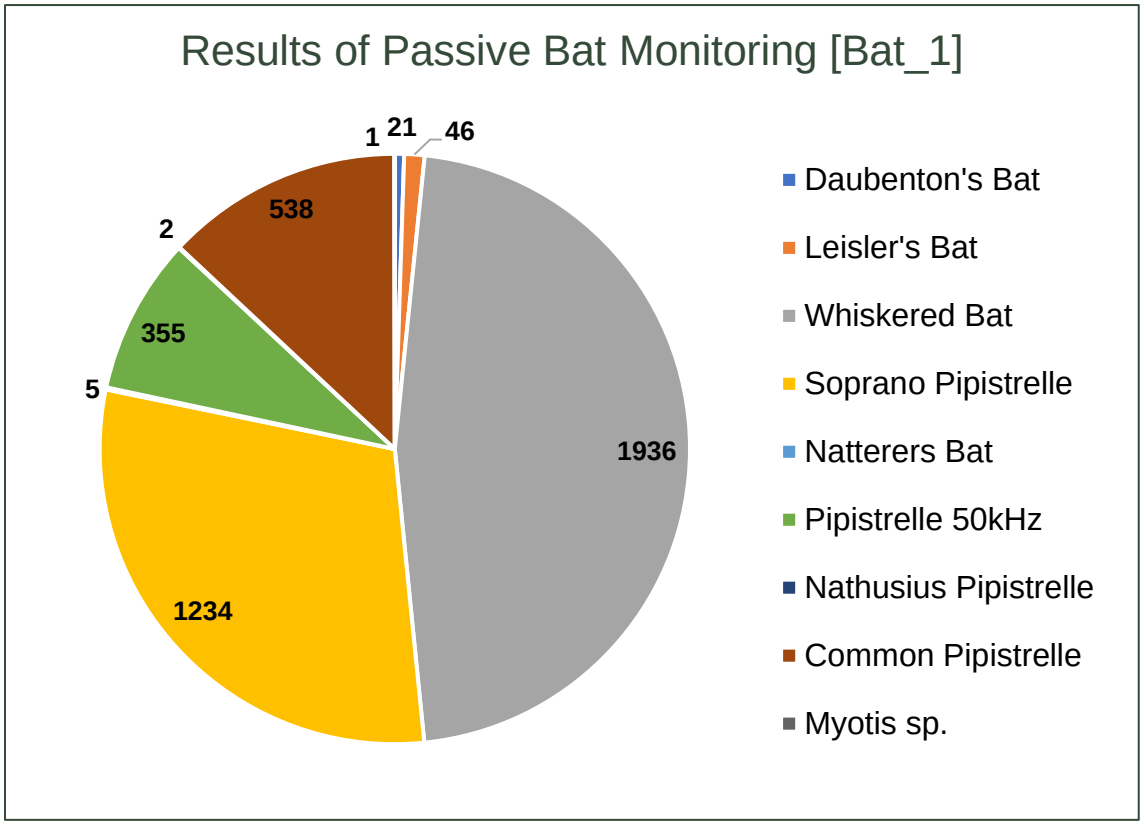


Figure 3.7 – Results of passive bat monitoring at monitoring point Bat_1

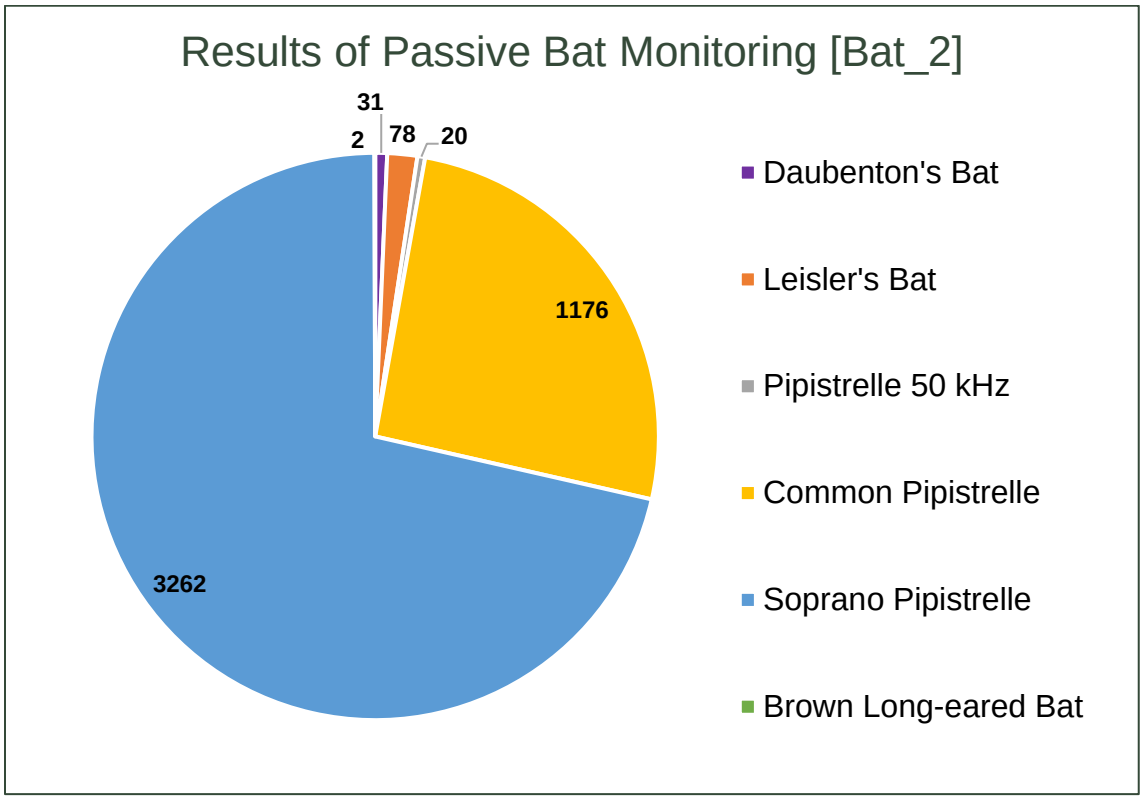


Figure 3.8 – Results of passive bat monitoring at monitoring point Bat_2

A maximum of three Soprano Pipistrelles were recorded foraging in the river corridor adjacent Orchard Court during pre-dawn bat activity surveys at any given time. However, further analysis of data derived from 'Bat_2' shows that there is significantly more bat echolocation activity in the earlier part of the night relative to the remainder of the night. **Figure 3.9**, below, shows the time distribution of all bat registrations recorded at 'Bat_2' over the nine-night survey period. Mean sunset time during the nine-night survey period was 19:20 and mean sunrise time was 07:30.

Relatively higher levels of activity in the earlier part of the night likely occur because the sheltered and productive habitat provided by the river corridor, especially where trees overhang the river, provides darkness and security for bats to forage in higher light levels. It is likely that as darkness falls and the insect resource available here is depleted bats begin to move outwards to feed in other areas. The Orchard Court river corridor is used particularly by Soprano Pipistrelles in the earlier part of the night, and to a lesser extent Common Pipistrelle.

The average time of first detection of Soprano Pipistrelles by the detector at 'Bat_2' was 26 minutes after sunset. The range was 23 minutes to 30 minutes. The average emergence time for Soprano Pipistrelles is approximately 20 minutes after sunset, but this may be longer in an urban environment if artificial light falls on a roost access point and causes a delayed emergence time (Boldogh *et al.* 2007). Soprano Pipistrelle bats (and possibly other species) are likely to be roosting in relative proximity to the site. In urban areas suitable foraging opportunities are often the limitation to bat presence, and not the availability of roosts.

There are a wide variety of roosting opportunities present locally which may be exploited by crevice dwelling bat species such as pipistrelles.

