

GREATER DUBLIN DRAINAGE PROJECT

ElAR Addendum Chapter 11A (Biodiversity (Terrestrial and Freshwater Aquatic))
Appendix A11.1 Terrestrial Baseline Survey Report

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1 INTRODUCTION

RPS was commissioned by Uisce Éireann (UÉ) to complete update ecology surveys to inform the Greater Dublin Drainage Project (hereafter referred to as the Proposed Project) Environmental Impact Assessment Report (EIAR) Addendum Report.

An Environmental Impact Assessment Report (EIAR) was prepared for the Proposed Project and was submitted in the 2018 planning application. Chapter 11 of the 2018 EIAR considered terrestrial biodiversity.

As detailed in Chapter 1A (Introduction) in Volume 2A of the Environmental Impact Assessment Report (EIAR) Addendum Report, we have reviewed the Chapter 11 (Biodiversity (Terrestrial and Freshwater Aquatic)) and the associated appendices of the EIAR submitted with the original 2018 planning application, in the light of:

- Changes to the baseline environment;
- The requirement for updated surveys; and
- Any changes to the law, policy, or industry standards and guidance in the intervening period.

This Appendix documents the findings of the update ecology surveys and informs Chapter 11A Biodiversity (Terrestrial and Freshwater Aquatic)) of the Environmental Impact Assessment Report (EIAR) Addendum Report.

In updating the baseline ecology information for the Proposed Project this was completed cognisant of the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guideline) (CIEEM 2018), with respect to the validity of baseline data.

This Appendix is a factual account of the update surveys which have been completed for the Proposed Project between 2020 and 2023, and documents the methodology and findings of these surveys, respectively. The update surveys completed were:

- Terrestrial Habitat Survey - updated to identify any material changes since the last survey completed in 2017;
- Invasive Alien Plant Species Survey - updated to identify any material changes since the last survey completed in 2017;
- Badger Survey - updated to identify any material changes since the original surveys completed in 2015 / 2016 and 2017;
- Bat Roosting and Activity Surveys - updated to identify any material changes since the original surveys completed in 2012, 2013, 2015 and 2017 and with reference to updates in guidance (Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016) and the National Parks and Wildlife Service (NPWS) Bat mitigation guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134. ISSN 1393-6670 (NPWS 2022));
- Smooth Newt Surveys - updated to identify any material changes since the last surveys completed in 2015 and 2017; and
- Aquatic Surveys - updated to identify any material changes since the last survey completed in 2017, including an update Otter Survey (last surveyed for Otter 2017).

In addition, the data has been compared with the relevant baseline in the Chapter 11 of the 2018 EIAR to identify any material changes to the baseline conditions in the intervening period. Any identified material changes have then been used to inform Chapter 11A (Biodiversity (Terrestrial and Freshwater Aquatic)) in Volume 3A Part A of the EIAR Addendum.

2 METHODOLOGY

This Section sets out the methodology of the update surveys which were completed for the Proposed Project between 2019 and 2023.

2.1 Habitat Survey

2.1.1 Terrestrial Habitats Survey

Between 18 October and 2 November 2022, an experienced RPS ecologist completed a walkover survey of all land within or immediately adjacent to the redline boundary of the Proposed Project. The survey was completed during daylight hours. The aim of the survey was to identify any material changes to the mapped habitats since the original survey was completed in August 2017. The mapping and description of the habitats was completed with reference to A Guide to Habitats in Ireland (Fossitt 2000) which is consistent with the surveys completed in August 2017. The results of the survey were digitally mapped in the Geographic Information System (GIS). The weather conditions during the survey were mild (c.10-15°C (degrees Celsius)) and mostly dry with occasional showers.

Such surveys can be completed at any time of year, however optimally during the spring and summer. The completion of the update surveys occurred during the Autumn of 2022. It is not considered a significant limitation given that the area had been previously mapped and described. Also, it was considered unlikely that the value attributable to the habitats mapped and described during 2017 had materially increased in value in their own right during the intervening period; rather the opposite is more likely.

2.1.2 Invasive Alien Plant Species Survey

An Invasive Alien Plant Species (IAPS) survey was undertaken to determine the presence / likely absence of IAPS, particularly those listed on the Third Schedule of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (hereafter referred to as the Birds and Natural Habitats Regulations). The survey was conducted within all lands within the redline boundary of the Proposed Project on 9 and 10 September 2019. The survey was completed at an optimal time of year for detecting the presence / likely absence of such species. The weather conditions during the survey were cloudy with some light rain with ambient air temperatures ranging from 9 to 16°C. The survey comprised a walkover survey undertaken by experienced RPS ecologists. The locations of the IAPS recorded during 2019 were re-confirmed during a follow-up survey completed on 5 May 2023.

In addition, incidental records of IAPS were also recorded during the completion of the estuarine survey of Baldoyle Estuary (as detailed in Chapter 9a Appendix A9.1) in 2022.

In 2023, during the badger surveys (17 to 19 April) and freshwater aquatic surveys (12 and 13 June) all incidental records of IAPS were also recorded, providing a full update within the Proposed Project redline boundary and 100m buffer.

2.2 Species Survey

2.2.1 Badger Survey

A badger (*Meles meles*) survey was conducted for all lands within the redline boundary and a 50m buffer around the redline of the Proposed Project, extending approximately between the M50 / N3 Motorway intersection at Connolly Hospital Blanchardstown and heading in an easterly direction to the proposed intersection with the proposed outfall pipeline route (land based section) at Portmarnock Strand. The survey included the construction access wayleaves shown along the corridor in **Figures R-1, R-2 & R-3 in Appendix R**.

The survey was completed on 28 and 29 October 2020 and was undertaken during daylight hours, commencing at approximately 09.00hrs and finishing at approximately 16.30hrs, over the course of two days. The weather conditions during the survey were cloudy, with light to moderate rain and ambient air temperatures ranging from 9 to 13°C. The survey was conducted with reference to the National Roads Authority (NRA) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2009) and was completed by experienced RPS surveyors. Broadly, the

survey involved mapping and describing any actual or potential signs of badger activity (e.g. setts, footprints, hairs, latrines). No wildlife licences, issued by the NPWS, were required for the surveys.

A further survey of badgers was completed using the same methodology between 17 to 19 April 2023. For this survey, the buffer referred to for the 2020 survey was increased from 50m to a 100m in line with those surveys undertaken and reported within Chapter 11A of the 2018 EIAR; to allow a more comprehensive comparison. The 2023 survey was undertaken during daylight hours, commencing at approximately 09.00hrs and finishing at approximately 17.00hrs, over the course of three days. The weather conditions during the surveys were sunny with ambient air temperatures ranging from 11 to 13°C.

A confidential report detailing the complete badger survey and the associated findings will be provided separately to the relevant bodies.

2.2.2 Bat Surveys

The bat surveys consisted of bat roost surveys of potentially affected trees and bat activity surveys. In relation to roost surveys, no buildings are proposed to be demolished (in whole or part) or refurbished as part of the Proposed Project, and therefore, no bat roost surveys of such features were necessary.

2.2.2.1 Bat Roost Assessments

2.2.2.1.1 Preliminary Roost Assessment of Trees

Preliminary Bat Roost Assessments (PBRA) were completed of all trees within the redline boundary of the Proposed Project between 18 October and 2 November 2022 by an experienced RPS ecologist. The PBRA was completed during daylight hours and consisted of a visual assessment of the trees from ground level, using binoculars as necessary. The suitability assessment of trees was completed with reference to Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016). Any potential roost features (PRFs) found were graded into low, moderate or high roost suitability, and the tree given the highest feature grade as the overall suitability. The survey was completed within an optimal season for the completion of such surveys.

2.2.2.1.2 Tree Climbing PRF Inspection Survey

Following on from the PBRA survey, a tree climbing inspection survey of all trees considered to have medium or high potential during the PBRA survey was completed. The survey was carried out by suitability qualified RPS surveyors on 24 and 25 November 2022 and repeated on 1 and 2 December 2022. The survey was aided through the use of tree-climbing rope equipment, ladders, a torch and a Rigid CA-350 endoscope inspection camera. The aim of the survey was to allow closer inspection of PRFs identified during the PBRA in order to look for evidence of bats including live or dead bats, droppings, staining, odour and / or other physical characteristics, and where necessary, to reclassify PRFs. The surveys were completed with reference to Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016). Survey results were compared with information and records from Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (Andrews 2018) to aid in the classification and identification of PRFs.

2.2.2.2 Bat Activity Surveys

The bat activity survey consisted of two separate but complimentary methodologies, namely walked transect surveys and fixed static detector surveys. The aim of both methodologies was to characterise the bat activity present along the route of the Proposed Project in relation to the species and levels of activity by each species. The surveys were completed with reference to Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016) and Bat mitigation guidelines for Ireland – V2. Irish Wildlife Manuals., No. 134. ISSN 1393-6670 (NPWS 2022). All bat detector data from the surveys was processed with Kaleidoscope software using AutoID to identify bat species.

2.2.2.2.1 Walked Transect Survey

In 2020, the methodology consisted of walking four transects, labelled as T1 to T4, within and adjacent to the lands within the redline boundary of the Proposed Project. Full spectrum recording bat detectors (Anabat

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Scout) were used during the walked transects over four days between 7 and 10 September 2020 (**Figure E-1 to E-5 of Appendix E**). Five-minute listening points were taken along the transects during the bat activity surveys. Transects started 15 minutes before sunset and ended two hours after sunset. Weather conditions for the bat activity surveys are shown in **Table 2-1**.

Table 2-1: Weather conditions during 2020 walked transect surveys

Date	Cloud cover	Precipitation	Wind (0-7)	Temperature	Description
7/9	not recorded	not recorded	not recorded	not recorded	not recorded
8/9	not recorded	not recorded	not recorded	not recorded	not recorded
9/9	95%	none	1	15°C	Mild
10/9	95%	none	1	14°C	Calm with slight chill

In 2021, the methodology consisted of walking seven transects, labelled as T1 to T7, within and adjacent to the lands within the redline boundary of the Proposed Project. Full spectrum recording bat detectors (Elekon Batlogger M2) (**Figure F-1 to F-8 of Appendix F**) were used. Each transect was surveyed a minimum of twice between May to September 2021 (**Table 2-2**). Thirty-five, five-minute listening points were taken along the transects during the bat activity surveys (**Figure G-1 to G-4 of Appendix G**). Weather conditions for the bat activity surveys are shown in **Table 2-3**.

Table 2-2: Transects walked for bat activity survey, 2021

Date	Transect							Dusk/ Dawn
	T1	T2	T3	T4	T5	T6	T7	
19/05/2021	X		X					Dusk
25/05/2021					X		X	
09/06/2021							X*	Dusk
15/06/2021		X		X				
16/06/2021					X*	X		
12/07/2021			X		X			Dawn
13/07/2021				X			X	
16/08/2021	X					X		Dawn
17/08/2021		X						
02/09/2021		X*						Dusk
14/09/2021	X		X					
15/09/2021					X		X	

* Carry over of survey to the next month.

Both dusk and dawn activity surveys were carried out for each transect. Transects started 15 minutes before sunset and ended two hours after sunset for dusk surveys. For dawn surveys transects started two hours before sunrise and ended 15 minutes after sunrise.

Table 2-3: Weather conditions during 2021 walked transect surveys

Date	Transect	Cloud cover	Precipitation	Wind (0-7)	Temperature	Description
19/5	1	15%	none	3-4	15-10°C	Mild, cloudy, breezy
19/5	3	20%	none	2	12°C	Bright, dry evening
25/5	4	80%	none	1	13°C	Dry, clear, slight breeze
25/5	7	20%	none	2	14°C	Calm, bright and warm
8/6	7	30%	none	3	13°C	Bright, warm evening
15/6	2	30%	none	4	17°C	not recorded
15/6	4	not recorded	not recorded	not recorded	not recorded	not recorded

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Date	Transect	Cloud cover	Precipitation	Wind (0-7)	Temperature	Description
16/6	5	90%	none	1	16°C	Fine, settled, cloudy
16/6	6	90%	none	4	14°C	Bright, warm evening
13/7	3	35%	none	2	15°C	Warm evening, slight breeze
13/7	5	20%	none	2	13°C	not recorded
14/7	4	0%	none	3	14°C	Warm & calm
14/7	7	10%	none	1	13°C	Dry, mild, light breeze
3/8	1	10%	none	3	12°C	Breezy evening
17/8	6	100%	none	4	16°C	Blustery, warm, overcast
18/8	2	100%	none	3-4	13°C	Chilly evening
14/9	1	50%	none	2	17°C	Clear, warm
14/9	3	10%	none	2	17°C	Clear, mild evening
15/9	5	not recorded	not recorded	not recorded	not recorded	not recorded
15/9	7	70%	none	2	17°C	Fine, calm

2.2.2.2.2 Static Bat Detector Surveys

Additionally, two static bat detectors were placed at one of eight locations along the Proposed Project Boundary (**Figure H-1 to H-4 of Appendix H and Table 2-4**) and moved to the next location after one week. This means that each location was surveyed for a period of at least five consecutive nights each month between May to September 2021. The locations were determined through considering a number of factors, primarily identifying potentially optimal habitat in locations least likely to result in the equipment being tampered with, damaged or stolen.

Table 2-4: Locations and dates of static bat detectors 2021

Month	Detector	Transect							
		T1	T2	T3	T4	T5	T6	T7	T8
April-May	4		30/04/2021	10/05/2021		17/05/2021			24/05/2021
			10/05/2021	17/05/2021		24/05/2021			31/05/2021
	5	30/04/2021			10/05/2021		17/05/2021	24/05/2021	
		10/05/2021			17/05/2021		24/05/2021	31/05/2021	
May-June	4		31/05/2021		08/06/2021	16/06/2021		22/06/2021	
			08/06/2021		16/06/2021	22/06/2021		28/06/2021	
	5	31/05/2021		08/06/2021			16/06/2021		22/06/2021
		08/06/2021		16/06/2021			22/06/2021		28/06/2021
June-July	4		28/06/2021	05/07/2021		12/07/2021			19/07/2021
			05/07/2021	12/07/2021		19/07/2021			26/07/2021
	5	28/06/2021			05/07/2021		12/07/2021	19/07/2021	
		05/07/2021			12/07/2021		19/07/2021	26/07/2021	
July-Aug	4	26/07/2021		04/08/2021			10/08/2021	16/08/2021	
		04/08/2021		10/08/2021			16/08/2021	23/08/2021	
	5		26/07/2021		04/08/2021	10/08/2021			16/08/2021
			04/08/2021		10/08/2021	16/08/2021			23/08/2021
Aug-Sept	4	23/08/2021		30/08/2021		06/09/2021			
		30/08/2021		06/09/2021		14/09/2021			
	5		23/08/2021		30/08/2021		06/09/2021		
			30/08/2021		06/09/2021		14/09/2021		

2.2.3 Smooth Newt Survey

Presence / absence surveys, completed under licence from the NPWS (Licence No. C117/2023), were carried out by experienced RPS ecologists at three locations containing potential smooth newt (*Lissotriton vulgaris*) breeding habitat during the newt breeding season and larval development period (March to September) in 2021 (Table 2-5 and Figure M-1 to M-4 of Appendix M), and again in April and May 2023.

The methodology used primarily involved techniques for smooth newt survey outlined in Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2008) and the Northern Ireland Environment Agency (NIEA) Newt Surveys - NIEA Specific Requirements (NIEA 2017). Additional guidance was gathered from Britain’s Reptiles and Amphibians (Inns 2009), The distribution and status of smooth newts in Northern Ireland (O’Neill *et al.* 2004) and the National Newt Survey - Final Report 2012 (Buckley 2012).

For site one (Coldwinters), 16 water bodies were assessed in 2021, which increased to 20 waterbodies in 2023. For site two (Ballymun), eight water bodies were assessed in both years. For site three (Toberbunny), four water bodies were assessed in both years. Sites one and two were surveyed three times, on 2 and 19 April 2021 and again on 26 May 2021. Site three was only surveyed on 2 April 2021, since the four features comprising one shallow pond and three drainage ditches were in-filled with vegetation and litter after that initial period. Willows and bramble added further cover. These features were no longer recognisable as water bodies and would not support breeding smooth newt. As such, no further surveys were scheduled at site three in 2021. In 2023 all three sites were surveyed three times each, on 20 April, 3 May and 17 May.

Dip-netting, which involves running a 25cm (centimetre) hand net with 1mm (millimetre) mesh through the submerged vegetation and water body substrate over an area of 1m² (metres squared) at random points around the edge and middle of the water body (Marnell F. 1996), was attempted at sites one and two. However, for the most part, the water bodies were too silty or full of weeds to perform this survey method successfully. Therefore, torching was the favoured survey method. Torching involved moving around the water body perimeter and stopping every 2m to torch (Meehan S. 2013). Torching was carried out by shining a high-powered torch into the water from the bank outward and examining the water for newts, paying particular attention to examine amongst vegetation and on the water body floor, as newts are more difficult to see there. The sites were surveyed at night shortly after sunset (Table 3-7), as this is when smooth newts are most active.

Weather conditions can influence the results of the newt surveys, with newt activity considered to drop considerably below 5°C and with rainfall and wind decreasing water clarity. Surveys should not be conducted in these conditions. All surveys were completed in optimal weather conditions (2021: Table 3-7, 2023: Table 3-8).

For each water body surveyed, the following information was collected:

- Presence of fish, frogs, and birds; and
- The number of individual newts identified in each water body.

Table 2-5: Smooth Newt netting and torching times and dates at site 1, 2 & 3.

Site no.	Location	No of waterbodies	Description
1	Coldwinters	16/20	A mixture shallow depressions with deeper pools or ponds
2	Ballymun	8	One large, interconnected waterbody (variable depths) with seven aligned smaller pools (old foundation works) adjacent
3	Toberbunny	1	One shallow depression and 3 drainage ditches

2.3 Freshwater Aquatic Surveys

Freshwater aquatic surveys were completed by experienced RPS ecologists over two days on 1 and 2 September 2021 and repeated on 12 and 13 June 2023. The locations where watercourses will cross the footprint of the Proposed Project were surveyed (Figure O-1 to O-4 of Appendix O), namely:

- The Tolka_040 within the grounds of Sport Ireland (Location 1a);

- The Tolka_040 within the grounds of Blanchardstown Hospital, downstream of Abbotstown bridge (Location 1b, 2021); The Tolka_040 within the grounds of Blanchardstown Hospital, along Abbotstown stream, (Location 1b. 2023);
- The Tolka_040 within the grounds of Blanchardstown Hospital, upstream of Abbotstown bridge (Location 1c);
- The Santry_010 within the grounds of Sillogue Golf Course (Location 2, 2021);
- The Santry_010 in the field upstream of Sillogue Golf Course (Location 2, 2023);
- The Mayne_010 located south of the Old Airport Road (Location 3);
- The Mayne_010 located east of Clonshagh Road (Location 4); and
- The Mayne_010 located north of the R139 (Location 5).

The aquatic survey consisted of sampling at each location indicated in **Figure O-1 to O-4 of Appendix O** and included identification of key ecological features such as fisheries habitat potential (salmonid / lamprey / crayfish), an assessment for otter (*Lutra lutra*) (150m upstream and downstream to identify any evidence) and the presence / likely absence of invasive species. The general physical characteristics and hydromorphological features of each site were recorded including substrate, flow types, and aquatic vegetation during surveys. Specifically, the following tasks / activities were conducted:

- The surveyors carried out a two-minute kick sample by placing the flat bottom of the kick net on the riverbed, against the flowing water (a sweep was undertaken at site 3 in 2023 due to siltation). The surveyors kicked the bottom of the stream within suitable riffle habitat to dislodge the substrate and disturb any macroinvertebrates into the direction of the net. A stone wash was also completed to ensure collection of species which cling to rock surfaces;
- The contents of the kick net were inverted into the sorting tray with some added water from the stream. Once the contents settled, the different groups of macroinvertebrates were identified using a macroinvertebrate identification key;
- The macroinvertebrate data (structure of the community) was then interpreted and a Q value for the stream calculated using the Quality value index, in order to ascertain the biological quality of the river. A higher value of the index interprets good water quality and a lower value indicates poor water quality (**Table 2-6**);
- Water chemistry was also recorded in-situ using a hand-held calibrated meter (Oxyguard Handy Polaris). This measured conductivity, dissolved oxygen (% and mg/l), temperature (°C), total dissolved solids (ppm) and pH of the water sample (conductivity and pH not recorded in 2023 due to equipment maintenance, although this is not considered a significant limitation in drawing conclusions);
- An in-field visual assessment at each sample location was also undertaken and included:
 - % Substrate, % sedimentation, % macrophyte (and composition), % macroalgae, fisheries habitat suitability assessment (e.g. signs of redds, flow velocity, barriers to passage, organic detritus, areas of soft sediment deposition and clean spawning gravels) plus recording of land use and bankside vegetation.
- An assessment for the presence of otter was also completed (150m upstream and downstream) to identify any evidence such as prints, holts, slides and droppings.