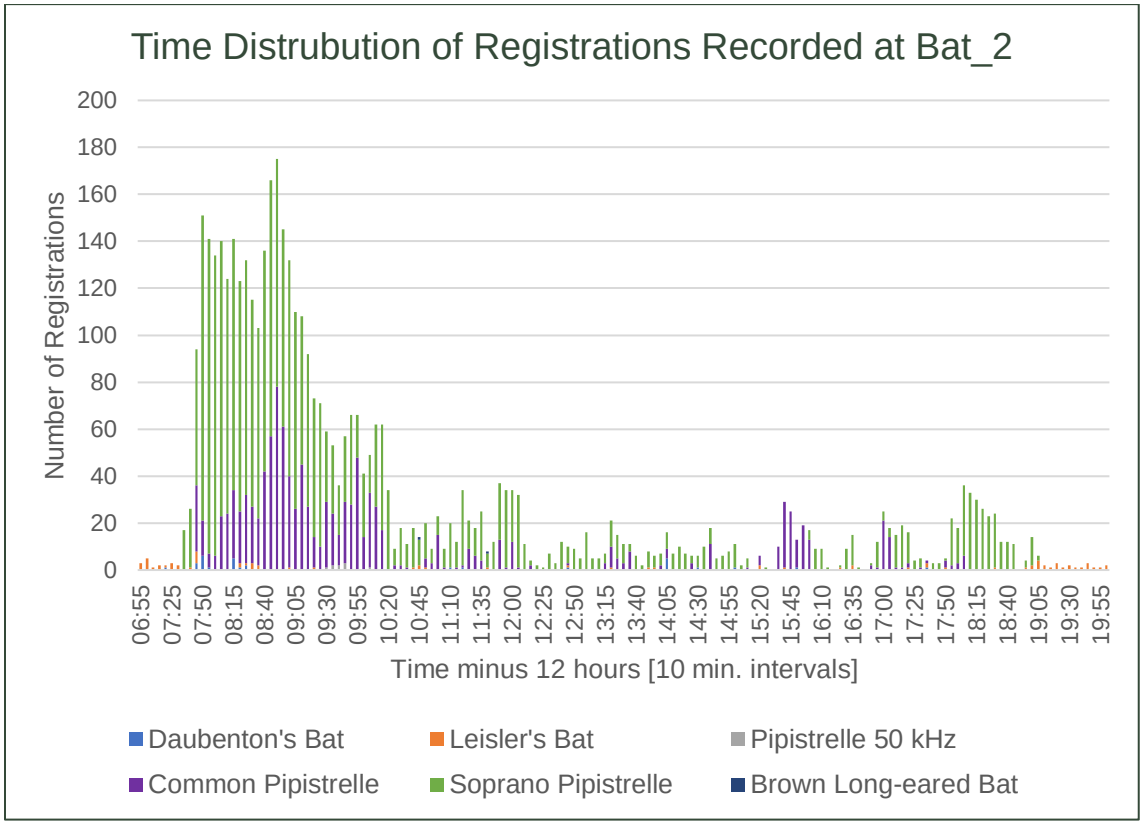


Figure 3.9 – Results of passive bat monitoring at monitoring point Bat_2 (Orchard Court).

Very low levels of bat activity were recorded in the more urban areas of the scheme, away from suitable habitat (see **Figure 3.10** and **Figure 3.11**). This is likely to be because of a lack of productive foraging habitat and light pollution from street lighting. These areas occur mostly in the southern areas of the scheme approaching Cork City centre and in the industrial areas adjoining Commons Road (example **Appendix A**).

3.3.1 Emergence Count at Identified Roost

An emergence count was carried out at an identified roost in a residence located at Woodpark in the Glenamought Valley (S04, Figure 3.3) and 145 Soprano Pipistrelles were counted emerging from the roost. Given the seasonality of the survey and the number of bats present, the roost is assumed to be a maternity roost. Catching of bats to sex bats and look for signs of lactation would have confirmed the maternity status of the roost, but this was not carried out as a precautionary measure due to COVID related advice in place at the time to avoid unnecessary handling of bats[3].

The first bat emerged at 21:33 (9 minutes after sunset) and no emergence was recorded after approx. 22:00. Upon exit all bats flew northwest directly to the closest available trees. The foraging range of this

[3] IUCN SSC Bat Specialist Group (BSG) Recommended Strategy for Researchers to Reduce the Risk of Transmission of SARS-CoV-2 from Humans to Bats (19th June 2020).

roost is not known. A number of kestrels were active in the area at the time of first emergence and so the presence of trees in proximity to the roost is likely to play a role in predator avoidance. At 22:40, after ten minutes of light rain bats began re-entering the roost.

The Residents report that this roost has been present for many years any may be occupied all year round.

No works are proposed which would directly affect the roost, but tree felling works which may indirectly affect the viability of the roost are possible. This is discussed further in Section 4. The roost is categorised as being of 'County' importance following the ecological valuation scheme outlined in NRA (2009).

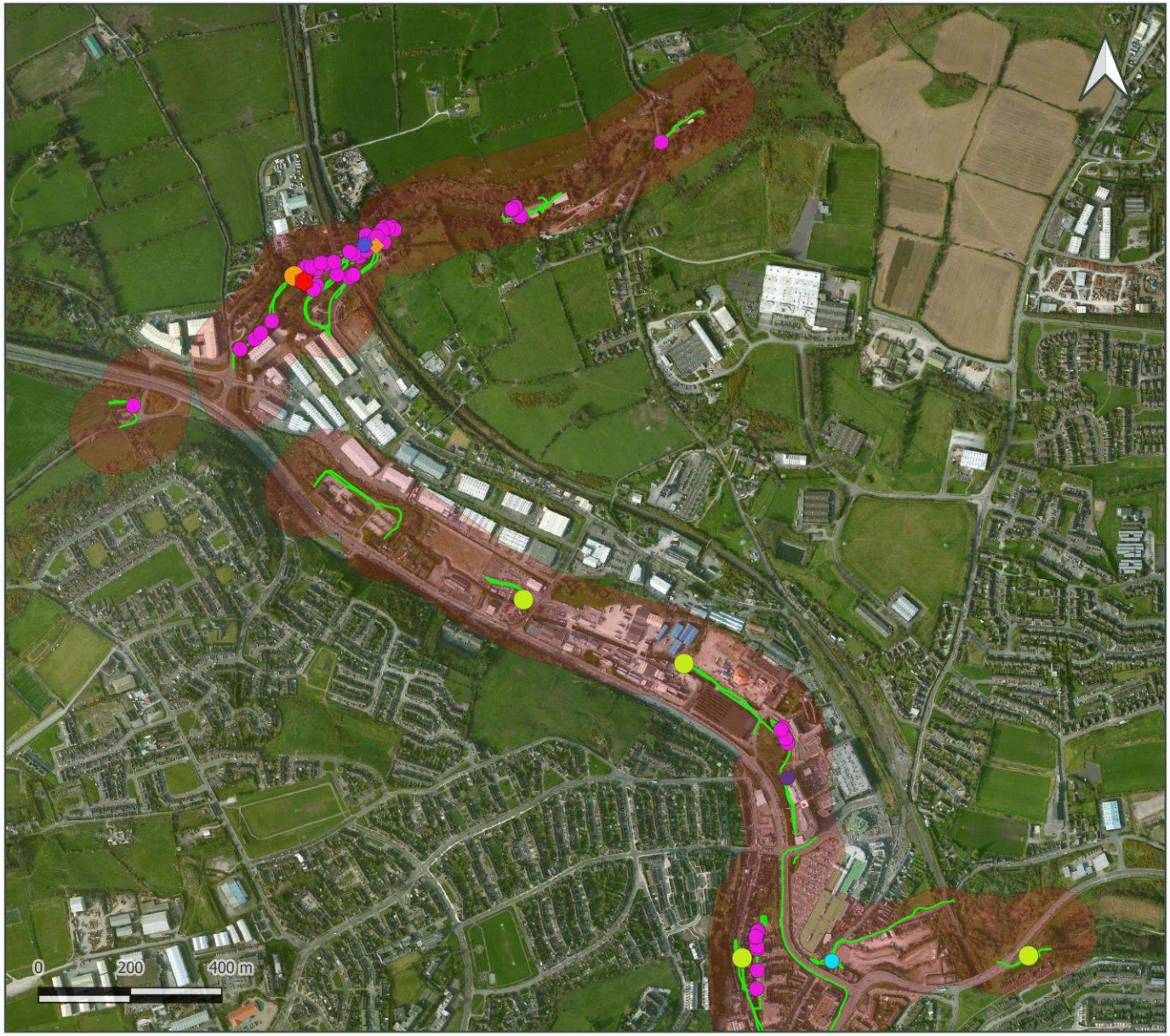


Figure 3.10
Bat Activity Survey Results

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Prepared for:
Ryan Hanley on behalf of OPW

Tom O'Donnell CEnv MCIEEM
D: 08/10/2020

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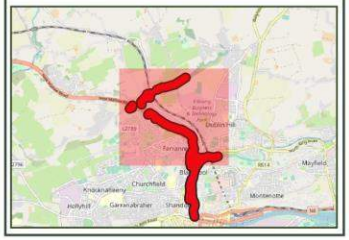
O'DONNELL ENVIRONMENTAL

Legend

- Confirmed Roost

Bat Registrations

- Whiskered Bat
- Daubenton's Bat
- Soprano Pipistrelle
- Common Pipistrelle
- Pipistrelle 50 kHz
- Brown Long-Eared Bat
- Leisler's Bat
- Transect Surveys GPS Track