The rating of habitat for salmonids, crayfish and lamprey is on a scale of *None/Poor/Fair/Good/Very Good/Excellent*. This rating assesses the physical suitability of the habitat; the presence / absence / density of the species in question will also depend on present and historical water quality and accessibility of the section to these species.

A rating of:

- **'None'** indicates that the ecologist carrying out the assessment regards it as impossible that the watercourse could support the species in question in the relevant life stage;
- **'None – Poor'** indicates that it is regarded as possible but extremely unlikely that the stream could support the species in the relevant life stage;
- **'Fair'** indicates that it is possible that the stream section could support the species in question;

- **'Good'** indicates that the ecologist considers it possible and likely that the stream could support the species in question;
- **'Very Good'** indicates that the stream certainly could support the species; and
- **'Excellent'** indicates that the ecologist regards the stream as the ideal habitat for the species in question.

Table 2-6: Q value indexes (EPA 2022)

Q Value	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously polluted	Unsatisfactory

3 RESULTS

3.1 Habitats

3.1.1 Terrestrial Habitats

This Section should be read with reference to **Figure 3-1**(*Key Changes to Terrestrial Habitats (Fossitt) along the Proposed Project Boundary 2017-2022*), and **Figure R-1 to R-3 in Appendix R** (*Proposed Construction Corridor, Access Routes, Compounds & Crossings*). Only changes to habitats above the mean high-water mark since the 2017 survey are compared here. Intertidal, sub-tidal and marine habitats below the mean high-water mark are compared to the 2017 survey in Chapter 9A Biodiversity (Marine). IAPS noted along the walkover survey are described in **Section 3.1.2**. Freshwater aquatic habitats and species are covered in **Section 3.3**.

3.1.1.1 Summary of Habitats

Figure 3-1 below illustrates the habitats which were identified within the redline boundary of the Proposed Project. Habitats are those described with reference to A Guide to Habitats in Ireland (Fossitt 2000). **Table 3-1** below tabulates the changes to the habitats since the original surveys completed in 2017.

Table 3-1: Changes to habitats along the redline boundary of the Proposed Project between 2017 and 2022

Changes to 2017 Survey	IDs
Abandoned area previously Improved Agricultural Grassland (GA1), now (GA1) and Scrub (WS1)	13
Amenity Grassland (GA2) now Buildings/artificial surfaces (BL3)	1
Amenity Grassland (GA2) now Dry Meadows & Grassy verges (GS2)	25
Amenity Grassland (GA2) now Improved Agricultural Grassland (GA1) unmanaged	40
Arable crops (BC1) now a construction site (BL3)	45
Arable crops (BC1) now Improved Agricultural Grassland (GA1)	30,35,36,51,52
Arable crops (BC1) now Improved Agricultural Grassland (GA1) / bare ground (ED2)	46
Arable crops (BC1) now Improved Agricultural Grassland (GA1) unmanaged	47
Arable crops (BC1) now Tilled land (BC3)	15,18,19,20,21,26,27,28,31
Construction site (BL3)	23
Contains a small area of Horticultural land (BC2) in the centre	39
Dry Meadows & Grassy verges (GS1) now a carpark (BL3)	2
Dry Meadows & Grassy verges (GS1) now Scrub (WS1)	3
Fixed dunes (CD3) now Marram dunes (CD2)	53
Horticultural land (BC2) now Arable crops (BC1)	41,42,43
Horticultural land (BC2) now Improved Agricultural Grassland (GA1)	32,48,49
Immature Woodland (WS2) now (Mixed) Broadleaved Woodland (WD1)	6,7,13,24
Immature Woodland (WS2) now Scrub (WS1)	4
Improved Agricultural Grassland (GA1) now Tilled land (BC3)	37
Improved Agricultural Grassland (GA1) unmanaged and allowed to go rank	10,11,12,16,17,22,33,34,38,50
Improved Agricultural Grassland (GA1), now (GA1) and Scrub (WS1)	9
Mostly built areas (BL3) with pockets of Amenity Grassland (GA2)	29
Mown grass paths between unmanaged areas allowed to go rank (GA1)	5,8

Changes to 2017 Survey	IDs
Tilled land (BC3) now Arable crops (BC1)	14
Wet Grassland (GS4) overgrown to Scrub (WS1)	44

3.1.1.2 Proposed Wastewater Treatment Plant

The key changes to the footprint of the proposed wastewater treatment plant (WwTP), ancillary Proposed Project elements and proposed temporary construction compounds associated with the proposed WwTP illustrated in **Figure R-2 to Figure R-3 of Appendix R** are outlined in **Table 3-1** above and described below.

Notable changes to the habitats present in 2017 were:

- The large field of arable crops (BC1) to the south of the proposed WwTP site is now improved agricultural grassland (GA1) (**30 in Table 3-1**);
- A small area of horticultural land (BC2) present in 2017 to the north-east of the proposed WwTP site is now also improved agricultural grassland (GA1) (**32 in Table 3-1**); and
- A field south of the south-east corner of the proposed WwTP site previously arable crops (BC1), is now currently tilled land (BC3) (**31 in Table 3-1**).

3.1.1.3 Proposed Abbotstown Pumping Station

The key changes to the proposed Abbotstown pumping station, ancillary Proposed Project elements and proposed temporary construction compounds associated with the proposed Abbotstown pumping station illustrated in **Figure R-1 of Appendix R** are outlined in **Table 3-1** above and described below.

Notable changes to the habitats present in 2017 were:

- This area previously recorded as arable crops (BC1) in 2017 now comprises a public park with mown grass paths between unmanaged areas allowed to go rank (GA1) (**5 in Table 3-1**); and
- The immature woodland present in 2017 within the redline boundary of the Proposed Project occurring within a Nature Development Area (NDA) which included a southward extension of woodland beyond the Tolka Valley Regional Park has now matured enough to be classed as mixed broadleaved woodland (WD1) (**6 and 7 in Table 3-1**).

3.1.1.4 Proposed Orbital Sewer Route – Blanchardstown to Clonshagh (Sections A and B)

The key changes to the proposed orbital sewer route, ancillary Proposed Project elements and proposed temporary construction compounds associated with the proposed orbital sewer route illustrated in **Figure R-1 and R-2 of Appendix R** are outlined in **Table 3-1** above and described below.

Notable changes to the habitats present in 2017 were:

- A small section of the western most end of the redline boundary of the Proposed Project close to the wooded area, which was previously amenity grassland (GA2), is now buildings / artificial surfaces (**1 in Table 3-1**); and
- An area of neutral grassland (GS1) occurring within the Connolly Hospital grounds with an unmanaged appearance in 2017 is now partially succeeded to scrub (WS1) (**3 in Table 3-1**).

As the proposed orbital sewer route will pass through the National Sports Campus (NSC) towards Cappoge, it will pass through improved grassland fields. In the 2022 survey, this area is unmanaged and allowed to go rank (**10 & 11 in Table 3-1**), or partially succeeded to scrub (**9 in Table 3-1**).

Intensively farmed enclosures (tillage, horticulture and pasture) and amenity grassland were the dominant habitats approaching Ballymun in 2017. In 2022 this was also the case, with the exception of horticultural land (BC2) which was absent. Other changes here included:

- Fields of arable crops (BC1) was tilled land (BC3) in 2022 (**15,18,19,20,21** in **Table 3-1**);
- Tilled land (BC3) was now arable crops (BC1) (**14** in **Table 3-1**);
- Improved agricultural grassland (GA1) now allowed to go rank (**16,17 & 22** **Table 3-1**);
- There is also an area below Dublin Airport just after Ballymun, which is now a construction site (**23** in **Table 3-1**); and
- At the section of the redline boundary of the Proposed Project along the M1 Motorway, north of the junction with the M50 Motorway, immature woodland (WS2) recorded there in 2017 is now (mixed) broadleaved woodland (WD1) (**24** in **Table 3-1**), and amenity grassland (GA2) is now dry meadows and grassy verges (GS2) (**25** in **Table 3-1**).

3.1.1.5 Proposed Temporary Construction Compound No. 2

The key changes to the proposed temporary construction compound no.2 illustrated in **Figure R-1** of **Appendix R** are outlined in **Table 3-1** above and described below.

The northern half of proposed temporary construction compound no.2 was recorded as tilled land (BC3) in the 2022 survey and the southern half improved agricultural grassland (GA1) (**Figure 3-1**). At the south-west corner of proposed temporary construction compound no.2, immature woodland (WS2) previously recorded here in 2017 was now (mixed) broadleaved woodland in 2022 (**13** in **Table 3-1**).

3.1.1.6 Proposed Temporary Construction Compound No. 3

No notable changes to the habitats present in 2017 were recorded in the 2022 survey with respect to proposed temporary construction compound no. 3.

3.1.1.7 Proposed Temporary Construction Compound No. 4

No notable changes to the habitats present in 2017 were recorded in the 2022 survey with respect to proposed temporary construction compound no. 4.

3.1.1.8 Proposed Outfall Pipeline Route (Land Based Section) (Clonshagh to Baldoyle) (Sections C and D)

The key changes to the proposed outfall pipeline route (land based section) running from the proposed WwTP to the R106 Coast Road, are illustrated in **Figure R-2** and **R-3** of **Appendix R**, and are described below.

Notable changes to the habitats present in 2017 were:

- Fields with arable crops (BC1) in 2017, were in 2022 recorded as tilled land (BC3) (**26,27,28 & 31** in **Table 3-1**);
- Other fields with arable crops (BC1) were now improved agricultural grassland (GA1) (**30,36,51 & 52** in **Table 3-1**);
- Areas of horticultural land (BC2) is now improved agricultural grassland (GA1) (**32,48 & 49** in **Table 3-1**);
- Improved agricultural grassland (GA1) is unmanaged and allowed to go rank in some areas (**33,34,38 & 50** in **Table 3-1**);
- A field of improved agricultural Grassland (GA1) is now tilled land (BC3) (**37** in **Table 3-1**);

- An area of amenity grassland (GA2) now improved agricultural grassland (GA1) unmanaged (**40** in **Table 3-1**);
- A field of improved agricultural grassland (GA1) contains a small area of horticultural land (BC2) in the centre (**39** in **Table 3-1**);
- Areas of horticultural land (BC2) are now arable crops (BC1) (**41,42 & 43** in **Table 3-1**);
- Area of wet grassland (GS4) is now overgrown to scrub (WS1) (**44** in **Table 3-1**);
- A field of arable crops (BC1) is now improved agricultural grassland (GA1) / bare ground (ED2) (**46** in **Table 3-1**); and
- Another field of arable crops (BC1) is now improved agricultural grassland (GA1) unmanaged (**47** in **Table 3-1**).

3.1.1.9 Proposed Outfall Pipeline Route (Marine Section) (Section E)

It is proposed to tunnel the proposed outfall pipeline route (marine section) from the R106 Coast Road, beneath the European sites at Baldoyle Bay, Portmarnock Golf Club and Velvet Strand, to emerge on the seabed approximately 600m offshore, where it will then be dredged to its termination point approximately 1km north-east of Ireland's Eye. The key changes to this area are illustrated in **Figure R-3** of **Appendix R** and are described below.

Notable changes to the habitats present in 2017 were:

- After the car park on either side of where the pedestrian trails lead onto the boardwalk and focuses the walkers through a narrow access section between the two golf courses, was recorded in 2017 as fixed dunes (CD2) but was noted as marram dunes (CD2) in 2022 (**53** in **Table 3-1**).

A comparison of the 2017 and 2022 surveys of the intertidal habitats is made in the next Section (**Section 3.1.2**).

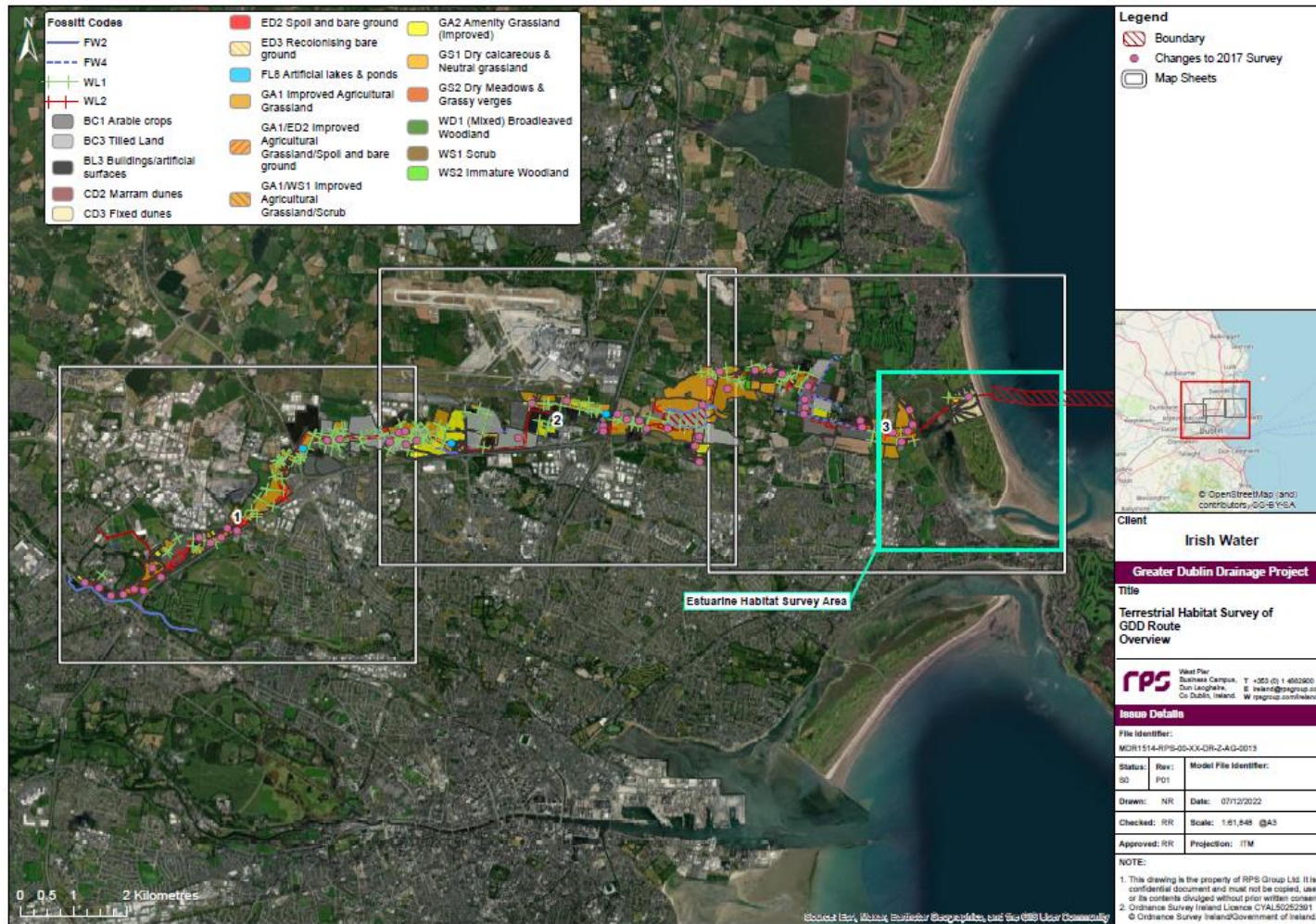


Figure 3-1: Key changes to terrestrial habitats (Fossitt) along the redline boundary of the Proposed Project 2017-2022 (Overview)

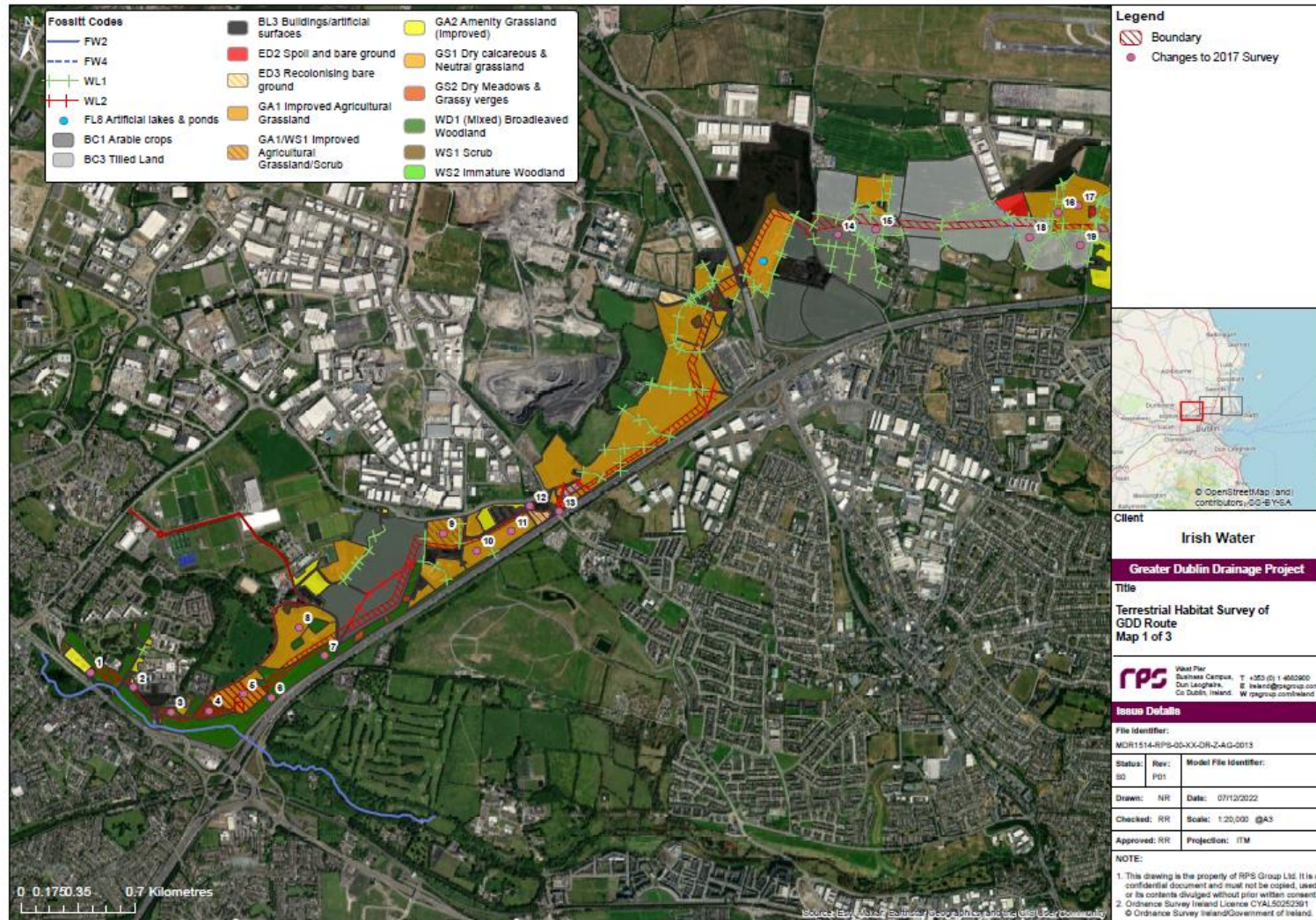


Figure 3-2: Key changes to terrestrial habitats (Fossitt) along the redline boundary of the Proposed Project 2017-2022 (1)