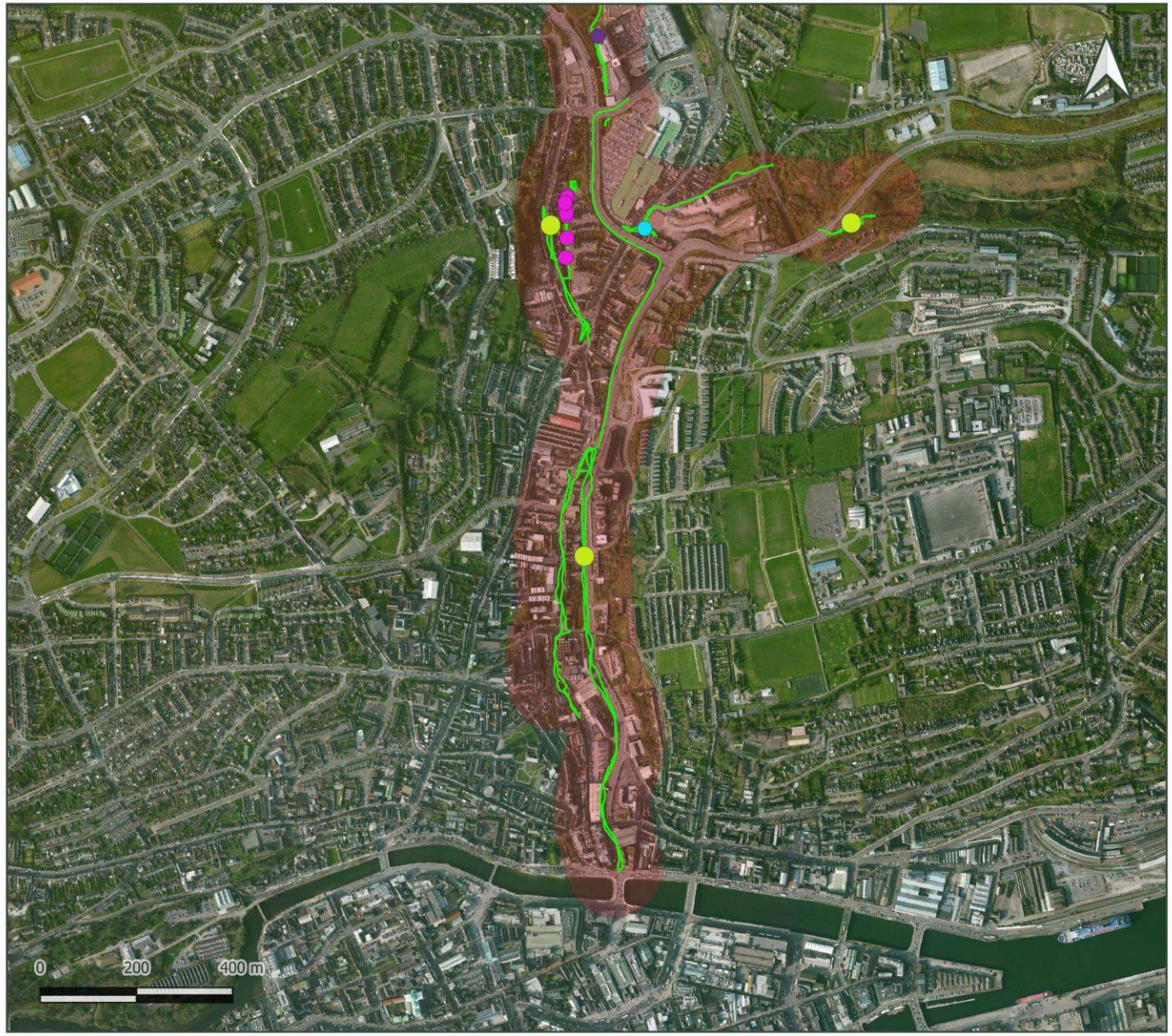


Figure 3.11
Bat Activity Survey Results

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O'DONNELL ENVIRONMENTAL

Legend

- Confirmed Roost

Bat Registrations

- Whiskered Bat
- Daubenton's Bat
- Soprano Pipistrelle
- Common Pipistrelle
- Pipistrelle 50 kHz
- Brown Long-Eared Bat
- Leisler's Bat
- Transect Surveys GPS Track

3.4 SUMMARY OF RESULTS

Several bat species have been recorded foraging in the environs of the proposed works area. The Annex II (EU Habitats Directive) Lesser Horse-shoe Bat was not recorded. The relative importance of areas of the proposed site to bats varies according to the availability of suitable foraging and commuting habitat and the level of anthropogenic disturbance (light and noise).

The habitats of highest value to bats within the study are were considered to be the mature woodlands bordering the Glenamought River and a limited area of vegetated riparian corridor along the River Bride, in proximity to and upstream of Orchard Court.

A well-established Soprano Pipistrelle maternity roost was discovered in the Glenamought Valley and this roost is of high conservation importance. Visual survey also identified the presence of a variety of Potential Roost Features (PRFs) in man-made structures and trees within the study area, although no high potential PRFs were identified.

4 Potential Impacts

Potential impacts on bats as a result of the implementation of the proposed Blackpool Flood Relief Scheme are discussed below. Construction works can often present ecological issues which do not occur during the operational phase of a development, potential impacts during both the construction and operational phase are discussed.

4.1 LOSS OF ROOSTING SITES

A long-established Soprano Pipistrelle maternity roosting site was identified during surveying and this roost is of high conservation value. The roost is categorised as being of 'County' importance following the ecological valuation scheme outlined in NRA (2009).

The roost is proximal to a proposed embankment (Item C08_E03). Tree group (T32) occurs within the footprint of the proposed embankment and this tree group is proposed for removal. As outlined in Section 3.3.1 these trees are likely to play a role in the continued success of the roost by providing shelter to bats upon emergence from the roost.

The precise nature and scale of impacts on the Soprano Pipistrelle maternity roost which would arise as a result of the loss of tree group T32 cannot be predicted with any degree of accuracy but a negative impact on the roost is likely to occur. The importance of tree cover in roost uptake has been shown in several studies (White, 2004; Jenkins *et al*., 1998; McAney and Hanniffy, 2015). While the reason for this is not certain it could be attributable to increased shelter and reduced exposure to predators upon emergence Mackintosh (2016).

Collins (2016) states "*the time of emergence from a roost depends on the species' ecology, the amount of protective cover around the roost, the reproductive status of the bats in question…*". Where bats are delayed from emerging this shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance often occurs around dusk, a delay in emergence can mean reduced foraging success (Boldogh *et al.* 2007).

In the absence of appropriate mitigation measures, it is likely that a reduction in breeding success would occur such that it causes a reduction in the size of the colony. The possibility of abandonment of the roost cannot be ruled out.

The proposed scheme will involve other works directly affecting, or in close proximity to, a number of manmade features including bridges. These features were assessed and a number of them were found to have 'low' or 'moderate' potential for roosting bats.

Tree felling will be required in the footprint of the proposed permanent works and also to enable access to temporary working areas. This report identifies and describes trees with 'low' and 'moderate' potential to support roosting bats. It is highly likely that some of these features will be used at least occasionally by bats and their value to bats may increase over time. Their removal represents a loss of roosting opportunities to bats.