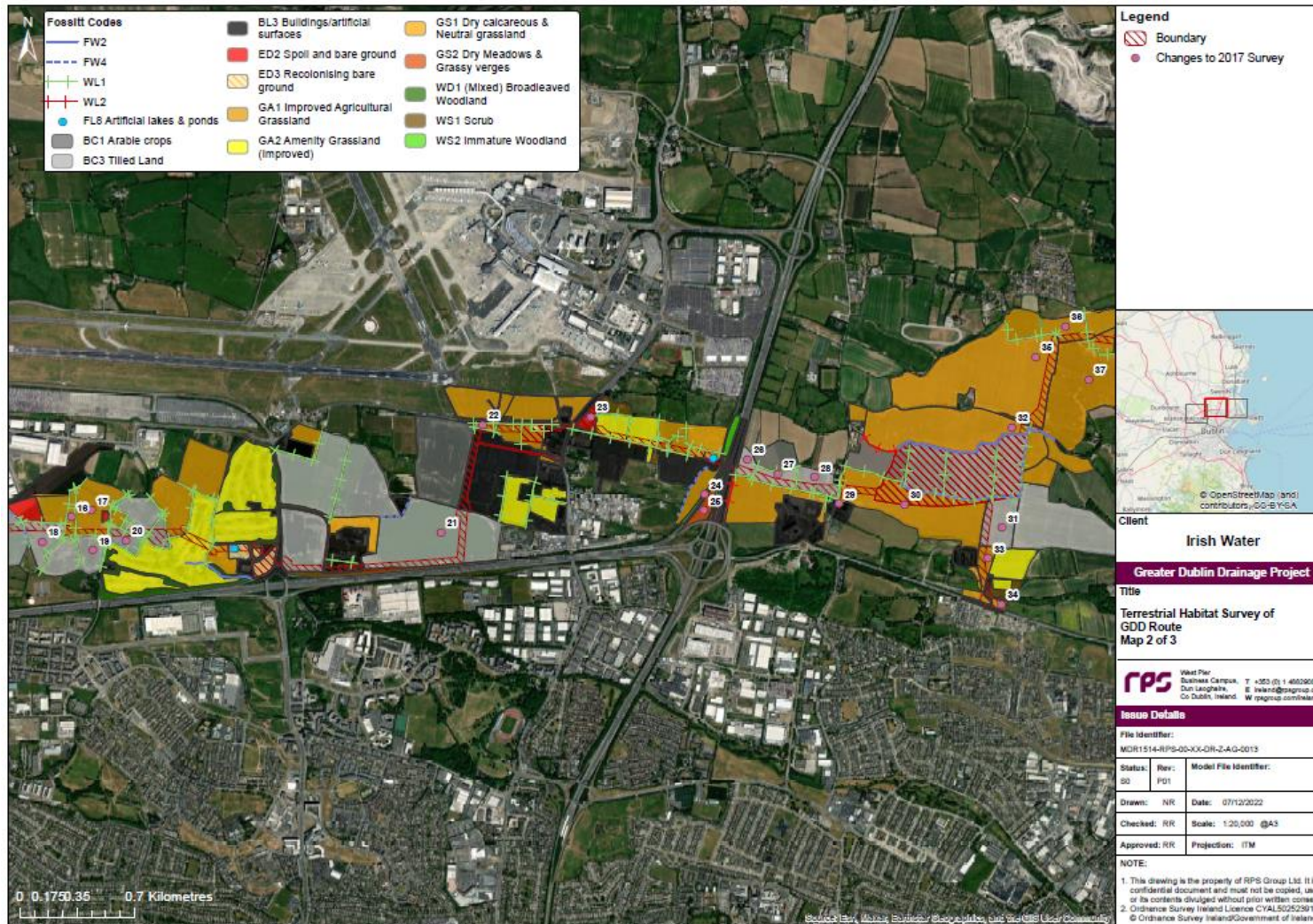


Figure 3-3: Key changes to terrestrial habitats (Fossitt) along redline boundary of the Proposed Project 2017-2022 (2)

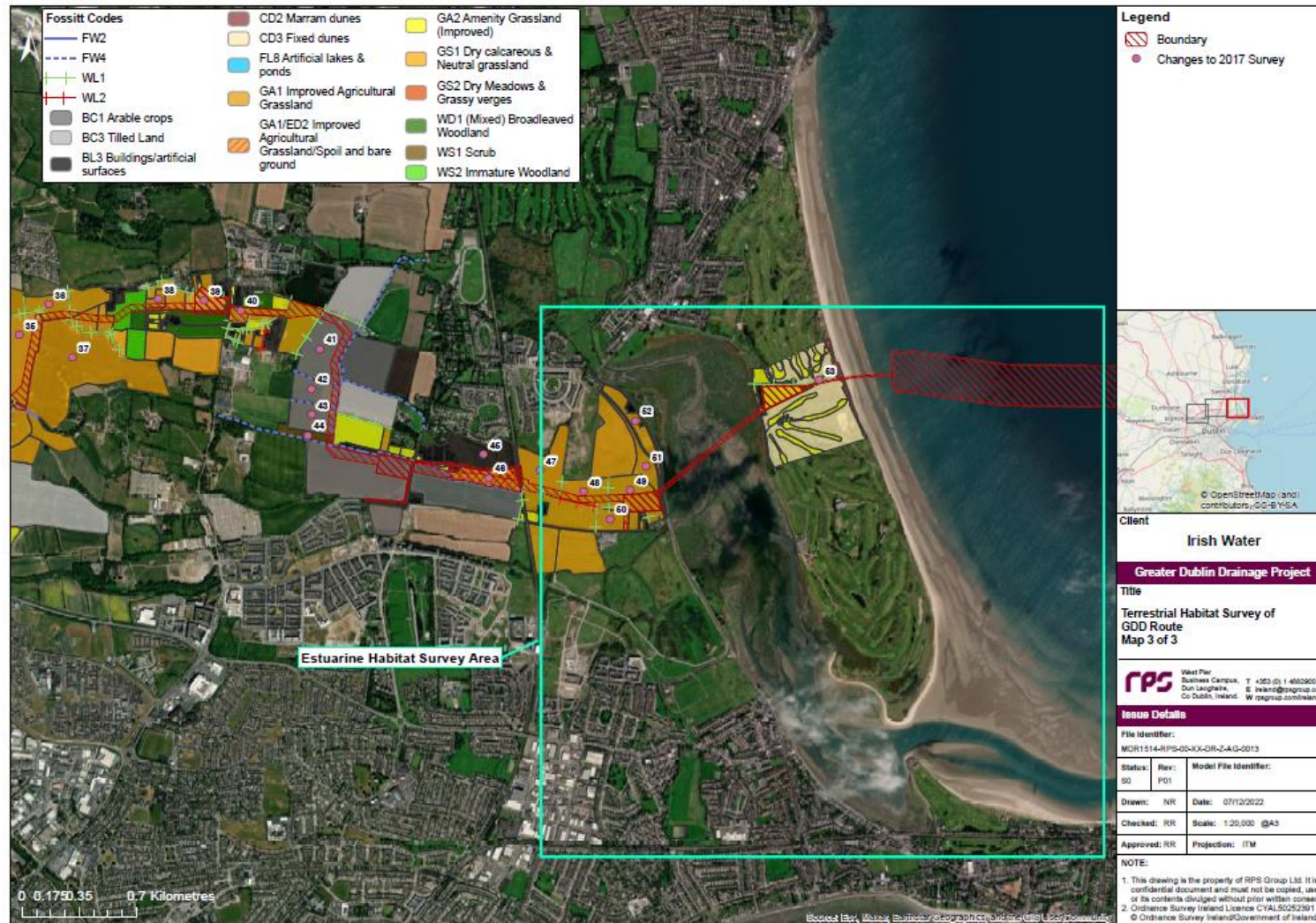


Figure 3-4: Key changes to terrestrial habitats (Fossitt) along the redline boundary of the Proposed Project 2017-2022 (3)

3.1.2 Invasive Alien Plant Species

During the previous 2017 survey, giant rhubarb (*Gunnera tinctoria* M.) was recorded along the River Tolka downstream of the proposed orbital sewer route and the proposed Abbotstown pumping station site. However, no Third Schedule IAPS were observed within the redline boundary of the Proposed Project. The giant rhubarb was at a sufficient distance from the proposed access corridor that it would not be affected by the Proposed Development and therefore no update surveys at this location have been undertaken.

The 2019 / 2022 surveys carried out by RPS confirmed the presence of several IAPS, although, in most cases, they largely comprised medium impact species such as sycamore (*Acer pseudoplatanus*), butterfly bush (*Buddleia davidii*) as well as the high impact cherry laurel (*Prunus laurocerasus*). These species which were occasionally noted in hedgerows or on derelict land are not included on the Third Schedule and are not further discussed.

During the 2019 survey two species of Third Schedule IAPS were recorded as occurring within the vicinity of the Proposed Project (**Table 3-2**), namely Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzanum*). Only the giant hogweed was noted from within the redline boundary of the Proposed Project (**Table 3-2**).

Table 3-2: IAPS Survey Results 2019 and 2023 (Giant Hogweed and Japanese Knotweed) and 2022 (Spartina sp.).

Scientific Name	Common Name	Grid reference (ITM)	Chainage	Online/Offline	Designation	Habitat/ Comment
<i>Heracleum mantegazzanum</i> *	Giant Hogweed	0715206 0741438	9,000m	Online	3 rd schedule IAPS	Derelict ground
<i>Reynoutria japonica</i>	Japanese knotweed	0723570 0741495	N/A	Offline	3 rd schedule IAPS	Moyne Road (R123), near access to construction compound 9. Currently being treated.(Not present in 2023)
<i>Reynoutria japonica</i>	Japanese knotweed	0723653 0742292	N/A	Offline	3 rd schedule IAPS	On seaward side of R106 road. Currently being treated.(Not present in 2023)
<i>Reynoutria japonica</i>	Japanese knotweed	0719736 0741220	N/A	Offline	3 rd schedule IAPS	Left bank of Mayne River. (discovered in 2023 only)
<i>Spartina</i> sp.	Common Cordgrass	N/A	N/A	Online, but unaffected	3 rd schedule IAPS	Intertidal mudflats
<i>Fallopia x bohemica</i>	Bohemian Knotweed		10,300m	Offline	3 rd schedule IAPS	Eastern edge of field 185m east of Ch 10,300m (discovered in 2023 only)

*As well as being a third schedule IAPS, the plant poses a cause for concern because of the human health hazard associated with it.

A single clump of Giant Hogweed, a phytotoxic plant, was identified in 2019, near the National Car Test (NCT) centre at the western end of derelict land along a Poplar treeline. This species is directly on the Proposed Project centreline.

Two areas of Japanese knotweed were noted from the 2019 surveys, with both located towards the eastern end of the Proposed Project near Baldoyle. The first is located on the seaward side of the R106 Road. It is believed that the patch is being managed, as evidenced by the presence of signage.

A second treated patch was recorded on the Moyne Road (R123), on the opposite side of the road from a halting site, west of proposed access route to proposed construction compound no. 9. The vegetation has previously been subject to chemical treatment as evidenced by dead canes. However, fresh growth was noted though the patch. Although offline, this IAPS is adjacent to the proposed access route to proposed construction compound no. 9.

The coastal grass, *Spartina* sp. is well established along both sides of Baldoyle Bay on intertidal mudflats and extending into saltmarsh vegetation.

Spartina swards were also recorded in the estuarine survey in 2009. The Giant Hogweed and Japanese Knotweed recorded in the 2019 survey, especially the Giant Hogweed within the Proposed Project Boundary was therefore a material change to the baseline at the time.

In the follow-on survey in 2023 the Japanese knotweed recorded in 2019 was not recorded at the two locations. The treatment for the Japanese knotweed must have been effective. However, the Giant Hogweed was still present at the location where it was noted in 2019. During the aquatic surveys in 2023, a stand of Japanese knotweed was recorded near the proposed WWTP site, along the left bank of the River Mayne (**Table 3-2** and **Figure 3-5**). This is a material change to the baseline. Additionally, during the 2023 badger survey, a large stand of Bohemian Knotweed was recorded along the Proposed Orbital Sewer Route Ch 10,300m.. This is regarded as a Third Schedule species as a hybrid of a third schedule species and therefore is a material change to the baseline.

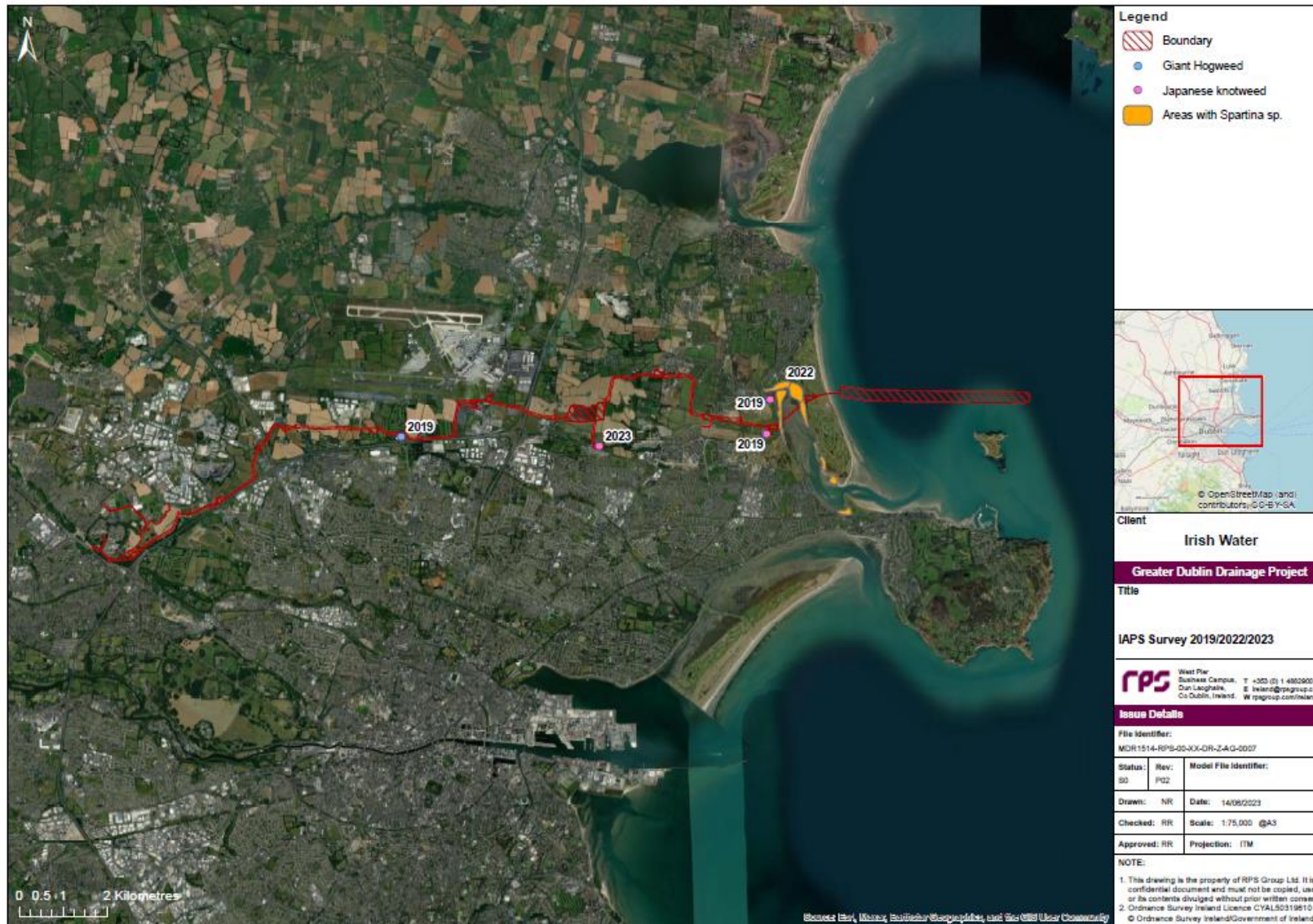


Figure 3-5: IAPS survey 2019 (Giant Hogweed & Japanese Knotweed), 2022 (*Spartina* sp.), 2023 (Japanese and Bohemian Knotweed, Giant Hogweed)

3.2 Species

3.2.1 Badgers

During the 2020 and 2023 surveys, badger activity was identified within the survey area (i.e., all land within the redline boundary of the Proposed Project plus associated buffer as documented in methodology section). Due to the high level of persecution of badger and legal protection afforded to this species (badger is listed in the Fifth Schedule of the Wildlife Act 1976 (as amended) and protected under Section 23), information pertaining to the location of setts is treated as confidential. For this reason, figures identifying the location of badger setts are not provided with this Appendix. A confidential report detailing the complete badger survey and the associated findings will be provided separately to the relevant bodies.

In 2020, ten badger setts were identified. Eight badger setts (BS1, BS2, BS3, BS4, BS5, BS6, BS9 and BS10) were identified outside of the redline boundary but within 50m of the redline boundary of the Proposed Project. Another two setts (BS7 and BS8) were identified outside of the redline boundary but within 100m of the redline boundary of the Proposed Project. Four of the 10 setts (BS7, BS8, BS9 and BS10) were also recorded in the 2017 survey. Therefore, the six extra setts recorded in 2020 are new setts and represent a material change. Ten setts were also recorded in 2017. Six of which were not re-recorded in 2020. It is not considered that such fluctuations in sett activity, particularly for setts which are not main setts, is unusual, given that badgers are mobile with sett activity able to change during and between years. The location of these setts and further details are provided in the **Confidential Badger Report Figures C-1 to C-5 of Appendix C and Table D-1 of Appendix D**

In 2023, 18 badger setts were identified. One sett (S17) was identified within the redline boundary of the Proposed Project. 14 badger setts (S2, S3, S4, S5, S6, S7, S8, S9, S11, S12, S13, S14, S16, S18) were identified outside of the redline boundary but within 50m of the redline boundary of the Proposed Project. Another three setts (S1, S10 and S15) were identified outside of the redline boundary but within the 50m to 100m buffer of the redline boundary of the Proposed Project. The location of these setts and further details are provided in the **Confidential Badger Report Figures G-1 to G-12 of Appendix G and Table H-1 of Appendix H**.

Four of the 18 setts (S3 (BS1), S6 (BS2), S8 (BS3), and S9 (BS4)) were also recorded in the 2020 survey. Therefore, the 14 new setts recorded in 2023 are a material change. Eleven of the setts recorded in 2017 and 2020 were not recorded in 2023. Again, it is not considered that such fluctuations in sett activity, particularly for setts which are not main setts, is unusual given that badgers are mobile with sett activity able to change during and between years.

In 2020, other badger evidence such as snuffle holes, excavations, trails, prints, and latrines were recorded either close to or within the redline boundary of Proposed Project (**Table 3-3**). The badger evidence is also mapped in GIS and shown in **Figure B-1 to B-7 of Appendix B**. The majority of this evidence was recorded in the eastern section of the Proposed Project route.

In 2023, other badger evidence such as snuffle holes, hair, trails, prints, and latrines were recorded either close to or within the footprint of the Proposed Project Boundary (**Table D1 of Appendix D**). The badger evidence is also mapped in GIS and shown in **Figures C-1 to C-8 of Appendix C**. The majority of this evidence was recorded in the western section of the Proposed Project route.

Table 3-3: Badger Survey Results (2020; to be read in conjunction with Figure B-1 to B-7 of Appendix B)

Activity	Label	Location	Description
Snuffle hole	BE1	Less than 10m away from BS2.	Single snuffle hole.
Trail/Snuffle mark	M6.1	Silloogue Golf course and westward to private road.	Some mammal trails but not conclusive badger, possible snuffle marks offline and west of Silloogue golf course in woodland
Trail	M6.2	Silloogue Golf course and westward to private road.	West of Silloogue golf course some evidence of badger trails.
Snuffle hole	M6.3	Silloogue Golf course and westward to private road.	Single snuffle hole.
Excavation	M8.2	AILSA lands eastwards to M1.	Two areas of excavation with some potential as badger. Many infilled or actively used by rabbits.

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Activity	Label	Location	Description
Scat	M8.3	AILSA lands eastwards to M1.	Fresh badger deposit in centre of field. No evidence of trails.
Scat	M8.4	AILSA lands eastwards to M1.	Old badger dropping.
Hole	M8.5	AILSA lands eastwards to M1.	Mostly rabbit burrows at corner of hedgerow, but two times larger holes. No evidence of recent badger
Latrine	M8.6	AILSA lands eastwards to M1.	Area had feel for badger. On the grass, there was a latrine with a single wet deposit. Evidence on both sides of hedgerow ditch is rabbit and inside ditch no obvious badger along base of ditch.
Print	M8.7	AILSA lands eastwards to M1.	Partial badger print.
Trail/Snuffle mark	M8.8	AILSA lands eastwards to M1.	Hint of trail in unmown sports field and snuffling.
Trail/Snuffle mark	M8.9	AILSA lands eastwards to M1.	Linear feature of snuffles along edge of hedgerow/sports field. A number of potential trails across scrub northwards but can coincide with grass dumping area also.
Trail/Snuffle mark	M8.10	AILSA lands eastwards to M1.	Some linear element of snuffling and clear trail, some rain obscured prints leading northwards.
Trial/Scat	M8.11	AILSA lands eastwards to M1.	No continuous trail but at least three areas along edge of hedgerow/rough field interface with repeat badger deposits. Some trails into dense scrub that could not be followed in most instances.
Trail	M10.1	Teagasc lands, West of road towards Woodland	Distinctive trails.
Trail	M10.2	Teagasc lands, West of road towards Woodland	Distinctive trails.
Trail	M10.3	Teagasc lands, West of road towards Woodland	Some minor hints of badger trails along paths, including a trail that could not be followed into dense woodland.
Trail	M10.4	Teagasc lands, West of road towards Woodland	Well-worn mammal trail crossing steep ditch.
Trail	M10.5	Teagasc lands, West of road towards Woodland	Well-worn narrow trail between two fields.
Scat	M10.6	Teagasc lands, West of road towards Woodland	Badger deposit at edge of field.
Trial/Scat	M11.3	South of GAA club heading westwards than northwards	Number of trails and badger scat along edge of arable field.
Print	M11.4	South of GAA club heading westwards than northwards	One area of considerable prints, but no areas of obvious setts when proximal hedges searched.
Trail	M11.5	South of GAA club heading westwards than northwards	Badger trail on eastern side of hedgerow. Large elder on corner had potential for sett but no excavation in ditch
Snuffle mark	M11.6	South of GAA club heading westwards than northwards	Snuffle mark.
Trail	M11.7	South of GAA club heading westwards than northwards	Well-worn mammal trail across ditch – no prints discernible.
Trail	M11.8	Single field east of Teagasc lands – (TR visited)	Well-worn badger trail along northern boundary of field. The trail continued westwards into Teagasc lands but could not be followed from other side despite absence of recent vegetation management.

Activity	Label	Location	Description
Trail	M11.9	Single field east of Teagasc lands – (TR visited)	Smaller hint of trail along access track, with one partial badger print near warehouse.
Trail	M12.1	West of Baldoyle Bay to Railway bridge	Hints of badger trail in some areas, but no setts.

3.2.2 Bats

3.2.2.1 Bat Activity Surveys

3.2.2.1.1 Walked Transect Survey

The four transects in 2020 (**Appendix E**) were completed within four consecutive days from 7 September to 10 September. The seven transects in 2021 (**Appendix F**) were completed between the months of May and September, each being surveyed between two and four times, over 12 separate nights..

Soprano pipistrelle (*Pipistrellus pygmaeus*) was the most common species occurrence during the 2020 transects, with Leisler’s bat (*Nyctalus leisleri*), and common pipistrelle (*Pipistrellus pipistrellus*) frequently occurring across the four days (see **Figure 3-6**). A species count of 65 was recorded on 8 September, 49 on 9 September, 25 on 7 of September, and 7 on 10 of September.

In 2021, aside from data collected on 17 June, 18 August, and 3 September which had low counts (<10), species counts ranged between 38 and 125 per transect (see **Figure 3-7**). As transect 2 data was only collected on 18 August and 3 September, the total species count for transect 2 was 14, of which 13 were common pipistrelle. The species compositions varied across the transects, with common pipistrelle, Leisler’s bat, and soprano pipistrelle the most common. There was one recording of a brown long-eared bat (*Plecotus auritus*) on 14 September at transect 1 (see **Figure 3-7**). In total, 70% of the species recorded were in the *Pipistrellus* family.

3.2.2.1.2 Static Bat Detector Surveys

Data was collected across eight locations during 2021 (**Appendix H**), from May through to September, with the exception of locations one and two (where data was collected in April as well) and location eight (where there was no data collected during June) (

Table 3-4).

The highest individual count was observed at location four, where 9,258 was the max count (**Figure 3-8** and **Table 3-4**). Locations 1, 2, 3 and 7 max counts were spread across a range of 1,548, with location 7 displaying the highest with 6,254. Locations 5, 6, and 8 had a max count of 1,453, 757, and 321; respectively.

June provided the highest count data, with 9,647 observations across eight of the locations, with May and July yielding 7,402 and 7,198, respectively. Six thousand, seven hundred and ninety-eight (6,798) individual counts were made during August, while 3,204 counts were made during September. April saw 31 counts, although only two of the locations collected data during this month. The total individual count across all locations from April to September was 34,280.

As displayed in Figures M-1 to M-8 (**Appendix I**) and summarised in Figure M-9 (**Appendix I**), the bat passes per night (BPPN) were calculated by dividing the species count by the number of nights the recorder was collecting data. The peak BPPN was observed in June, with a combined number of 1,170 across all eight locations. Four hundred and sixty-three (463) of these were observed at location 3. Location 4 observed the highest BBPN with 1,358, representing 29.6% of the total BBPN across all locations. The most frequent species recorded was the common pipistrelle with a total of 3,174 BBPN across all locations. Soprano pipistrelle and Leisler’s bat BBPN were recorded at 855 and 487 respectively. *Myotis* Spp. (3.29), Nathusius’ pipistrelle (0.45), and brown long-eared bat (0.2) were observed at lower occurrences. Of note is the Nathusius’ pipistrelle, which was only recorded at location 3. The species is observed across Northern Ireland but rarely recorded in the Republic of Ireland (Bat Conservation Ireland 2022). Brown long-eared bat

were also only recorded at one location (location 4). It is a woodland species and there are no woodlands at location 4, only treelines and hedgerows. This species was recorded during the bat activity walk at transect 1 however, which is a wooded area. The species may have been commuting between the two areas.

Table 3-4: Bat static detector data at eight locations along Proposed Project Boundary

Location	1	2	3	4	5	6	7	8	Total Count
Total Count	5403	6128	4706	9258	1453	757	6254	321	34280
April Count	19	12	-	-	-	-	-	-	31
May Count	2896	2314	151	281	212	26	1286	236	7402
June Count	1655	2230	3700	321	245	348	1148	-	9647
July Count	455	685	327	2250	158	296	2951	76	7198
Aug Count	378	887	349	3860	660	34	626	4	6798
Sept Count	-	-	179	2546	178	53	243	5	3204

Soprano pipistrelle, common pipistrelle, Leisler’s bat, brown long-eared bat, whiskered / Brandt’s bat, Daubenton’s bat and *Myotis* spp. were all recorded along the redline boundary of the Proposed Project in bat surveys carried out in 2017 or earlier. Whiskered bat and Daubenton’s bat were not recorded in the 2021 surveys.



Figure 3-6: Bat counts by species on 2020 transects

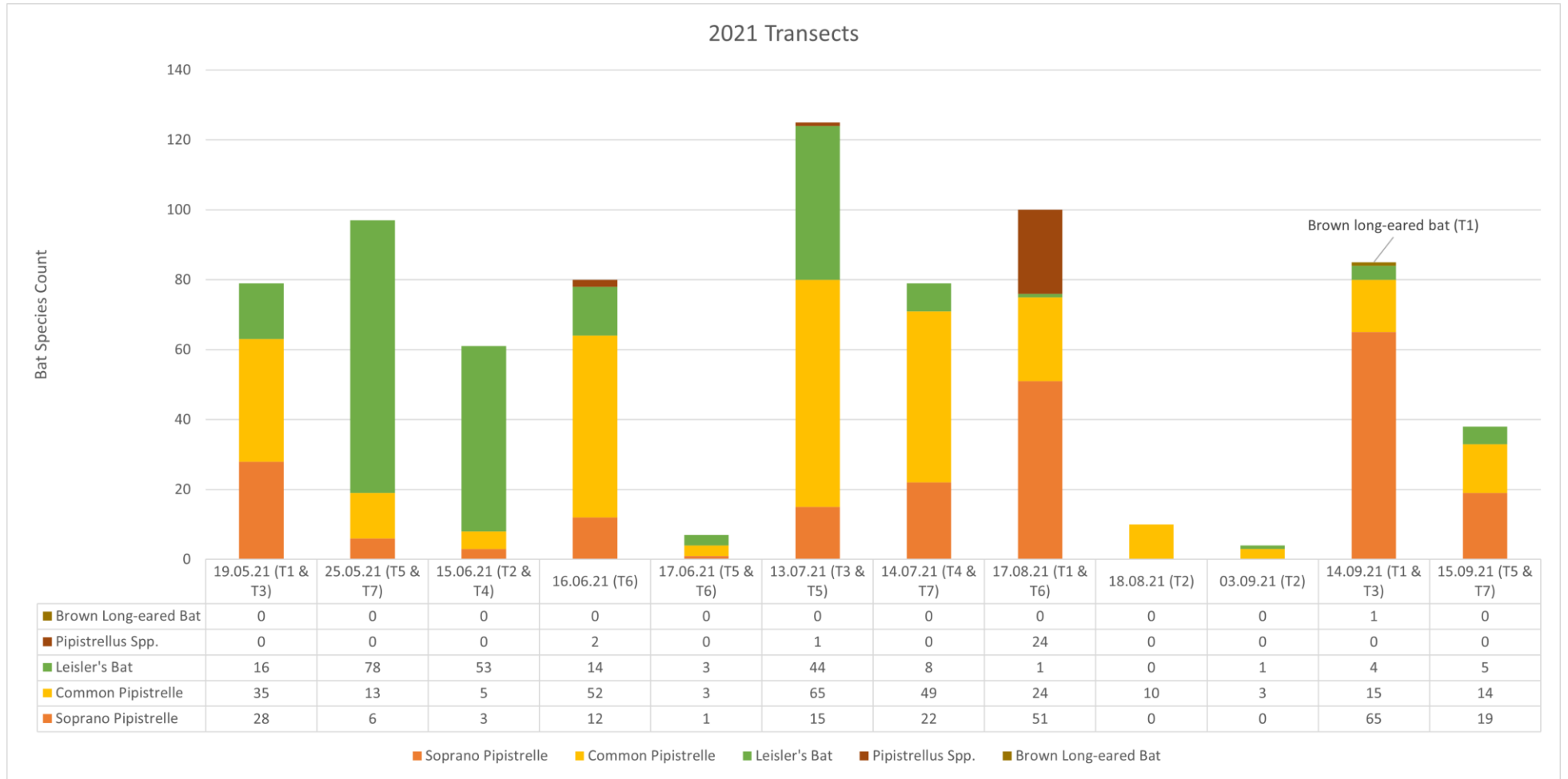


Figure 3-7: Bat counts by species on transects during 2021

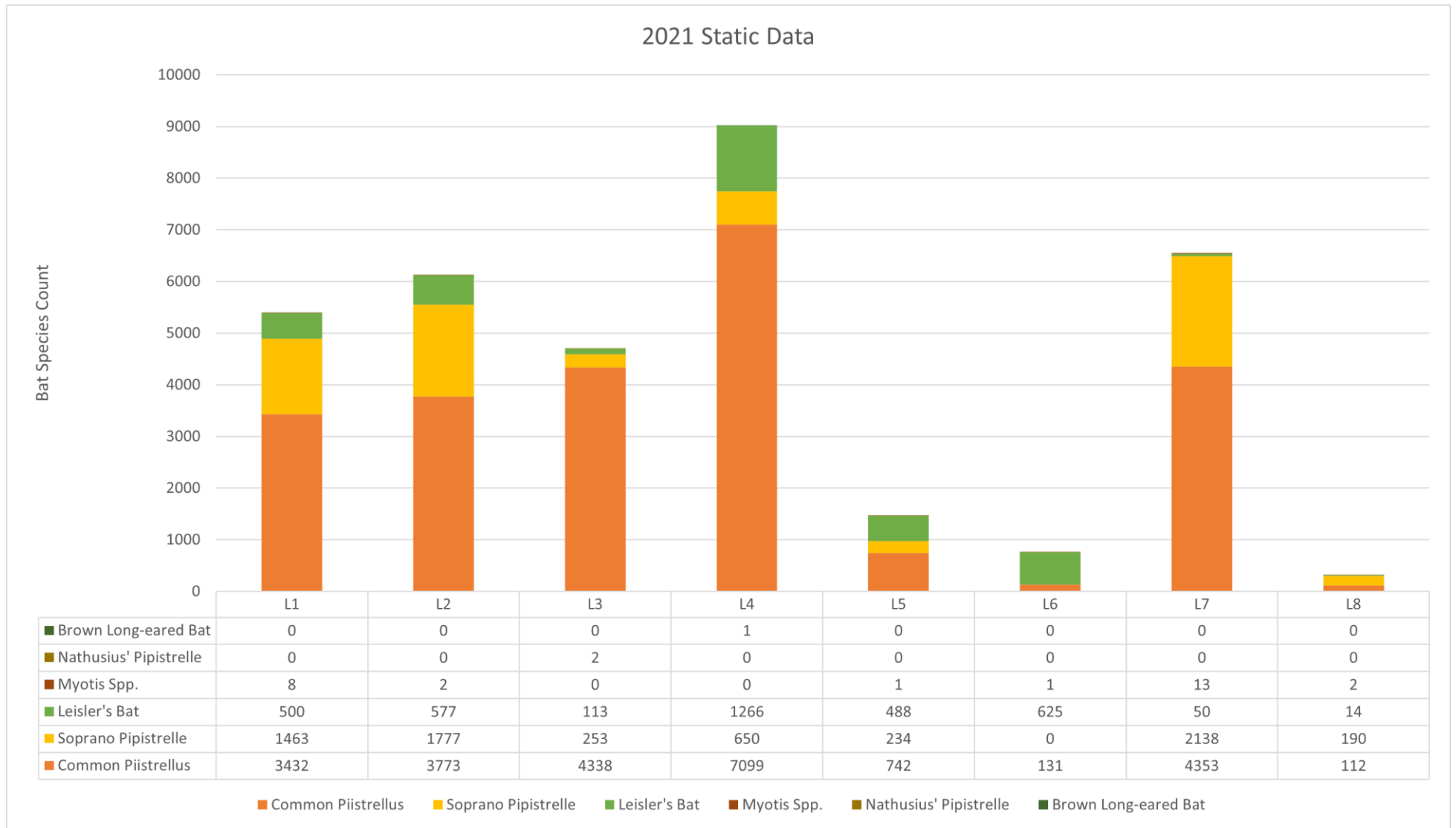


Figure 3-8: Bat counts by species at static detector locations along Proposed Project Boundary 2021

3.2.2.2 Bat Roost Assessments

3.2.2.2.1 Preliminary Roost Assessment of Trees

The preliminary roost assessment of trees within the redline boundary of the Proposed Project recorded 102 trees from ground level with low to high roost potential (**Figure J -1 to N- J** of Appendix **J** and **Table K -1** of Appendix **K**). Of these, 13 were recorded as moderate suitability and two as high suitability (**Table 3-5**). The location of these 15 moderate or high roost suitability trees are shown in **Figure 3-9**. The majority of these 15 trees were located in the wooded areas west and east of Connolly Hospital Blanchardstown. Others were recorded in hedgerows or treelines along the route of the Proposed Project, heading east.

Table 3-5: Trees with Moderate/High potential bat roost features

Tree Code	Roost potential (Low, Moderate, High)	Tree Species	Features	X ITM	Y ITM
1-2	Moderate	Beech	Tree with ivy (mod), two knotholes(mod).	708721.601	738628.8
1-5	Moderate	Cypress	Large tree with ivy(low), knotholes (mod), and horizontal cracks (low).	708953.745	738644.75
1-7	Moderate	Beech - dead	Dead tree with large knothole (mod), and compression feature (mod)	708989.625	738666.4
1-9	Moderate	Beech - dead	Dead tree with knotholes (mod).	708997.165	738688.25
1-17	Moderate	Oak	Large tree with horizontal cracks, one mod.	708355.072	738801.17
1-20	High	Sycamore	Massive tree with ivy (low) and knotholes (high).	708286.206	738869.07
1-22	Moderate	Californian redwood	Redwood with vertical cracks in bark (low) and groove in bark with branch overhanging (mod).	708677.196	738606.77
1-34	Moderate	Unknown - dead	Large dead tree with knotholes (mod).	709486.8	739049.19
1-35	Moderate	Beech	Large tree with a knothole (low) and two cavities (mod).	709522.385	739051.37
1-51	High	Horse chestnut	Tree with large knothole (high).	708203.203	738869.03
1-52	Moderate	Beech	Tree with ivy (low), and knothole (mod).	708210.709	738872.96
2-1	Moderate	Sycamore	Sycamore with knotholes (mod).	713060.361	741650.22
2-3	Moderate	Ash	Ash tree with knothole (mod).	713743.261	741677.74
2-29	Moderate	Willow	Willow with big cavity (mod).	719670.958	741991.32
2-32	Moderate	Beech	Beech tree with one low and two mod knotholes.	719659.814	741830.54

3.2.2.2.2 Tree Climbing PRF Inspection Survey

No roosting bats, or evidence of roosting bats was recorded during Tree Climbing PRF Inspection Surveys.

Upon close inspection, Trees 1-34 and 1-51 were considered unsuitable to support roosting bats (**Table 3-6**).

A total of five trees were considered to support Low bat roosting suitability. These include Trees 1-x (a suitable bat roosting tree added on during the tree climbing survey, close to 1-2), 1-5, 1-17, 2-29, and 2-32 (**Table 3-6**). According to Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016), a tree with Low roosting suitability is 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”. These trees were considered to verge on the higher end of Low Bat Roosting Suitability. However, they are still considered to have limited potential to support more than an individual roosting bat on a sporadic basis.

A total of eight trees were considered to support Moderate bat roosting suitability, and these include Trees 1-2, 1-7, 1-9, 1-20, 1-22, 2-1, and 2-3 (**Table 3-6**). A tree with Moderate bat roosting suitability is a “tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status..” (Collins J. 2016). These trees do not hold cavities which could support a larger roost such as a maternity colony.

Trees 1-35 and 1-52 were considered to support High bat roosting suitability (**Table 3-6**). According to Bat surveys for professional ecologists: Good practice guidelines (3rd edn) (Collins J. 2016), a tree with High Bat Roosting Suitability is a “*tree with one or more potential roost sites that are obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat*”. These trees hold cavities which could potentially support a larger roost such as a maternity colony. Forensic evidence of bats such as droppings or urine stains do not always persist long in trees. However, there was no evidence at all recorded in any of the trees surveyed, potentially indicating that if they are bat roosts, they have not been occupied recently.

As bats are known to display seasonal and even nightly roost switching behaviour, these trees have potential to support roosting bats at other times of the year. It is therefore important that all trees listed above with exception of Trees 1-34 and 1-51 are inspected again by a licenced ecologist for the presence of roosting bats prior to felling.

If any roosting bats are recorded during the pre-felling Tree Climbing PRF Inspection Surveys, tree works will stop and the NPWS will be contacted to discuss mitigation measures.

The previous bat surveys carried out in 2017, or earlier, found that some older trees within the hedgerows of the improved grassland and arable land had potential roosting opportunities, but of low suitability. Therefore, the two trees of moderate suitability (after tree climbing survey), 2-1 and 2-3, recorded in hedgerows in the 2022 survey represents a material change. Although no bats were found roosting in them.

The previous bat surveys carried out in 2017, or earlier, found a number of mature broadleaved trees of moderate potential for roosting bats within the broadleaved woodland at Blanchardstown and Abbottstown. No tree climbing inspections were carried out then as the updated guidance (Collins, 2016) was not widely adhered to in Ireland at that time. Five moderate suitability trees (1-2,1-7,1-9,1-20 and 1-22) were recorded in the 2022 surveys within this area. However, no bats were found roosting in them. A high suitability tree (1-52) was also recorded here. This high suitability tree represents a material change to the previous surveys. Although no bats were found roosting in it.

Table 3-6: Changes to bat roost suitability of trees after tree climbing survey

Tree Code	Roost potential (Low, Moderate,High)
1-x	Moderate -> Low
1-2	Moderate
1-5	Moderate -> Low
1-7	Moderate
1-9	Moderate
1-17	Moderate -> Low
1-20	High -> Moderate
1-22	Moderate
1-34	Moderate -> Negligible
1-35	Moderate -> Low
1-51	High -> Negligible
1-52	Moderate -> High
2-1	Moderate
2-3	Moderate
2-29	Moderate
2-32	Moderate



Figure 3-9: Tree locations of moderate/high bat roost potential (Sheet 1)



Figure 3-9: Tree locations of moderate/high bat roost potential (Sheet 2)



Figure 3-9: Tree locations of moderate/high bat roost potential (Sheet 3)



Figure 3-9: Tree locations of moderate/high bat roost potential (sheet 4)

3.2.3 Smooth Newt

All survey visits were undertaken in suitable conditions, with no visits made in ambient air temperatures below 5°C. It is desirable that surveys do not take place during rainfall. Results of the smooth newt surveys, undertaken in line with the methodology described in **Section 2.2.3** are set out below. A brief site summary precedes the results in **Table 3-7**. Prior to the survey, a "Licence to Capture Protected Wild Animals for Educational, Scientific or Other Purposes" was obtained from NPWS Wildlife Licensing Unit (Licence No: C124/2021).

Table 3-7: Newt survey dates, approximate times, and survey conditions, 2021

Date	Site no.	Site name	Netting		Torching		Weather conditions
			Start	End	Start	End	
02/04/2021	3	Toberbunny	n/a	n/a	n/a	n/a	Temp 10°C, calm, cloud cover 0/10
	2	Ballymun	18.20	18.55	21.55	23.20	Temp 7°C, calm, cloud cover 0/10
	1	Coldwinters	19.20	20.20	20.20	21.35	Temp 5°C, calm, cloud cover 0/10
19/04/2021	1	Coldwinters	n/a	n/a	21.55	22.25	Temp 9°C, calm, cloud cover 0/10, very light rain
	2	Ballymun	n/a	n/a	22.25	23.45	Temp 8°C, calm, cloud cover 10/10, no rain
26/05/2021	2	Ballymun	23.35	21.55	21.55	22.25	Temp 8°C, calm, cloud cover 10/10, no rain
	1	Coldwinters	n/a	n/a	22.45	12.00	Temp 8°C, calm, cloud cover 0/10, no rain

Table 3-8: Newt survey dates, approximate times, and survey conditions, 2023

Date	Site no.	Site name	Netting		Torching		Weather conditions
			Start	End	Start	End	
20/04/2023	3	Toberbunny	n/a	n/a	21.30	21.40	Temp 10°C, calm, cloud cover 0/10
	2	Ballymun	n/a	n/a	20.30	21.05	Temp 10°C, calm, cloud cover 0/10
	1	Coldwinters	19.30	20.10	22.00	23.32	Temp 09°C, calm, cloud cover 0/10
03/05/2023	3	Toberbunny	n/a	n/a	21.17	21.28	Temp 10°C, calm, cloud cover 10/10, no rain
	2	Ballymun	n/a	n/a	21.45	22.14	Temp 8°C, calm, cloud cover 10/10, no rain
	1	Coldwinters	n/a	n/a	22.35	23.45	Temp 9°C, breezy, cloud cover 10/10, no rain
17/05/2023	3	Toberbunny	n/a	n/a	21.30	21.46	Temp 13°C, calm, cloud cover 10/10, no rain
	2	Ballymun	n/a	n/a	22.03	22.50	Temp 13°C, calm, cloud cover 10/10, no rain
	1	Coldwinters	n/a	n/a	23.05	00.25	Temp 12°C, calm, cloud cover 0/10, no rain

3.2.3.1 Site 1 - Coldwinters

The site (circa 8.8ha) consists entirely of worked spoil and rubble presumably all from nearby road development. The site best resembles the habitat 'Recolonising bare ground (ED3)' (Fossitt 2000). Many hollows and / or depressions created by these works have evolved into permanent and seasonal water bodies, some with established flora including emergent, floating, and submerged macrophytes as well as a diverse array of freshwater invertebrate species. The findings of the 2021 surveys are summarised in **Table 3-9** below.