Roosts in trees are vulnerable to use of heavy machinery in the root zones which can cause accidental damage. This may result in increased tree morbidity and mortality if care is not taken to protect trees which are being retained during construction works. Equally, the use of machinery in proximity to trees can result in accidental damage to the trunk and branches of trees.

4.2 REDUCED FORAGING HABITAT

Permanent loss of foraging habitat will primarily occur where 342m of open water and riparian vegetation of the River Bride will be culverted. As described above this section of channel includes habitat which was found to provide special foraging habitat for bats, Soprano and Common Pipistrelles in particular. The habitat appears to be utilised mostly in the earlier part of the night and likely provides an early 'staging-post' from where bats move out to forage in other less sheltered areas as night falls. Loss of this habitat is likely to affect the distribution of Soprano and Common Pipistrelles and Daubenton's Bats locally. It is not possible to mitigate this impact within the scope of work proposed.

Loss of areas of existing vegetation (examples T35 and T36, see **Figure 3.5**) is likely to reduce the quality of foraging habitat locally, but is not likely to be significant given the relatively small amount of habitat loss involved in the context of the overall landscape.

4.3 IMPAIRED ABILITY TO COMMUTE

Many bat species utilise landscape features, such as hedgerows, to commute around the landscape. These features offer bats a degree of protection from aerial predators and can act as navigational aids. If linear landscape features are removed or severed, it may reduce the ability of bats to commute in the landscape which can reduce the available foraging habitat of bats or isolate bats from alternative roosts. Impairment of flight-lines can be especially detrimental in proximity to roosting sites.

As discussed above Tree group 'T32' is proximal to a proposed embankment (Item C08_E03) and these trees are likely to play a role in the avoidance of predators by bats roosting in the confirmed bat roost at Woodpark.

Removal of existing trees and other vegetation to facilitate the culverting of 342m of river corridor between the Blackpool Bypass and Blackpool Church will permanently reduce habitat connectivity for bats locally.

Removal of trees to facilitate the replacement of a bridge on the Glenamought River (C08_B01) will result in a gap of approximately 10m in the treeline on the downstream side of the existing bridge. While this may result in a slight negative impact on commuting, it is expected that good connectivity will be maintained by trees on the opposite bank.

4.4 DISTURBANCE DUE TO ILLUMINATION

Inappropriate or excessive illumination of tree-lines or woodland areas at night can cause disturbance to roosting (e.g. Downs *et al.* (2003) and Boldogh *et al.* (2007)), commuting and foraging bats.

While no lighting is proposed for the operational phase, construction phase lighting (should it be required) has the potential to delay or prevent emergence from roosts, sever commuting routes and reduce the available foraging area.

4.5 DISTURBANCE DUE TO NOISE AND VIBRATION

Construction can result in noise, vibration and air emissions through the presence of people and, the use of heavy machinery for example.

Of particular relevance to bats is the use of generators at night which create noise and vibration and are often left running at night.

4.6 POTENTIAL IMPACT SIGNIFICANCE

In the absence of mitigation measures, the above potential impacts would be expected to result in a permanent, 'very significant' negative impact on bat ecology at a local scale.

5 Mitigation Measures

Mitigation measures, in addition to those listed in Section 5.4.4.7 of the EIAR, are outlined below where potential impacts on bat conservation have been identified. These mitigation measures will be delivered as part of the proposed scheme.

5.1 LOSS OF ROOSTING SITES

A long-established Soprano Pipistrelle maternity roosting site was identified at Woodpark during surveying for this report, and this roost is of high conservation importance. Tree group 'T32' is likely to play a role in the success and viability. The footprint of the proposed embankment (works item C08_E03) will be modified locally to allow for the retention of trees such that landscape connectivity offered by the tree group is not significantly impacted. Three trees will be removed to facilitate the modified footprint of the embankment and these consist of two Copper Beech (*Fagus sylvatica 'Atropurperea'*) and a tall Spruce (*Picea* sp.). An image identifying those trees to be retained and removed is shown in **Appendix A** (photo A45). During construction, no night-time works, illumination, storage of materials etc. will take place in proximity to the maternity roosting site.

Removal of features (manmade structures) identified as having 'low' or 'moderate' potential for roosting bats tree will take place during the bat activity season. As outlined in Section 5.4.4.7 of the EIAR, tree removal will only be carried out in September/October. For both manmade structures and trees, these features will be surveyed by a bat licensed Ecologist in advance of works to attempt to confirm that no bats are present and any guidance from the Ecologist will be followed. A bat licensed Ecologist will be present to supervise removal/felling works. In the event that bat(s) are found to be present during works, works will be stopped and may only proceed with a roost derogation license issued by NPWS.

Arbocultural advice will be sought regarding the protection of trees which are to be retained. At a minimum, appropriate root protection zones will be established prior to commencement of works using a robust barrier to prevent access by machinery during the construction phase.