Of the 16 water bodies identified on this site, water body 1 almost certainly retains water year-round. The site has been grazed by horses prior to the survey although none were evident during the survey. It is understood that this grazing was not authorised. The site was overgrazed in 2015 and 2017 with evidence of supplementary feeding. Smooth newt was present in several of these water bodies in 2015 and 2017.

During the first visit on 2 April 2021, waterbody 1 had a polluted appearance. The aquatic vegetation had an unhealthy appearance and was scarcer compared to previous years. Smooth newts were recorded in five water bodies, namely 1, 4, 11, 12 and 16. Waterbody 4 recorded the highest score of 9 individuals. The temperature was slightly cooler than forecasted, dropping as low as 4°C during the survey at Coldwinters.

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There were significant amounts of filamentous algae. Due to a lack of rainfall, several water bodies had dried-up, namely numbers 2, 3, 5, 6, 10 and 13.

During the second visit on 19 April 2021, survey was by torching only. Netting was clouding the water column with silt impacting visibility. The number of water bodies supporting newts on this visit was reduced to four, namely 1, 4, 7 and 8. Waterbody 1 recorded the highest score of 25 individuals. Water bodies 2, 3, 5, 6, 9, 10, 12 and 13 had dried-up:

During the third visit on 26 May 2021, newt activity was reduced to just two water bodies (numbers 1 and 7) with four and nine newts recorded respectively. Waterbodies 2, 3, 5, 6, 9, 10, 12 and 13 had dried-up (as they were on 19 April 2021).

Table 3-9: Smooth newt survey results, 2021

Date	Water body	Male	Female	Unsexed	Total
02.04.21	1	1	3	-	4
	4	3	6	-	9
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-
	11	1	5	-	6
	12	1	1	-	2
	14	-	-	-	-
	15	-	-	-	-
19.04.21	1	11	12	2	25
	4	1	-	-	1
	7	-	-	3 (1 dead)	4
	8	2	-	1	3
	9	-	-	-	-
	11	-	-	-	-
	14	-	-	-	-
	15	-	-	-	-
	16	-	-	-	-
26.05.21	1	-	1	3	4
	4	-	-	-	-
	7	4	5	-	9
	8	-	-	-	-
	11	-	-	-	-
	14	-	-	-	-
	15	-	-	-	-
	16	-	-	-	-

In 2023, a number of additional water-filled depressions or pools were noted in the vicinity of water body 14 (**Table 3-10** and **Appendix N**). As such, water body 14 was transposed into four broadly separate water bodies, namely 14a, 14b, 14c and 14d. An additional water-filled depression, namely waterbody 17, was also noted and subject to survey. The site continues to be grazed by several horses. The sward is uniformly short, thus lacking structure and flowering is likely restricted. There was supplementary feeding taking place south-east of water body 11.

During the first visit on 20 April 2023, 18 of the 20 water bodies supported water. Water bodies 2 and 10 were dry. Newts were recorded in eight waterbodies (1, 3, 4, 6, 7, 11, 12 and 14a). Water body 1 recorded the highest score of 24. Some netting took place but was discontinued to limit disturbance to breeding newts.

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During the second visit on 3 May 2023, water bodies 2, 3, 10, 13 were dry. Newts were recorded in water bodies 1, 4, 6, 7, 12 and 15. Numbers in water body 1 were exceptionally high, with 40 in total. The survey was by torching only. There was a high abundance of tadpoles in water body 11.

During the third visit on 26 May 2023, newts were recorded in water bodies 1, 8, 9, 14a, 14c and 15. Water bodies 2, 3, 10 and 13 were dry. Newts were recorded in water body 9 for the first time.

Only two juveniles were recorded in water body 1. Horses had been drinking in the pond, dispersing fine sediment. Vision was significantly reduced and the survey was by torching only.

Table 3-10: Smooth newt survey results, 2023

Date	Water body	Male	Female	Unsexed / Juvenile	Total
20.04.23	1	.3	21	-	24
	2	-	-	-	-
	3	-	1	-	1
	4	-	3	-	3
	5	-	-	-	-
	6	-	1	-	1
	7	-	1	-	1
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	1	-	1
	12	-	2	-	2
	13	-	-	-	-
	14a	-	1	-	1
	14b	-	-	-	-
	14c	-	-	-	-
	14d	-	-	-	-
15	-	-	-	-	
16	-	-	-	-	
17	-	-	-	-	
03.05.23	1	4	36	-	40
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	1	1
	5	-	-	-	-
	6	-	2	1	3
	7	-	-	1	1
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	-	-	-
	12	-	3	-	3
	13	-	-	-	-
	14a	-	-	-	-
	14b	-	-	-	-
	14c	-	-	-	-
	14d	-	-	-	-
15	-	-	1	1	
16	-	-	-	-	
17	-	-	-	-	
17.05.23	1	-	-	2	2
	2	-	-	-	-

Date	Water body	Male	Female	Unsexed / Juvenile	Total
	3	-	-	-	-
	4	-	-	-	-
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	1	-	1
	9	-	1	-	1
	10	-	-	-	-
	11	-	-	-	-
	12	-	-	-	-
	13	-	-	-	-
	14a	1	3	-	4
	14b	-	-	-	-
	14c	-	-	1	1
	14d	-	-	-	-
	15	-	-	1	1
	16	-	-	-	-
	17	-	-	-	-

3.2.3.2 Site 2 - Ballymun

This site has similarities with Site 1. These water bodies have also evolved from past disturbance / construction works on what is now an abandoned site. Construction had begun on a large structure here, but these works were abandoned. These consist of foundations with steel mesh and concrete. The main pond (water body 1) is more accurately a series of interconnected pools and deeper ponds. The other seven water bodies are an alignment of foundation works with only seasonal water.

An array of emergent, floating and submerged aquatic plants have established in the succeeding years along with a diverse invertebrate fauna evidenced again by the array of insect larvae as well as adult damsel and dragonflies.

The habitat in the vicinity of the pools and ponds is 'Recolonising bare ground (ED3)'. There is no active management. The site was found to be negative for the presence of smooth newt (torchlight and netting) in 2015 and 2017.

- **2 April 2021**
 - Netting was clouding the water column. Survey was torching only.
 - No newts were recorded.
- **19 April 2021**
 - Survey was torching only. Waterbodies 2, 3 and 8 had dried-out.
 - No newts were recorded.
- **26 May 2021**
 - Netting was limited to small sections of waterbody 1.
 - No newts were recorded.
- **20 April 2023**
 - Survey was torching only. No newts were recorded.
- **03 May 2023**
 - Survey was torching only. No newts were recorded.
- **17 May 2023**
 - Survey was torching only. No newts were recorded.

3.2.3.3 Site 3 - Toberbunny

This enclosed site is adjacent to the long stay (Red) car park at Dublin Airport, east of Dardistown Cemetery. It consisted of a small water body beneath some willows along with three drainage ditches. The drainage ditches were already heavily vegetated since the initial 2015 survey.

In 2015, the wider habitat was described as recolonising bare ground (ED3) but in 2023 it is now well vegetated. The site is disadvantaged by a large car park to the immediate south, and a major road to the immediate east. Previous surveys noted evidence of hydrocarbons on water surfaces.

Smooth newt was not recorded in 2015 or 2017.

- **2 April 2021**
 - No newts were recorded. Surveys were discontinued at this location.
 - The four water bodies are now infilled with vegetation and litter. Willows and bramble add further cover. These features are no longer recognisable as water bodies and would not support breeding activity.
- **20 April 2023**
 - **Survey was torching only. No newts were recorded.**
- **03 May 2023**
 - **Survey was torching only. No newts were recorded.**
- **17 May 2023**
 - **Survey was torching only. No newts were recorded.**

3.2.3.4 Summary results

Smooth newts were recorded at Site 1 - Coldwinters only in 2021. Results of that survey were aligned with previous surveys carried out in 2015 and 2017, in that no smooth newts were recorded at sites 2 or 3. Newts were found in waterbody 1,7,11 and 16 in both 2017 and 2021. Newts were found in waterbody 15 in 2017 but not 2021. However, two waterbodies, 4 and 8, had newts in them in 2021 which didn't in 2017, which is a material change.

Smooth newts were recorded at Site 1 - Coldwinters only in 2023. Results of this most recent survey are again consistent with previous survey findings in that no smooth newts were recorded at sites 2 or 3. In 2023 at site 1 newts were found in waterbodies 1, 3, 4, 6, 7, 8, 9, 11, 12, 14a, 14c & 15. Therefore, the presence of smooth newts in ponds 3, 6, 12, 14a and 14c at site 1 in 2023 is a material change.

3.2.4 Otter

As part of the freshwater aquatic habitat surveys (see **Section 3.3**), sections of river 150m either side of the sampling locations were walked and checked for otter signs. No otter signs were recorded in 2021. In 2023, a number of otter signs were recorded on either side of survey locations 1b and 1c (**Table 3-11** and **Figure 3-10**). These consisted of spraints and a slide. No holt or resting sites were identified.

Table 3-11: Otter Evidence 2023

Activity	Label	Location	Description
Spraint	OE1.0	1c - Right bank of River Tolka (Tolka_040), 90m south of Connolly Hospital southern carpark. 49m west of redline boundary.	Spraint on moss.
Spraint	OE2.0	1c - Right bank of River Tolka (Tolka_040), 56m SE of OE1.0	Spraint on moss. Fishy smell.
Slide	OE3.0	1b -Left bank of Abbotstown stream (Tolka_040) feeding into the River Tolka	Well worn slide between tree roots.

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Activity	Label	Location	Description
		(Tolka_040), 169m SE of Connolly Hospital southern carpark. 14m SE of redline boundary.	
Spraint	OE4.0	1b - Right bank of Abbotstown stream (Tolka_040) feeding into the River Tolka (Tolka_040), 40m SW of OE3.0.	Spraint on moss. Urine staining.

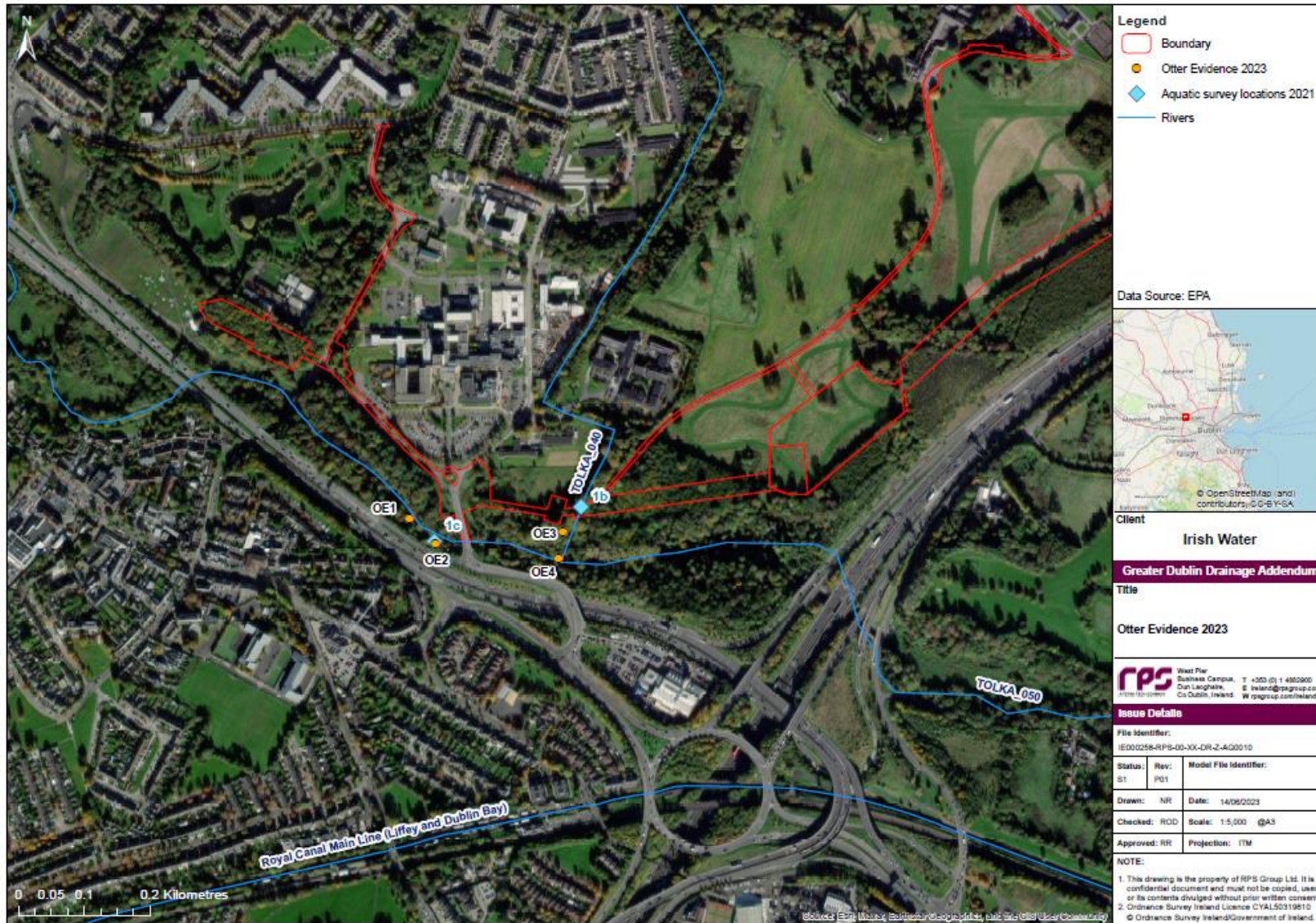


Figure 3-10: Otter Evidence during 2023 freshwater aquatic survey.

3.3 Freshwater Aquatic Ecology

This Section contains a summary of the notable changes between aquatic surveys carried out at the five sampling locations along the Proposed Project in 2017, 2021 and then in 2023. This Section should be read with reference to **Appendix O**, **Appendix P** and **Appendix Q**.

3.3.1 Habitats

3.3.1.1 Location 1

Three separate survey locations were identified within location 1 – location 1a, 1b and 1c during the 2021 and 2023 surveys.

Location 1a is located within the National Sports Campus (NSC). The route crosses the Abbotstown Stream (IE_EA_09T011000) at this location. Aquatic ecology surveys were not undertaken at this site in both 2021 and 2023 as the stream could not be found and is assumed to be culverted at this location.

Location 1b is located southeast of Connolly Hospital on the Abbotstown Stream. The survey location of location 1b was corrected in 2023 to the crossing point on the Abbotstown Stream. During the 2021 surveys, location 1b was located on the River Tolka, approximately 200m downstream of location 1c, which was also located on the River Tolka. At location 1b in 2021, the River Tolka was 12m wide and approximately 60cm in depth, with heavy siltation evident and very slow flow noted. It was bordered by broadleaved woodland with abundant scrub habitat, mostly to the south, and scrub / amenity grassland to the immediate north-west, moving into built up areas. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-2** of Appendix **P**.

Due to the revised location of this survey site in 2023 (from the mainstem of the River Tolka to a small tributary of the River Tolka), there are differences in the survey results. The stream surveyed at location 1b in 2023 was small, channelised, with high banks (ca. 1.6m). The stream flowed into a man-made pool and over a waterfall before discharging into the mainstem of the River Tolka. The left bank comprised a concrete wall. The stream was approximately 1m wide and shallow (4cm deep) on the day of survey. Siltation at the site was moderate, and a high silt plume was noted when the bed was disturbed. Flow discharge was low with slow velocity. No colour and low turbidity were noted. The substrate was dominated by fine gravel. The river habitat comprised riffles (30%) and pools (70%). The substrate within the riffle habitat was embedded as a result of calcification. Shading was heavy, with ivy, sycamore, beech, hart's tongue fern and hogweed recorded adjacent to the stream. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-2** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

Location 1c is located on the mainstem of the River Tolka. During the 2021 surveys, river width was estimated at being 8m wide and approximately 10-30cm in depth, with heavy siltation. Moderate flow was recorded. The substrate was dominated by coarse substrate with cobble comprising ca. 50% of the grain size fraction. The river was bordered by broadleaved woodland with abundant scrub habitat, mostly to the north and northwest and the N3 National Road runs to its south with an access road to the east. River habitat comprised riffle (75%), glide (20%) and pool (5%). Filamentous green algae covered approximately 30% of the substrate. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-3** of Appendix **P**.

The river habitat recorded during the 2023 surveys at location 1c was similar to the 2021 surveys. The width and depth were similar to those recorded in 2021. Siltation was moderate, and a high silt plume was noted when the bed was disturbed. Flow discharge was normal with moderate velocity. No colour and low turbidity were noted. The substrate was dominated by cobble (50%), with bedrock, boulder and coarse gravel making up the remaining substrate grain sizes. The river habitat comprised riffle (50%) and run (50%) habitat. The substrate was slightly compacted. Filamentous green algae covered approximately 70% of the substrate. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-3** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

The EIAR of the 2018 planning application describes one sampling location on the River Tolka, “upstream and downstream of the M50 Motorway at Abbotstown Bridge, south of the proposed Abbotstown pumping station”, referred to as “location 1”. During 2021 and 2023, the River Tolka mainstem was surveyed immediately upstream of Abbotstown Bridge (the bridge leading to Connolly Hospital). As such, there are discrepancies in the survey locations and the results are not directly comparable. Nevertheless, the

prevailing habitat conditions along the River Tolka within the general area of Abbotstown were similar between 2017, 2021 and 2023, with siltation, filamentous algae, well vegetated riverbanks and coarse substrate noted during each survey campaign. The slight discrepancy in survey results is not of concern and is not considered to affect the overall conclusions of the assessment.

The 2018 EIAR also notes that “one site, a tributary of the Tolka River between the back of Connolly Hospital and the N3 National Road which will be crossed by the proposed orbital sewer route, was not suitable for survey due to significant morphological alternations to its channel, which have impacted its aquatic characteristics”. It is assumed that this location is location 1b, surveyed in 2023, described above. Whereas conditions at location 1b in 2023 may have affected the macroinvertebrate Q-value inferred (and this is acknowledged and accounted for in the relevant section below), it was nevertheless deemed appropriate to undertake general physical habitat surveys at this location.

3.3.1.2 Location 2

Location 2 is located on the Santry River (Santry_010), immediately north of Sillogue Golf Course. In 2021, the river was 2m wide and approximately 5cm in depth, with heavy siltation recorded. The stream was very slow flowing to stagnant in places. It was bordered by arable land to the west and improved agricultural grassland to the east. The substrate consisted of a mixture of coarse and fine material with 45% of the grain size fraction comprising cobble and 20% comprising silt. River habitat was 80% glide, 10% riffle and 10% pool. The riparian vegetation was unmanaged. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-4** of Appendix **P**.

The general river habitat recorded in 2023 was largely similar to that recorded in 2021. In 2023, the stream was approximately 1.2m in width at the survey location, with water depth measured at approximately 5cm. The stream appears to have been straightened and deepened in the past. The right bank was very steep and approximately 3m in height whereas the left bank was approximately 0.5m in height. Calcareous deposits were noted on some of the cobbles in stream. Siltation at the site was heavy, and a high silt plume was noted when the bed was disturbed. The substrate was dominated by fine sediment grain sizes, namely sand (35%), silt (35%), fine gravel (15%), coarse gravel (10%) and cobble (5%). The river habitat comprised riffle (20%), glide (40%) and pool (40%) habitat. Shading was heavy, with ash, nettles, dog rose, bramble, elder, hart's tongue fern, meadow buttercup, bush vetch, cleavers and ivy recorded adjacent to the stream. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-4** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

The EIAR of the 2018 planning application describes location 2 as being shaded, with a glide/riffle type habitat and a substratum of bedrock, sand and silt deposition, with well vegetated river banks. Slight discrepancies between river habitat descriptions are evident between the surveys undertaken in 2017, 2021 and 2023. This may be linked to slight differences in survey location (due to access, dense vegetation growth etc), potential differences in surveyor judgement and temporal variation in local conditions and river habitat. These discrepancies are not of concern and are not considered to affect the overall conclusions of the assessment.

3.3.1.3 Location 3

Site 3 is located in the upper reaches of the Mayne River in a field south of the L2015 road. The site was not surveyed in 2021 as the stream was dry and resembled a dry drainage ditch.

Physical habitat surveys at this site were however undertaken in 2023. The stream at this location had been straightened and resembled a ditch with low flow discharge and stagnant velocity. The substrate comprised 100% silt and instream habitat was best described as 100% pool. Dissolved oxygen was low at 44.7% and 4.46mg/l. Wetted and bankfull width was approximately 1m and water depth was 10cm. Siltation was heavy and some light bank erosion was noted. Shading was heavy, with ivy, hawthorn, cleavers, bramble, meadow thistle, dog rose, hogweed, dock and ash recorded in the riparian buffer. Bank height was 1.6-1.2m. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-5** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

The EIAR of the 2018 planning application describes the river habitat at location 3 as slow-flow habitat over a compacted substratum comprising predominantly cobble and some coarse gravel with overlying silt. No instream vegetation was noted and river banks were recorded as being very steep. Slight discrepancies between river habitat descriptions are evident between the surveys undertaken between 2017 and 2023,

mainly related to excessive siltation recorded in 2023, and the fact that the stream was recorded as being dry in 2021. Whereas these discrepancies may be linked to slight differences in survey location and temporal variation in local conditions and river habitat, it does appear conditions at this site, in terms of habitat, have deteriorated since the 2017 surveys. These discrepancies are not considered to affect the overall conclusions of the assessment.

3.3.1.4 Location 4

Location 4 is on the Cuckoo Stream (Mayne_010), a tributary of the Mayne River. During the 2021 surveys, this stretch of the Cuckoo Stream was 3.5m wide and approx. 5cm in depth, with heavy siltation recorded. River habitat was mostly glide, however stagnant flow was noted in places. A mixture of river substrate was noted with cobble and coarse gravel and silt dominating. It was bordered by tilled land to the south and north. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-5** of Appendix **P**.

During the 2023 surveys, the stream was approximately 1.8m wide and 10cm deep. It was noted that the stream appears to have been straightened in the past. Bank height was approximately 1.4m. Siltation at the site was low, however a high silt plume was noted when the bed was disturbed. Turbidity was high. The substrate was dominated by coarse gravel (50%), with cobble (30%) fine gravel (10%) and sand (10%) also recorded. Filamentous algae was noted to cover approximately 20% of the substrate. Rain the previous night resulted in elevated water levels at this site. However, the river was not in flood and the increased water levels observed were not deemed to have affected the survey undertaken. River habitat comprised riffle (70%) and glide (30%). The results of the aquatic survey at this location in 2023 are summarised in **Table Q-6** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Riverine habitat recorded during the 2017 surveys was generally similar to that recorded in 2021 and 2023. The EIAR of the 2018 planning application describes the river habitat at location 4 as moderate to fast flowing with compacted substratum comprising predominantly cobble and boulder. Silt deposition was recorded along undercut banks. Filamentous algal coverage was recorded as extensive in the downstream channel and proliferated along extraneous material recorded on the river bed.

3.3.1.5 Location 5

Location 5 is located on the Mayne River (Mayne_010). During surveys undertaken in 2021, this stretch of the Mayne was 2m wide and approximately 5 to 10cm in depth, with heavy siltation. Velocity was slow, with the river habitat comprising 70% glide and 30% riffle. It was bordered by scrub to the east and an access road to the west with scrubland after that. The access road runs to the north and south-east. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-6** of Appendix **P**.

During 2023, the stream was recorded as being approximately 1.5m wide and 10cm deep. The channel was noted to have been straightened and valley sides reprofiled. The stream was surveyed downstream of a culverted section of the stream. As recorded in 2021, siltation was heavy and a high plume was noted when the bed was disturbed. A slight hydrocarbon sheen was noted. The substrate was dominated by fine material (small cobbles, gravel and sand). The river habitat comprised 50% riffle and 50% glide habitat. Flow discharge was normal and velocity slow. Shading was heavy throughout the majority of the surveyed reach. Fool's watercress and dense *Vaucheria* growth was observed in the less heavily shaded sections of the stream immediately downstream of the culvert. Dense bramble scrub is causing a tunnelling effect within the stream. Butterfly bush *Buddleia davidii* was noted within the surveyed reach and Japanese Knotweed *Reynoutria japonica* was noted downstream of the surveyed reach. The results of the aquatic survey at this location in 2023 are summarised **Table Q-7** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Riverine habitat recorded during the 2017 surveys was similar to that recorded in 2021 and 2023. Substrate recorded in 2017 was similar (cobble with covering layer of silt) as was the degree of shading. A key difference was the presence of pool dominated habitat recorded in 2017. This incongruence may be linked to slight differences in survey location and temporal variation in local conditions and river habitat. The slight discrepancy is not of concern and is not considered to affect the overall conclusions of the assessment.

3.3.2 Macroinvertebrate Biodiversity

3.3.2.1 Location 1

Three separate survey locations were identified within location 1 – location 1a, 1b and 1c during the 2021 and 2023 surveys.

Location 1a is located within the National Sports Campus (NSC). The route crosses the Abbotstown Stream (IE_EA_09T011000) at this location. Aquatic ecology surveys were not undertaken at this site in both 2021 and 2023 as the stream could not be found and is assumed to be culverted at this location.

Location 1b is located southeast of Connolly Hospital on the Abbotstown Stream. The survey location of location 1b was corrected in 2023 to the crossing point on the Abbotstown Stream. During the 2021 surveys, location 1b was located on the River Tolka, approximately 200m downstream of location 1c, which was also located on the River Tolka.

During the 2021 surveys, 10 macroinvertebrate taxa were recorded at location 1b. The species recorded typically comprised pollution tolerant species such as *Asellus* sp. and Chironomidae. No crayfish were present within the kick sample. However, with in-stream boulders and cobbles, over hanging banks, aquatic vegetation and detritus, there is suitable crayfish habitat available. A habitat rating of 'Fair' was assigned. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-2** of Appendix **P**.

During the 2023 surveys of location 1b (on the Abbotstown Stream), a total of 14 macroinvertebrate taxa were recorded. Again, the community typically comprised pollution tolerant species such as veliidae, *Asellus aquaticus* and *Serratella ignita*. No crayfish habitat was available due to shallow water levels and general lack of coarse substrates. The left bank comprised a concrete wall, whereas the right bank comprised earth. However, the right bank was not soft and is unlikely to be suitable for burrowing. No submerged tree roots which could provide cover for crayfish were noted. A rating of 'None' was assigned. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-2** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

During the 2021 surveys at location 1c, 14 macroinvertebrate taxa were recorded. No crayfish were present within the kick sample. However, with instream boulders and cobbles, over hanging banks, aquatic vegetation and detritus, there is suitable crayfish habitat available. A habitat rating of 'Fair' was assigned. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-3** of Appendix **P**.

During the 2023 surveys at location 1c, a total of 18 macroinvertebrate taxa were recorded. These mostly comprised pollution tolerant species such as *Serratella ignita*. However some more sensitive species were observed including 2 cased caddisfly species and the mayfly *Alanities muticus*. Crayfish habitat was assigned a rating of 'Good'. The coarse substrate (boulders and cobbles) within the river could provide refuge habitat. Furthermore, exposed tree roots were noted on the left bank. Some areas of deeper water were noted. Water quality and siltation is likely to be an issue for this species. No crayfish were observed during the survey. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-3** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Macroinvertebrate samples were not collected from the River Tolka in 2017 due to access difficulties at the time of survey. However 'Good' habitat for white-clawed crayfish was noted with abundant refugia and foraging potential. Whereas there was no change in the habitat appraisal for white-clawed crayfish in 2017 and 2023 (within the mainstem of the Tolka (i.e. location 1c in 2023) with the habitat described as "Good", there was a slight change in habitat potential for crayfish in 2021. During the 2021 survey, the habitat was described as "Fair" at locations 1b and 1c.

3.3.2.2 Location 2

Macroinvertebrate diversity at location 2 during the 2021 surveys was relatively low. A total of 7 taxa were recorded, the majority of which were tolerant of pollution. No crayfish were present within the kick sample. With over hanging banks, aquatic vegetation and leaf litter, there was some suitable crayfish habitat available. However, due to cobbles dominating the substrate and water depth being 0.1-0.5cm a habitat rating of 'Poor-Fair' was assigned. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-4** of Appendix **P**.

Macroinvertebrate diversity was also low during the 2023 surveys where a total of 8 macroinvertebrate taxa were recorded within the stream. Again, the community was dominated by pollution tolerant species. The stream was very shallow with no large coarse substrates which could provide habitat for the white-clawed crayfish. There is a small chance that the banks could be burrowed into by crayfish, and overhanging vegetation was noted along the margins. Water quality and siltation is likely to be an issue for this species at this site, however. No crayfish were observed during the survey. A habitat rating of 'None-Poor' was assigned. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-4** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Macroinvertebrate diversity was lowest in 2017 where a total of 4 taxa were recorded. Similar to the surveys undertaken in 2021 and 2023, 'Poor' white-clawed crayfish habitat was noted due to low quality aquatic habitat and reduced foraging potential.

3.3.2.3 Location 3

It was not possible to collect a macroinvertebrate sample at location 3 in 2021 as the watercourse was dry. A habitat rating of 'None' was assigned for white-clawed crayfish. Due to the drain-like nature of the watercourse in 2023, it was not suitable for kick-sampling. However, a sweep of the margins and substrate identified a number of pollution tolerant species including *Asellus aquaticus*, *Gammarus* sp., Gerridae, *Chironomus* sp., Planorbidae and excessive numbers of pea/orb mussels (Sphaeriidae). A total of 6 taxa were recorded. Given the ditch-like nature of the stream with stagnant flow conditions and high levels of siltation, it was deemed unlikely to support crayfish. A habitat rating of 'None' was assigned. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-5** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Similar to 2023, macroinvertebrate diversity was low in 2017, with only 3 taxa recorded. Furthermore, 'Poor' habitat for white-clawed crayfish was noted here in 2017 due to lack of overhanging banks, poor invertebrate assemblages and degraded water quality.

3.3.2.4 Location 4

Macroinvertebrate diversity was low at location 4 in 2021. A total of 6 macroinvertebrate taxa were recorded, which were all pollution tolerant. No crayfish were present within the kick sample. However, with some in-stream boulders and cobbles, little over hanging banks, and flooded tree roots at heavy rainfall events, there was some suitable crayfish habitat available. A habitat rating of 'Poor-Fair' was assigned. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-5** of Appendix **P**.

Macroinvertebrate diversity was notably higher in 2023, with a total of 15 taxa recorded. Pollution tolerant as well as pollution sensitive species were recorded. Crayfish habitat was assigned a rating of 'Fair'. No large boulders were noted in the stream, with some siltation and high turbidity noted. However, soft banks for burrowing, undercut banks and overhanging vegetation and submerged tree roots were noted. No crayfish were observed during the survey. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-6** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Low macroinvertebrate diversity was recorded as part of the 2017 surveys with a total of 6 taxa recorded, all of which are pollution tolerant. This is inkeeping with the results obtained in 2021. 'Good' habitat for white clawed crayfish was observed in 2017 as silty marginal sections and undercut banks were noted as providing good habitat.

3.3.2.5 Location 5

Macroinvertebrate diversity was low at location 5 in 2021, with a total of 5 taxa recorded all of which were pollution tolerant. No crayfish were present within the kick sample. With some instream boulders and many cobbles, siltation gathering along banksides, aquatic vegetation and detritus, there is some suitable crayfish habitat available. A habitat rating of 'Fair' was assigned. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-6** of Appendix **P**.

Macroinvertebrate diversity was notably higher in 2023, with a total of 13 taxa recorded. All macroinvertebrates recorded were pollution tolerant species, however. Crayfish habitat was assigned a rating of 'None-Poor'. No large boulders and cobbles which could provide cover were noted in the stream, with heavy siltation observed. Some instream vegetation was noted in the less shaded part of the stream

immediately downstream of the culvert. No crayfish were observed during the survey. The results of the aquatic survey at this location in 2023 are summarised **Table Q-7** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Low macroinvertebrate diversity was recorded as part of the 2017 surveys with a total of 4 taxa recorded, all of which were pollution tolerant. This is inkeeping with the results obtained in 2021. Poor habitat for white clawed crayfish was observed in 2017 as silty marginal sections and undercut banks provide good habitat.

3.3.3 Biological Water Quality Assessment

3.3.3.1 Location 1

Three separate survey locations were identified within location 1 – location 1a, 1b and 1c during the 2021 and 2023 surveys.

Location 1a is located within the National Sports Campus (NSC). The route crosses the Abbotstown Stream (IE_EA_09T011000) at this location. Aquatic ecology surveys were not undertaken at this site in both 2021 and 2023 as the stream could not be found and is assumed to be culverted at this location.

Location 1b is located southeast of Connolly Hospital on the Abbotstown Stream. The survey location of location 1b was corrected in 2023 to the crossing point on the Abbotstown Stream. During the 2021 surveys, location 1b was located on the River Tolka, approximately 200m downstream of location 1c, which was also located on the River Tolka.

During the 2021 surveys, 10 macroinvertebrate taxa were recorded at location 1b with Class C taxa (pollution tolerant) forming most of the sample (five taxa). Three Class D taxa (very pollution tolerant) were recorded, one in low numbers (Lymnaeidae), one common throughout the sample (Hirudinea), and one numerous (*Asellus* sp.). One Class E taxon (most pollution tolerant) was recorded in low numbers (Tubificidae), and one Class B taxon (less pollution sensitive) was recorded in low numbers (Leptoceridae). No single taxon was dominant. No Class A taxa (pollution sensitive) were recorded. A Q2-3 was inferred (corresponds with poor WFD status). The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-2** of Appendix **P**.

During the 2023 surveys of location 1b (on the Abbotstown Stream), a total of 14 macroinvertebrate taxa were recorded. Group A and B taxa were absent. Group C taxa were dominant in the sample, Group D taxa were numerous and Group E taxa few. A Q-value of 2-3 (corresponds with poor WFD status) was inferred. As the riffles were small in size and difficult to kick, it was necessary to collect the kick sample within the pool habitat as well as riffle habitat. It should be noted that the Q-value could be affected by the calcareous nature of the substrate in addition to the fact that some of the kick sample had to be collected from pool habitat (for Q-value assessments, macroinvertebrates are preferably collected from the faster flowing riffle habitats). It is possible that the observed Q-value is lower than expected due to these factors. Nevertheless, the score is in keeping with the poor status assigned to the river by the EPA. The mainstem of the River Tolka, downstream of Abbotstown Bridge, was assigned a Q-value of 3 (corresponds with poor WFD status) in 2022 by the EPA (station number RS09T011000). The results of the aquatic survey at this location in 2023 are summarised in **Table Q-2** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

During the 2021 surveys at location 1c, 14 macroinvertebrate taxa were recorded with Class C taxa forming most of the sample. Three Class B taxa were recorded in low numbers (*Alaniities muticus*, *Serratella ignita* and Leptoceridae). Two Class D taxa were recorded, one in low numbers (Hirudinea), and one common throughout the sample (*Asellus* sp.). One Class E taxon was recorded in low numbers (Tubificidae sp.). No single taxon was dominant. No Class A taxa were recorded. A Q2-3 was assigned (corresponds with poor WFD status). The results of the aquatic survey at this location are summarised in **Table P-1** and **P-3** of Appendix **P**.

During the 2023 surveys at location 1c, a total of 18 macroinvertebrate taxa were recorded. Group A taxa were absent, Group B taxa were few, Group C taxa were excessive, Group D taxa were common and Group E taxa were absent. *Serratella ignita* was numerous, whereas *Baetis rhodani/atlanticus*, Chironomidae, Simuliidae and *Hydropsyche* sp. were common. Based on the relative abundance of the various macroinvertebrate groups recorded, a Q-value of 3 (corresponds with poor WFD status) was inferred. The presence of silt, excessive filamentous green algae and low dissolved oxygen concentration (75.1%) within the river support this assessment. This Q-value is in-keeping with the Q-value assigned to the river by the EPA in 2022 (Q3), at a monitoring point located immediately downstream of the M50 motorway

(RS09T011000). The results of the aquatic survey at this location in 2023 are summarised in **Table Q-3** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

Macroinvertebrate samples were not collected from the River Tolka in 2017 due to access difficulties at the time of survey. As noted previously, the 2018 EIAR notes that “one site, a tributary of the Tolka River between the back of Connolly Hospital and the N3 National Road which will be crossed by the proposed orbital sewer route, was not suitable for survey due to significant morphological alternations to its channel, which have impacted its aquatic characteristics”. It is assumed that this location is location 1b described above. During 2023, location 1b was considered suitable for macroinvertebrate assessment, provided all limitations (e.g. limited riffle habitat, calcareous deposition on substrate) were taken into consideration.

3.3.3.2 Location 2

During the 2021 surveys, the macroinvertebrate sample recorded 7 taxa altogether with Class C taxa forming most of the sample. One Class B taxon was recorded in low numbers namely the cased caddis fly of the family Hydroptilidae. An empty cased caddisfly case was recorded, as was a single Polycentropodidae individual. These were not included in the Q-value assessment. One Class D taxon was recorded in low numbers (Hirudinea). No single taxon was dominant. No Class A or E taxa were recorded. A Q2-3 was inferred (corresponds with poor WFD status). The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-4** of Appendix **P**.

During the 2023 surveys a total of eight macroinvertebrate taxa were recorded within the stream. Group A, B and E macroinvertebrate taxa were absent. Group C taxa were dominant whereas Group D were numerous. *Asellus aquaticus* and *Potamopyrgus antipodarum* were numerous whereas Simuliidae and Hirudinea were common. Based on the relative abundance of the macroinvertebrate groups recorded within the stream, a Q-value of 2-3 (corresponds with poor WFD status) was inferred. This is consistent with the Q-value assigned to the Santry River by the EPA (Q2-3) in 2022 at a monitoring location downstream of the site near North Side Shopping Centre (station code: RS09S010300) as well as the Q-value inferred at the site in 2021. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-4** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

There was no change in the Q-value score between the surveys carried out in 2017, 2021 and 2023. A Q-value of Q2-3 was inferred each year.

3.3.3.3 Location 3

It was not possible to collect a macroinvertebrate sample at location 3 in 2021 as the watercourse was dry. Due to the drain-like nature of the watercourse in 2023, it was not suitable for kick-sampling or Q-value assessment. However, a sweep of the margins and substrate identified a number of pollution tolerant species including *Asellus aquaticus*, *Gammarus* sp., Gerridae, *Chironomus* sp., Planorbidae and excessive numbers of pea/orb mussels (Sphaeriidae). The results of the aquatic survey at this location in 2023 are summarised in **Table Q-5** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Q-values were inferred at location 3 in 2017, where a Q-value of Q2 (corresponds with bad WFD status) was inferred.

3.3.3.4 Location 4

A total of 4 macroinvertebrate taxa were recorded at location 4 in 2021. Class C taxa formed most of the sample. Two Class D taxa were also recorded, one in low numbers (Hirudinea sp.), and one numerous (*Asellus* sp.). No single taxon was dominant. No Class A, B or E taxa were recorded. A Q2-3 was inferred (corresponds with poor WFD status). The results of the aquatic survey at this location are summarised in **Table P-1** and **P-5** of Appendix **P**.

In 2023, a total of 15 macroinvertebrate taxa were recorded at the site. Group A macroinvertebrate taxa were absent, Group B numerous, Group C numerous, Group D numerous and Group E absent. *Hydroptilia* sp. (Group B) and *Asellus aquaticus* (Group D) were numerous whereas Chironomidae (Group C) were common. Based on the relative abundance of the various macroinvertebrate groups recorded, a Q-value of 3 (corresponds with poor WFD status) was inferred. This Q-value is in-keeping with the Q-value assigned to the river by the EPA in 2022 (Q3), at a monitoring point located downstream of the site at Hole-in-the-Wall

Road Bridge (RS09M030500). The results of the aquatic survey at this location in 2023 are summarised in **Table Q-6** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

A Q-value of 2-3 (corresponds with poor WFD status) was inferred at location 4 in 2017. This is inkeeping with the results obtained in 2021. However, the Q-value calculated at location 4 improved in 2023. Despite the increase in the Q-value score from Q2-3 to Q3, the inferred ecological status remains “poor” (see **Table 2-6**) across all years.

3.3.3.5 Location 5

A total of 5 macroinvertebrate taxa were recorded at location 5 in 2021. Class C taxa formed most of the sample. Two Class D taxa were also recorded, in low numbers (*Hirudinea* sp.), and one numerous (*Asellus* sp.). One Class E taxon was recorded in low numbers (Tubificidae sp.). No single taxon was dominant. No Class A or B taxa were recorded. A Q-value of Q3 (corresponds with poor WFD status) was inferred. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-6** of Appendix **P**.