Bat boxes are commonly employed to mitigate the loss of tree roosts. More robust types, such as woodcrete boxes, can be expected to last for approx. 15 years in Ireland. Most Irish bat species will utilise bat boxes at various times of the year. The exception being Lesser Horse-shoe Bat. An additional six woodcrete bat-boxes (above the four required by Section 5.4.4.7 of the EIAR, i.e. a total of 10) will be deployed in suitable areas where they are ecologically meaningful and safe from vandalism. They will be deployed in advance of the commencement of construction works. Ecological advice will be sought as to their location. Bat boxes will be erected min. 4m above ground level and in locations where climbing-unaided is difficult. Woodland habitats in the Glenamought Valley and in proximity to the Commons Inn should be considered. Bat boxes are considered suitable mitigation for the loss of minor roosts and tree roosts but not maternity roosts in buildings (McAney & Hanniffy, 2015). The boxes will be monitored at least twice by a licensed Ecologist to ensure the appropriateness of their location. They will be monitored one year following installation and one year following completion of works. After each monitoring visit, where the boxes have not

been used or where there is evidence of vandalism, they will be relocated. Bats present will be identified, and any relevant data provided to Bat Conservation Ireland.

5.2 REDUCED FORAGING HABITAT

The primary impact of the proposed scheme in terms of loss of foraging habitat will occur as a result of the culverting of 342m of the River Bride in Blackpool. It is not possible to mitigate this impact within the scope of work proposed. While some replacement tree planting and other landscaping will occur, the primary purpose of this area will be amenity, and required public lighting will significantly reduce its value to foraging bats.

Removal of existing trees and other vegetation to facilitate the proposed works will be minimized in all areas and particularly in the following areas:

- The river corridor between the Blackpool Bypass and Blackpool Church (Item C06_B04)
- Upstream of Kilnap Bridge (Item C08_T01)
- Rose Cottage (Item C06_R01; Tree group T35)
- Commons Inn (Item C06_C01; Tree group T36).

In advance of commencement of construction in the above areas the works areas will be demarcated in consultation with an Ecologist and vegetation to be retained will be appropriately fenced off. This fencing and exclusion area will be maintained for the duration of the construction period. Measures in relation to the protection of trees are outlined above.

Any loss of trees or tree cover will be mitigated in so far as is possible through replacement planting within the scheme boundary, as close as possible to the area where trees may have to be removed to accommodate the proposed works.

5.3 IMPAIRED ABILITY TO COMMUTE

Removal of existing trees and other vegetation to facilitate the proposed works will be minimised in all areas and particularly in the river corridor between the Blackpool Bypass and Blackpool Church (Item C06_B04).

In advance of commencement of construction in the above area the works area will be demarcated in consultation with an Ecologist and vegetation to be retained will be appropriately fenced off. This fencing and exclusion area will be maintained for the duration of the construction period. Measures in relation to the protection of trees are outlined above.

5.4 DISTURBANCE DUE TO ILLUMINATION

During construction if night-time lighting is required for health, safety or security reasons, lighting units will not be installed within 10m of existing treelines, watercourses or other sensitive ecological features outlined herein and lighting shall be directed away from such ecologically sensitive features. The Site Ecologist will be consulted on the placement of temporary lighting.

5.5 DISTURBANCE DUE TO NOISE AND VIBRATION

During construction works, generators or other machinery which create noise, vibration and air emissions, will not be located within 20m of sensitive habitats or any features with potential for bat roosting. Excessive noise and vibration will be avoided in as much as possible. The Site Ecologist will be consulted on the placement of machinery which creates excessive noise or vibration.

5.6 MONITORING

The current report is based upon best available scientific information. However, there are limitations to this information, acknowledged herein, particularly in an Irish context. Monitoring will be carried out to contribute to understanding of the impact of future development projects on bats in an Irish context.

Monitoring will be designed with cognisance of the methodology employed in carrying out the current report. At a minimum, monitoring will be carried out in years 1, 3 and 5 post-construction and will involve the following:

- Passive monitoring will be carried out utilising the monitoring stations descried in this report for a minimum of five consecutive nights per year.
- Emergence survey will be carried out at the Soprano Pipistrelle roost at Woodpark, with the Residents permission.

A report will be produced which details the methodology employed, presents the results of surveys and compares result to previous monitoring surveys (in years 3 and 5) and baseline information. Recommendations for the survey, assessment and mitigation of future schemes will be made where appropriate. Data gathered during monitoring will be provided to Bat Conservation Ireland and National Biodiversity Data Centre.

6 Residual Impacts

Following the implementation of the avoidance and mitigation measures, outlined above, the potential for temporary disturbance due to construction works is minimised. The potential for loss of minor potential roosting features is partially mitigated in the short and medium term by the provision of bat boxes in suitable locations.

The potential for impacts on the known roost at Woodpark will be avoided by tree retention facilitated by a minor local modification of the proposed embankment footprint and design.

In most areas of the scheme the potential for loss of commuting and foraging habitat will be minor and short-term in nature. However, the loss of 342m of open water channel at the Orchard Court area cannot be mitigated within the scope of work proposed. While some tree planting may occur in this area, it is to be maintained primarily as an amenity area and will be subject to public lighting at night which will limit its use by bats.