A total of 13 macroinvertebrate taxa were recorded in the stream in 2023. Group A and Group B taxa were absent from the sample, whereas Group C taxa were excessive, Group D taxa common and Group E taxa few. The relative abundance of the Group C species *Potamopygrus antipodarum* was excessive. *Asellus aquaticus* (Group D) was common. Based on the relative abundance of the macroinvertebrate groups recorded within the stream, a Q-value of 2-3 (corresponds with poor WFD status) was inferred. This is slightly lower than the Q-value assigned to the Mayne River by the EPA in 2022 (Q3), at a monitoring point located downstream of the site at Hole-in-the-Wall Road Bridge (RS09M030500). It is possible that the heavy shading at this site influenced the Q-value score. Nevertheless, the score is in keeping with the poor status assigned to the river by the EPA. The results of the aquatic survey at this location in 2023 are summarised **Table Q-7** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

During the 2017 surveys, a Q-value of 2 (corresponds with bad WFD status) was inferred at location 2. Therefore, water quality appears to have improved slightly since 2017.

3.3.4 Freshwater Flora

Across all sites, in-stream plant diversity was low in both 2021 and 2023. In 2021, aquatic flora recorded typically included filamentous algae (in the River Tolka at location 1b and 1c, at location 2 in the Santry River, at location 4 in the Cuckoo Stream). Bulrush was recorded in the Santry River at location 2.

In 2023, *Vaucheria* and filamentous algae were noted at location 1c, location 4 and location 5. Filamentous algae was also recorded at location 2. The moss *Fontinalis* sp. was recorded at location 1c and location 4. Fool’s watercress was recorded in unshaded sections of location 5 (Mayne River).

In-stream plant diversity was low across all sites surveyed in 2017. Bulrush was recorded in the Santry River, and lesser water-parsnip *Berula erecta* and fool’s watercress were recorded in the Mayne River. These species are common throughout Ireland and are often found in shallow water in nutrient rich sites.

3.3.5 Fish

3.3.5.1 Location 1

Three separate survey locations were identified within location 1 – location 1a, 1b and 1c during the 2021 and 2023 surveys.

Location 1a is located within the National Sports Campus (NSC). The route crosses the Abbotstown Stream (IE_EA_09T011000) at this location. Aquatic ecology surveys were not undertaken at this site in both 2021 and 2023 as the stream could not be found and is assumed to be culverted at this location.

Location 1b is located southeast of Connolly Hospital on the Abbotstown Stream. The survey location of location 1b was corrected in 2023 to the crossing point on the Abbotstown Stream. During the 2021 surveys, location 1b was located on the River Tolka, approximately 200m downstream of location 1c, which was also located on the River Tolka.

The 2021 surveys identified ‘Fair’ fish habitat at location 1b. For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe, but is not considered to a limitation to

determining a rating. The heavy siltation conditions are not representative of juvenile salmonid habitat, however, a number of juvenile salmonids were observed. Therefore, the location was assigned a rating of 'Fair'. For lamprey, the site may provide suitable habitat for a lamprey nursery as there was slow flow, silt in the river margins and good water depth (60cm). It was assigned a rating of 'Fair'. The site may provide suitable habitat for adult lamprey as even though the flow was slow, there were no barriers to migration, and there was instream vegetation and undercut banks with sand and silt present. It was assigned a rating of 'Fair'. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-2** of Appendix **P**.

During the surveys undertaken in 2023 at location 1b, salmonid and lamprey spawning and adult habitat was assigned a rating of 'None'. No spawning habitat was available due to the presence of calcareous deposits which were binding the gravel substrate. The stream was too shallow and slow flowing to support adult fish, with little cover or hiding places noted. The waterfall located downstream of the survey location would act as a barrier to upstream migration. Juvenile salmonid habitat was assigned a rating of 'None-Poor' as instream habitat was shallow, slow flowing with the substrate dominated by fine gravel. There was a lack of cover from riparian vegetation. Some small areas of deposited silty-sand which could support lamprey ammocetes were noted. However, a rating of 'None-Poor' was assigned due to shallow water depth and limited extent of this habitat in the survey area. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-2** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

The 2021 surveys identified 'Fair' fish habitat at location 1c. For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. The heavy siltation conditions were not representative of juvenile salmonid habitat, however, due to suitable cover, moderate flowing water and coarse substrate, the location was assigned a rating of 'Fair'. The site may be suitable habitat for a lamprey nursery as although the flow is moderate, silt was present in the river margins, and there was good water depth (10-30cm). Therefore, this location was assigned a rating of 'Fair'. The site may provide suitable habitat for adult lamprey as the flow was moderate, there were no barriers to migration, and there was instream vegetation and undercut banks with sand and silt present. It was assigned a rating of 'Fair'. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-3** of Appendix **P**.

During the surveys undertaken in 2023, salmonid spawning and adult habitat at location 1c was assigned a rating of 'Fair'. Riffle/run habitat which could be utilised as spawning habitat was present, however it was silted and comprised a considerable amount of coarse substrate (cobbles) which may limit spawning activity. Holding pools were present downstream for adult salmonids. Adult brown trout were observed within the river. Juvenile salmonid habitat was assigned a rating of 'Fair'. The physical habitat available is generally good with overhanging vegetation present along with shallow, fast flowing water over large rocks and coarse substrates which could provide cover for this life stage. However, water quality is likely to be an issue for salmonids in this river with siltation, low dissolved oxygen and low Q-value recorded. Lamprey spawning and adult habitat was assigned a rating of 'Fair'. Suitable hiding places are available within the river channel for adults. Some spawning habitat is available however the substrate is quite coarse, silted and water quality is unsatisfactory. Lamprey nursery habitat was assigned a rating of 'None-Poor'. Some sandy/silt deposits were noted on the margins of the river, however these were small relative to the size of the surveyed reach. However, it should be noted that silty/sand deposits were noted upstream of the bedrock waterfall/cascade upstream of the survey reach, which could provide juvenile lamprey nursery habitat. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-3** of Appendix **Q** and compared with the results in 2021 in **Table 3-12** below.

Similar to the surveys undertaken in 2021 and 2023, in 2017, 'Fair' spawning habitat for salmonids and lamprey was identified in the River Tolka. 'Good' nursery habitat for salmonids and 'Good' habitat for lamprey ammocoetes utilising marginal soft sediments was also noted. Therefore, the suitability of nursery habitat has reduced since the 2017 surveys were undertaken.

3.3.5.2 Location 2

The 2021 surveys identified 'Poor' to 'Poor-Fair' fish habitat at location 2. The site may provide suitable habitat for salmon and lamprey spawning as there is a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide/pool present, although most was glide (80%). However, due to heavy siltation, extremely low flow, and barriers such as concrete blocks and debris, it was assigned a rating of 'Poor-Fair' for salmonids and 'Poor' for lamprey. For juvenile salmonids, some overhanging vegetation was present along with cobbles. Dissolved oxygen levels could not be measured at the time due to a faulty probe, but is not considered to a limitation to determining a rating. The heavy siltation conditions were not representative of juvenile salmonid habitat, and, although there was some suitable cover, slow to stagnant

flowing water meant the location was assigned a rating of 'Poor'. No suitable habitat for a lamprey nursery was recorded due to the stagnant nature of the flow over the silty deposits within the stream and low water depth (5-10cm). Therefore, this location was given a rating of 'Poor'. The stream was not suited to adult lamprey as there was low flow, and a barrier to migration with the presence of concrete blocks and debris. Additionally, there are no suitable hiding places. The channel was straightened but not recently. Therefore, this location was given a rating of 'Poor'. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-4** of Appendix **P**.

In 2023, salmonid spawning and adult habitat was assigned a rating of 'None'. The substrate was dominated by fine sediment (sand, fine gravel, silt) and therefore did not provide suitable spawning conditions. Only very small areas of riffle habitat were present within the stream. Juvenile salmonid habitat was assigned a rating of 'None-Poor'. The substrate was dominated by fine sediment, the flow was slow and had limited cobbles and boulders. Some overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue for salmonids in this stream. Lamprey spawning and adult habitat was assigned a rating of 'None-Poor'. There is a small possibility that brook lamprey could spawn in the small riffles within this stream. Some limited hiding places were available within the river channel for adults. Siltation is likely to be an issue, however. Lamprey nursery habitat was assigned a rating of 'Fair', as some sandy/silt deposits were noted on the margins of the river. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-4** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

Similar to the surveys undertaken in 2021 and 2023, in 2017, 'Poor' spawning habitat for salmonids and lamprey was identified at location 2. 'Poor' nursery habitat for salmonids and lamprey was also noted in 2017.

3.3.5.3 Location 3

In 2021, the watercourse at location 3 was dry on the day of survey and resembled a dry drainage ditch. There was no potential for salmonids or lamprey at any life stage at the site surveyed and habitat rating of 'None' was assigned.

In 2023, the watercourse at location 3 was ditch-like with stagnant flow conditions and high levels of siltation. A habitat rating of 'None' was assigned for salmonid spawning, lamprey spawning and salmonid nursery. The silty substrate could potentially support lamprey ammocetes, however, the stagnant conditions and potential lack of upstream spawning habitat (assuming the habitat is similar upstream in this watercourse) makes this very unlikely. A rating of 'None' was also assigned. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-5** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

In 2017, 'Poor' spawning and nursery for salmon and lamprey was noted.

3.3.5.4 Location 4

In 2021, the watercourse at location 4 was assessed as having suitable habitat for salmonid and lamprey spawning, as even though there was heavy siltation, a mixture of suitable substrate (coarse/gravel/cobble) was present. However, instream habitats were near 100% glide, and the flow was extremely low. It was assigned a rating of 'Poor-Fair'. For juvenile salmonids, some overhanging vegetation was present along with some coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe, but is not considered to a limitation to determining a rating. The heavy siltation conditions were not representative of juvenile salmonid habitat, and the extremely low flow meant the location was assigned a rating of 'Poor-Fair'. Suitable lamprey nursery habitat was not recorded due to the absence of areas with slow flow/backwater and shallow water depth (5cm). There were some areas of deposited silt/mud. It was given a rating of 'None-Poor'. The habitat was not suited to adult lamprey as there was low flow, and there were no suitable hiding places. The channel was straightened but not recently. Therefore, this location was given a rating of 'None-Poor'. The results of the aquatic survey at this location are summarised in **Table P-1** and **P-5** of Appendix **P**.

In 2023, salmonid spawning and adult habitat was assigned a rating of 'Fair'. The physical habitat was suitable for spawning and holding pools were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for salmonids. Juvenile salmonid habitat was also assigned a rating of 'Fair'. The physical habitat was suitable with shallow, fast flowing water over coarse substrates. Some overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue, however. Lamprey spawning and adult habitat was assigned a rating of 'Fair'. The physical habitat was suitable for

spawning and hiding places for adults were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for lamprey spawning. Lamprey nursery habitat was assigned a rating of 'Fair', as some silty/sand accumulations were noted along the stream margins. The results of the aquatic survey at this location in 2023 are summarised in **Table Q-6** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

In 2017, 'Poor' spawning for salmon and lamprey was noted at location 4. Similarly, 'Poor' nursery habitat for salmonids and lamprey ammocoetes utilising marginal soft sediments was also noted.

3.3.5.5 Location 5

In 2021, the River Mayne at location 5 was assessed as having suitable habitat for salmon and lamprey spawning as even though there was heavy siltation, a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide was noted. It was assigned a rating of 'Fair'. For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe, but is not considered to a limitation to determining a rating. The heavy siltation conditions and slow flow were not representative of juvenile salmonid habitat, however, due to suitable cover, and coarse substrate, the location was assigned a rating of 'Fair'. The site may provide suitable habitat for a lamprey nursery due to the presence of silt in the margins, and some instream debris. However, due to the extremely low flow it was assigned a rating of 'Poor-Fair'. The site may suitable habitat for adult lamprey as even though the flow is slow, there are no barriers to migration and hiding places for adults were noted. It was assigned a rating of 'Poor-Fair'. The results of the aquatic survey at this location in 2021 are summarised in **Table P-1** and **P-6** of Appendix **P**.

In 2023, salmonid spawning and adult habitat was assigned a rating of 'None-Poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted and poor water quality would be an issue for salmonids in this stream. Juvenile salmonid habitat was assigned a rating of 'None-Poor'. The physical habitat was unsuitable with shallow, slow flowing water over predominantly fine substrates (gravel and sand) noted. Overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue. Lamprey spawning and adult habitat was assigned a rating of 'None-Poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted. Lamprey nursery habitat was assigned a rating of 'None-Poor'. The physical habitat was unsuitable with only very small areas of silty sand accumulations noted on the river margins. Unsatisfactory water quality is likely to be an issue. The results of the aquatic survey at this location in 2023 are summarised **Table Q-7** of Appendix **Q** and compared with the results in 2017 and 2021 in **Table 3-12** below.

In 2017, 'Poor' spawning for salmon and lamprey was noted at location 4. Similarly, 'Poor' nursery habitat for salmonids and lamprey ammocoetes utilising marginal soft sediments was also noted.

3.3.6 Summary of Results

Overall, while some minor changes in either Q-value score or the quality of fish or crayfish habitat were noted, no significant changes in the baseline between 2021 and 2023 were evident. The only exception was site 1b. However, changes in the baseline are to be expected for this site, as the survey location was corrected in 2023 from the mainstem of the River Tolka to a small tributary of the River Tolka.

None of the sites provided 'Very Good' or 'Excellent' habitat for fish or crayfish. Where Q-value assessments were carried out in 2021 and 2023, water quality was consistently 'poor'. All sites surveyed in both 2021 and 2023 typically suffered from excessive siltation. The habitat assessment for fish and crayfish rarely deviated by more than one rating on the categorical scale used (None/Poor/Fair/Good/Very Good/Excellent) between 2021 and 2023. Any differences observed are likely a result of slight differences in survey location (due to access, dense vegetation growth etc), potential differences in surveyor judgement (mainly for the fish and crayfish habitat assessment) and temporal variation in local conditions and river habitat. Key deviations from the 2017 baseline are discussed in **Section 4.6**.

Table 3-12: Summary of aquatic ecology survey results in 2021 and 2023

Survey	1a		1b		1c		2			3		4			5					
	2021	2023	2021	2023	2017	2021	2023	2017	2021	2023	2017	2021	2023	2017	2021	2023				
Q-Value	n/a	n/a	2-3	2-3	-	2-3	3	2-3	2-3	2-3	2	n/a	n/a	2-3	2-3	3	2	3	2-3	
Corresponding WFD Status	-	-	Poor	Poor	-	Poor	Poor	Poor	Poor	Poor	Poor	Bad	-	-	Poor	Poor	Poor	Bad	Poor	Poor

Terrestrial Baseline Survey Report

Survey	1a		1b		1c			2		3		4		5					
Adult and Spawning Salmonid Habitat	n/a	n/a	Fair	None	Fair	Fair	Fair	Poor	Poor-Fair	None	Poor	None	None	Poor	Poor-Fair	Fair	Poor	Fair	None-poor
Juvenile Salmonid Habitat	n/a	n/a	Fair	None-Poor	Good	Fair	Fair	Poor	Poor	None-Poor	Poor	None	None	Poor	Poor-Fair	Fair	Poor	Fair	None-poor
Lamprey Spawning Habitat	n/a	n/a	Fair	None	Fair	Fair	Fair	Poor	Poor	None-Poor	Poor	None	None	Poor	None-Poor	Fair	Poor	Fair	None-poor
Lamprey Nursery Habitat	n/a	n/a	Fair	None-Poor	Good	Fair	None-Poor	Poor	Poor	Fair	Poor	None	None	Poor	None-Poor	Fair	Poor	Poor-Fair	None-poor
Crayfish Habitat	n/a	n/a	Fair	None	Good	Fair	Good	Poor	Poor-Fair	None-Poor	Poor	None	None	Good	Poor-Fair	Fair	Poor	Fair	None-poor

*2017 results for location 1c provided as this location was consistently surveyed on the River Tolka in all survey years.

4 KEY MATERIAL CHANGES IN BASELINE

4.1 Terrestrial Habitats

The key material changes along the Proposed Project boundary are:

- Areas of amenity grassland being developed on or allowed to go unmanaged;
- Areas of arable crops are now improved agricultural grassland or still tilled land;
- Horticultural land is now arable crops or improved agricultural grassland;
- Immature woodland is now (mixed) broadleaved woodland; and
- Many areas of improved agricultural grassland have been left unmanaged and allowed to go rank.

4.2 Invasive Alien Plant Species

Only Giant Rhubarb (*Gunnera tinctoria M.*) was recorded in the previous survey carried out in 2017. It was found along the River Tolka, downstream of the proposed orbital sewer route and the proposed Abbotstown pumping stations sites during the aquatic surveys. *Spartina* swards were also recorded in the estuarine survey in 2009. The Giant Hogweed and Japanese knotweed recorded in the 2019 survey, especially the giant hogweed within the redline boundary of the Proposed Project, was therefore a material change to the baseline. However, in the confirmatory survey in 2023, these instances of Japanese knotweed were not found. One new instance of Japanese knotweed and one of bohemian knotweed was recorded in 2023 at the proposed WWTP site and 185m east of Ch 10,300m, which is a material change.

4.3 Badger Survey

Six of the 10 setts recorded in the survey carried out in 2020 were new compared to the 2017 survey. This was a material change in the baseline. The 14 new setts recorded in the most recent 2023 survey are also a material change.

4.4 Bat Surveys

The previous bat surveys carried out in 2017, or earlier, found older trees within the hedgerows of the improved grassland and arable land with potential roosting opportunities, of only low suitability. Two trees of moderate suitability (2-1 and 2-3) were recorded in hedgerows in the 2022 survey. The previous bat surveys also found mature broadleaved trees of moderate potential for roosting bats within the broadleaved woodland at Blanchardstown and Abbotstown. A high suitability tree (1-52) was recorded here in 2022. However, no roosting bats were found in the trees with potential roosting features in the 2022 surveys.

For bat activity surveys, Nathusius' pipistrelle, recorded in the 2022 surveys, was not recorded in the 2017 or earlier surveys.

4.5 Smooth Newt Survey

Smooth newts were found in water bodies 1,7,11 and 16 in both 2017 and 2021. Newts were found in water body 15 in 2017 but not in 2021. However, two water bodies (4 and 8) had newts in them in 2021 which did not in 2017. This represented a material change in the baseline. In 2023, at site 1, smooth newts were found in water bodies 1, 3, 4, 6, 7, 8, 9, 11, 12, 14a, 14c and 15. Therefore, the presence of smooth newts in water bodies 3, 6, 12, 14a and 14c at site 1 in 2023 represents a material change.

4.6 Freshwater Aquatic Surveys

Overall, minor changes in the baseline were observed between the surveys undertaken in 2017 and 2021/2023. No significant changes in the baseline were noted between the 2021 and 2023 surveys. The only exception was location 1b, as the survey location was corrected in 2023 from the mainstem of the River Tolka to a small tributary of the River Tolka.

A key change in water quality was an improvement observed at Location 5, where the inferred Q-value improved from 'Q2' (seriously polluted/bad WFD status) to 'Q3' (moderately polluted/poor WFD status) and 'Q2-3' (moderately polluted/poor WFD status) in the years 2017, 2021 and 2023 (Table 3-12). Despite this improvement, however, water quality remains unsatisfactory at this location.

Similarly, the habitat assessment for fish and crayfish did not change significantly, and rarely deviated by more than one rating on the categorical scale used (None/Poor/Fair/Good/Very Good/Excellent). Location 1c (mainstem of the River Tolka) saw an overall reduction in suitability over the years 2021 and 2023 since the 2017 survey for juvenile salmonids and juvenile lamprey (Table 3-12). Habitat condition deteriorated at Location 3 since 2017, and consequently, habitat suitability for fish and crayfish reduced from 'Poor' (in 2017) to 'None' (in 2021 and 2023). Location 4 saw a reduction in suitability for crayfish habitat since the 2017 survey ('Good' habitat was recorded at this site in 2017, whereas 'Poor-Fair' and 'Fair' were recorded in 2021 and 2023 respectively). However, a slight improvement in habitat suitability for fish was observed at location 4 where suitability was recorded as 'Poor' for all species and life stages in 2017 and 'Fair' in 2023 for all species and life stages. Despite the observed improvement in water quality at location 5 since 2017, habitat suitability for fish and crayfish improved in 2021, but disimproved in 2023.

Differences observed are likely a result of slight differences in survey location (due to access, dense vegetation growth etc), potential differences in surveyor judgement (mainly for the fish and crayfish habitat assessment) and temporal variation in local conditions and river habitat.

Overall, with the exception of the River Tolka in 2017, river habitat, water quality and suitability of the various survey locations for fish was sub-optimal across all locations in all survey years (Table 3-12). 'Good' juvenile salmonid and 'Good' juvenile lamprey habitat was recorded in the River Tolka in 2017. Habitat suitability for white-clawed crayfish was also typically suboptimal across all locations and all survey years, with the exception of location 1c (the Tolka mainstem) and 4. 'Good' white-clawed crayfish habitat was recorded at location 1c in 2017 and 2023, and location 4 in 2017.