Overall, the proposed scheme is likely to result in a permanent, 'significant', negative effect on bat ecology at a local scale.

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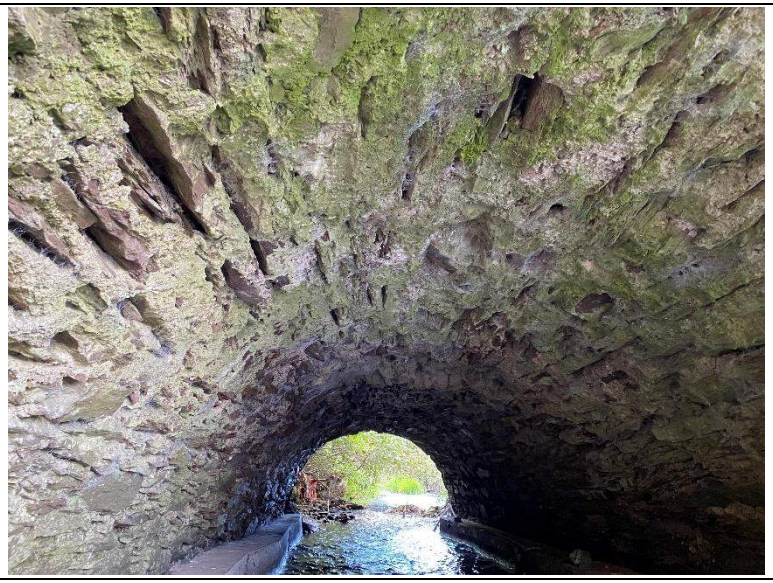
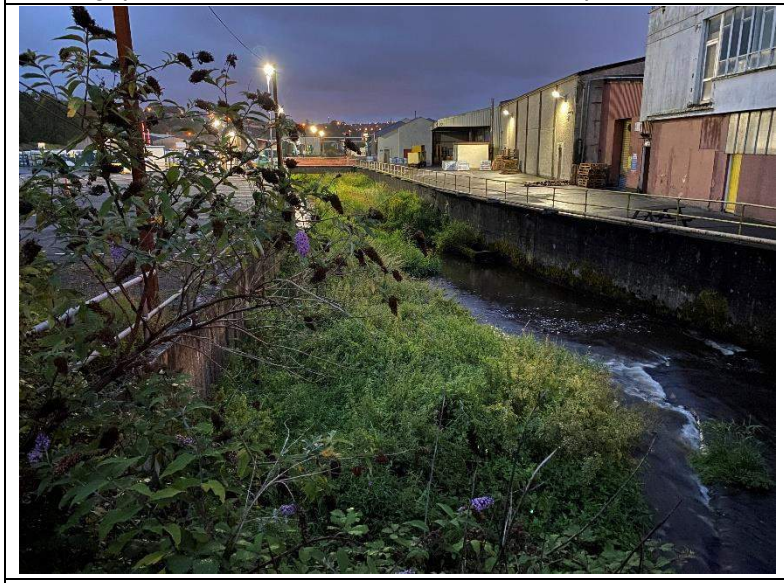
Appendix A – Photographic Record

	
A1. Bridge B01 - Located on the Glenamought River. Sheltered location proximal to suitable bat foraging habitat. Crevices within the bridge barrel and at the joint between spandrels and buttresses.	**A2.** Bridge B02 - Located on the Glenamought River. Considered to have moderate potential for bats due to sheltered location proximal to suitable foraging habitat and the presence of crevices within the bridge arch.
	
A3. Bridge B03 - Located on the Glenamought River. No PRFs visible from ground level. No evidence of roosting was detected during activity surveys.	**A4.** Bridge B04 - Located on Glenamought River. Gaps in stonework and where stonework meets concrete deck provide gaps suitable for roosting bats. No evidence of roosting was detected during activity surveys.

	
A5. Bridge B06 (U/S) - Located on Bride River. Two span masonry bridge with some gaps in stonework. Evidence of historic repairs.	**A6.** Bridge B06 - Located on Bride River. Two span masonry bridge with some gaps in stonework. Evidence of historic repairs.
	
A7. Bridge B07 - bridge in background. This section of channel experiences significant light pollution at night.	**A8.** B09 - Modern cast concrete bridge which presents few opportunities for bats. Occurs in a location which experiences significant light pollution at night.

	
A9. B10 - Modern bridge with cast concrete barrel which presents few opportunities for bats.	**A10.** B11 - Old masonry culverts on Glen River. Unlikely to have any value to bats due to their low level relative to level of watercourse (photo taken at low flow levels). No works are proposed but fencing works taking place adjacent.
	
A11. B12 - Disused railway underpass. Not accessible for survey. A replacement security gate is proposed.	**A12.** B13 - Footbridge over River Bride. Steel and concrete construction. Occurs in a location which experiences significant light pollution at night.