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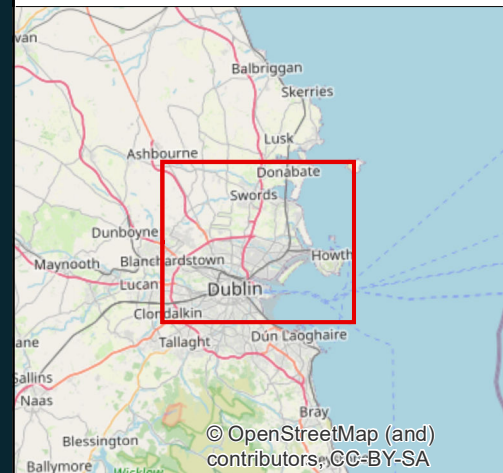
Appendix A

Invasive Alien Plant Species Results 2019 - 2023



Legend

-  Boundary
-  Bohemian knotweed
-  Giant hogweed
-  Japanese knotweed
-  Areas with *Spartina* sp.



Client
Uisce Éireann
Greater Dublin Drainage Project

Title
Figure 3 5:
IAPS survey 2019 (Giant Hogweed & Japanese Knotweed), 2022 (Spartina sp.), 2023 (Japanese and Bohemian Knotweed, Giant Hogweed)

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Issue Details

File Identifier:
IE000258-RPS-AG-XX-D-Z-0014

Status: A1	Rev: C01	Model File Identifier:
Drawn: NR	Date: 22/08/2023	
Checked: RR	Scale: 1:75,000 @A3	
Approved: RR	Projection: ITM	

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APPENDIX B Badger Evidence along the Proposed Project Boundary 2020



Figure B-1 Badger evidence locations along the Proposed Project Boundary 2020 (Overview)



Figure B-2 Badger evidence locations along the Proposed Project Boundary 2020 (1)



Figure B-3 Badger evidence locations along the Proposed Project Boundary 2020 (2)

Legend

- Boundary
- Badger Evidence 2020

Client
Uisce Éireann

Greater Dublin Drainage Project

Title
Badger evidence locations along the Proposed Project Boundary 2020
Map 2 of 6

Issue Details

File Identifier:
IE000259-RP0-A0-XX-0-Z-0017

Status:	Rev:	Model File Identifier:
A1	001	

Drawn:	NR	Date:	09/10/2023
Checked:	RR	Scale:	1:6,000 @A3
Approved:	RR	Projection:	ITM

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Figure B-4 Badger evidence locations along the Proposed Project Boundary 2020 (3)



Figure B-5 Badger evidence locations along the Proposed Project Boundary 2020 (4)



Figure B-6 Badger evidence locations along the Proposed Project Boundary 2020 (5)



Figure B-7 Badger evidence locations along the Proposed Project Boundary 2020 (6)

APPENDIX C Badger Evidence along the Proposed Project Boundary 2023



Figure C-1 Badger evidence locations along the Proposed Project Boundary 2023 (Overview)



Figure C-2 Badger evidence locations along the Proposed Project Boundary 2023 (1)



Figure C-3 Badger evidence locations along the Proposed Project Boundary 2023 (2)

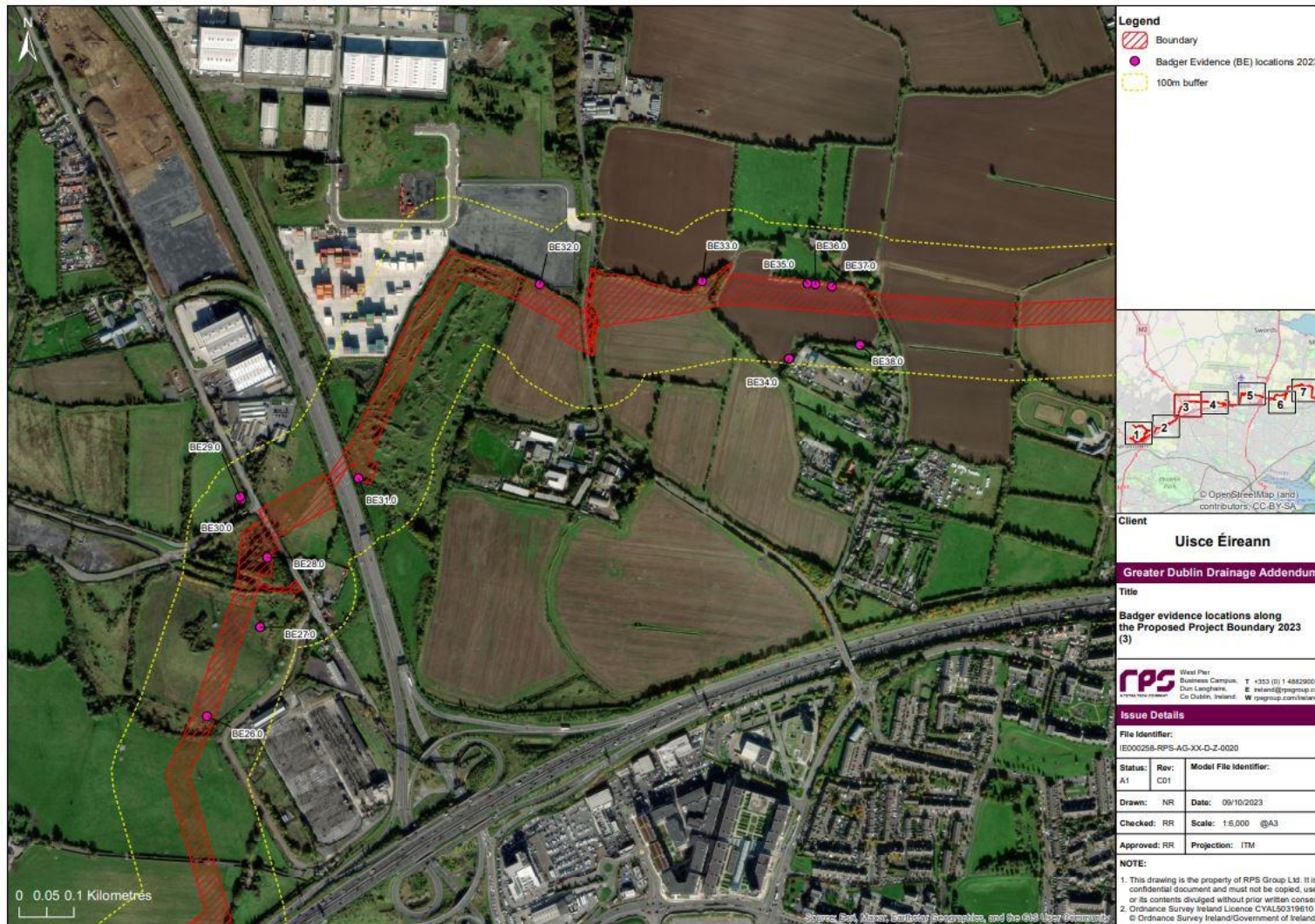


Figure C-4 Badger evidence locations along the Proposed Project Boundary 2023 (3)



Figure C-5 Badger evidence locations along the Proposed Project Boundary 2023 (4)

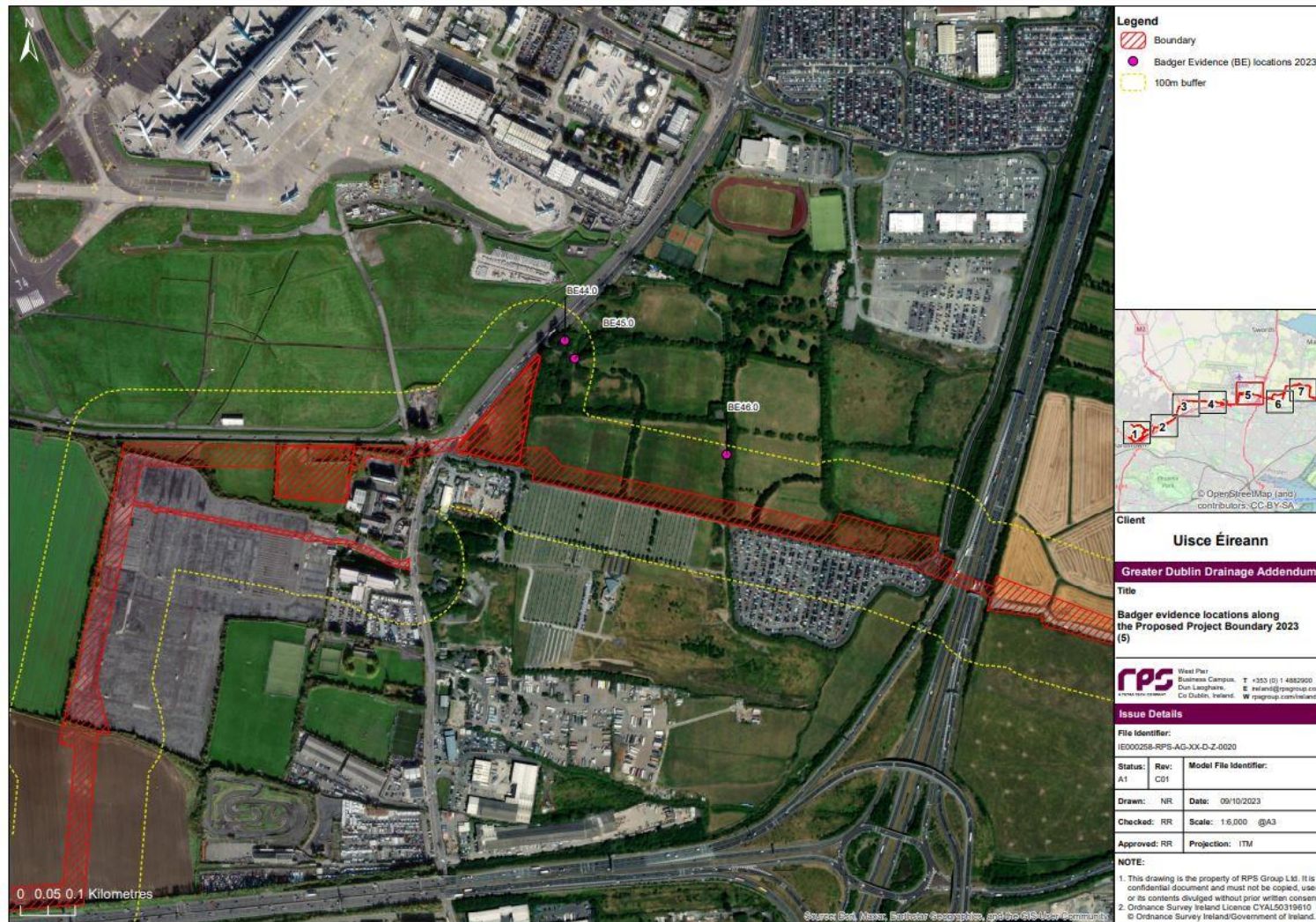


Figure C-6 Badger evidence locations along the Proposed Project Boundary 2023 (5)



Figure C-7 Badger evidence locations along the Proposed Project Boundary 2023 (6)



Figure C-8 Badger evidence locations along the Proposed Project Boundary 2023 (7)

Appendix D

Badger Evidence along the Proposed Project Boundary 2023 Tabulated

Appendix D - Badger Evidence Along the Proposed Project Boundary 2023 Tabulated

Table D-1 Badger Evidence along the Proposed Project Boundary & 100m either side, 2023

Activity	Label	Location	Description
Hair	BE1.0	In wooded area 28m NW of Connolly Hospital Laboratory, 67m east of access track.	Clump of white hair on the ground.
Snuffle hole	BE2.0	WL0002 – In wooded area 65m SW of Connolly Hospital southern carpark, 54m SW of redline boundary.	Potential snuffle hole x two.
Snuffle hole	BE3.0	WL0003 – In scrub 210m SE of Connolly Hospital southern carpark, 13m north of redline boundary.	Possibly old snuffle hole-vegetation present.
Snuffle hole	BE4.0	WL0003 - In wooded area 234m west of Connolly Hospital southern carpark, along access track.	Scat present with musty smell.
Snuffle hole	BE5.0	WL0003 - In scrub SE of Connolly Hospital southern carpark, 14m SE of BE3.0, 2m north of redline boundary.	Possible snuffle hole - vegetation present.
Snuffle hole	BE6.0	WL0003 - In scrub SE of Connolly Hospital southern carpark, 132m SE of BE5.0, 14m north of redline boundary.	Potential snuffle hole, surrounded with vegetation.
Snuffle hole	BE7.0	WL0003 - In wooded area east of Connolly Hospital southern carpark, just west of the M50, 188m east of BE6.0, 7m SE of redline boundary.	Old snuffle hole- surrounded by vegetation.
Latrine	BE8.0	WL0003 - In treeline south of Caveen Cemetery, east of Connolly Hospital southern carpark, just west of the M50, 0.6m north of redline boundary.	Numerous fresh, quite wet scats, smell musty. Note another scat nearby looked like fox.

Activity	Label	Location	Description
Scat	BE9.0	WL0003 – Among a clump of trees in mid western part of Sport Ireland National Cross Country Track, 3m east of access track.	Fresh scat, some kind of seeds inside. Smells musty but odd location on road.
Snuffle hole	BE10.0	WL0003a - In felled area 105m east of BE8.0, just west of the M50, 36m SE of redline boundary.	Several potential snuffle holes in close proximity to each other.
Snuffle hole	BE11.0	WL0003a - In felled area 30m SE of BE10.0, just west of the M50, 30m south of BE10.0.	Numerous potential snuffle holes, just adjacent to well-worn trail through woodland.
Snuffle hole	BE12.0	WL0003 – In wooded area NW of M50, 273 east of BE9.0, 10m SE of redline boundary.	Possible snuffle hole near mammal path - vegetation present, may be old.
Trail	BE13.0	In a hedgerow 31m north of the National Diving Centre, 88m west of the access tracks.	Badger sized trail through nettles leading into hedgerow.
Snuffle hole	BE14.0	Below hedgerow north of the National Diving Centre, 23m SE of BE13.0.	Musty smell.
Latrine	BE15.0	In wooded area 48m west of the Irish Olympic Handball Association, 72m east of the access tracks.	Potential snuffle hole.
Snuffle hole	BE16.0	In scrub area between the GAA Centre of Excellence and Sport Ireland National Indoor Arena. 56m north of access tracks.	Single snuffle hole.
Trail	BE17.0	In scrub area 7m NE of BE16.0.	Badger sized trail through grass parallel to hedgerow.
Scat	BE18.0	WL0004 – On edge of footpath 185m SW of Malley Sports, 4.5m east of access tracks.	Smells musty.
Snuffle hole	BE19.0	WL0004 – In field, 170m east of A Plus Skip Hire, 68m SE	Potential snuffle holes.

Activity	Label	Location	Description
		of redline boundary, 61m NW of M50.	
Scat	BE20.0	WL0007 – In wooded area within redline boundary, 52m north of where Cappagh road crosses M50.	Smells musty.
Snuffle hole	BE21.0	WL0007 – Next to treeline, 89m NE of BE20.0, 31m east of access tracks, 6m west of redline boundary.	Three snuffle holes. Potentially badger.
Snuffle hole	BE22.0	WL0008 - Next to treeline, 56m NE of BE21.0.	Several possible snuffle holes.
Snuffle hole	BE23.0	WL0008 - Next to treeline, 26m NE of BE22.0.	Several potential snuffle holes.
Scat	BE24.0	WL0009 – 209m NW of Harvey Norman Nedding Warehouse, just south of a hedgerow, 96m NW of redline boundary.	Fresh badger scat, smells musty
Scat	BE25.0	WL0009 – Just west of a hedgerow, 87m SE of BE24.0, 9m north of the redline boundary.	Potential badger scat smells musty.
Scat	BE26.0	WL0011 – At SE corner of field, in grassland, within redline boundary, 43m NW of road bordering NW corner of Finglas 220kV Station.	Smells musty, likely badger. Not too fresh.
Scat	BE27.0	WL0011a – In scrub 26m SE of redline boundary, 127m SW of AnCu Veterinary Clinic.	Dry/old badger scatt (badger smell) adjacent to dense bramble area.
Scat	BE28.0	WL0011a – In wooded area, within redline boundary, 50m west of AnCu Veterinary Clinic.	Old badger scat, smells musty
Scat	BE29.0	WL0011a – In SE corner of field, 19m west of North Road, 42m NW of redline boundary, 94m SW of Coopers coffee.	Fresh badger scat.

Activity	Label	Location	Description
Scat	BE30.0	WL0011a – In SE corner of field, 6m SE of BE29.0.	Fresh badger scat.
Scat	BE31.0	WL0015 – SW corner of field of recolonising bare ground at Coldwinters site, within redline boundary, 10m east of N2.	Smells musty.
Snuffle hole	BE32.0	WL0015 – Top of agricultural field, along south side of hedgerow, 6m north of redline boundary, 85m west of R122.	Potential snuffle hole.
Snuffle hole	BE33.0	WL0017 – SE corner of agricultural field, north of tree line, 200m east of R122, 3m NW of redline boundary.	Potential snuffle hole.
Snuffle hole	BE34.0	WL0017 – Field side of hedgerow, 10m west of A1 Auto Care.	Potential snuffle hole.
Snuffle hole	BE35.0	WL0017 – Field side of hedgerow, within redline boundary, 140m NE of BE34.0.	Potential snuffle holes together.
Snuffle hole	BE36.0	WL0017 – Field side of hedgerow, within redline boundary, 15m east of BE35.0.	Potential snuffle holes.
Scat	BE37.0	WL0017 – Field side of hedgerow, within redline boundary, 29m east of BE36.0.	Fresh scat, smells musty likely badger.
Snuffle hole	BE38.0	WL0017 – Field side of hedgerow, 58m south of redline boundary, 132m NE of BE34.0.	Potential snuffle hole.
Snuffle hole	BE39.0	WL0019 – Field side of hedgerow, 15m south of redline boundary, 406m north of Sillogue Water Tower.	Potential snuffle hole near hedgerow.
Snuffle hole	BE40.0	WL0019 – Within the same field as BE39.0 and 185m	Single snuffle hole.

Activity	Label	Location	Description
		SE, field side of hedgerow, 68m south of redline boundary.	
Snuffle hole	BE41.0	WL0020 – Opposite side of hedgerow to BE40.0 in a different field. 73m NE of BE40.0, 13m south of redline boundary.	Potential snuffle hole near hedgerow.
Snuffle hole	BE42.0	WL0023 – In Sillogue Park Golf Club, in a wooded area enclosed on either side by fields from WL0020 & WL0021. 77m south of the redline boundary.	Seven potential snuffle holes.
Snuffle hole	BE43.0	WL0021 – 348m south of Sillogue Farm, in a field along a hedgerow. 10m north of the redline boundary.	Potential snuffle holes x two.
Snuffle hole	BE44.0	271m north of Dardistown Cemetery, 16m SE of Swords Road. 55m NE of the redline boundary, in an area of scrub.	Potentially a snuffle hole.
Snuffle hole	BE45.0	At edge of field, 39m SE of BE44.0.	Single snuffle hole.
Snuffle hole	BE46.0	WL0033/34 - 327m SE of BE45.0, 82m north of the redline boundary, along a hedgerow.	Single snuffle hole.
Trail	BE47.0	WL0039 – On the western side of this wayleave, on the southern edge of the central part of the plantation. 240m south of Orby House & 41m south of the redline boundary.	Trail leading into dense brambles, unable to follow further.
Snuffle hole	BE48.0	WL0039 – On the edge of the plantation, 43m east of BE47.0.	Multiple snuffle holes within close proximity.
Trail	BE49.0	WL0039 – On the edge of the plantation, 33m NE of BE48.0.	Definite mammal trail, possibly too small for badger.

Activity	Label	Location	Description
Snuffle hole	BE50.0	WL0039 – On the edge of the plantation, 12m east of BE49.0.	Twelve snuffle holes in close proximity.
Snuffle hole	BE51.0	WL0039 – On the edge of the plantation, 14m east of BE50.0.	Single snuffle hole.
Snuffle hole	BE52.0	WL0039 – Within the central part of the plantation, 166m SE of Orby House, and 40m south of the redline boundary.	Single snuffle hole.
Snuffle hole	BE53.0	WL0039 – Within the plantation, 8m NE of BE52.0.	Single snuffle hole.
Snuffle hole	BE54.0	WL0039 – Within the plantation, 15m NE of BE53.0.	Single snuffle hole.
Trail	BE55.0	WL0039 – On the edge of the northern part of the plantation, 65m east of Orby House and 50m south of Baskin Lane.	Trail leading into dense bramble scrub, could not follow any further.
Trail	BE56.0	WL0043 – Within the redline boundary. On the edge of the agricultural field, 193m SE of Trinity Gaels GAA club.	Trail leading into area of scrub.
Footprint	BE57.0	ACQ0005 - 133m SE of Craobh Chiarain GAA building. 6m north of redline boundary.	Single badger print in mud along river bank.

APPENDIX E Bat Activity Transects 2020



Figure E-1. Bat activity transects 2020 (overview^[JE1])



Figure E-2. Bat activity transects 2020 Transect 4



Figure E-3. Bat activity transects 2020 Transect 3

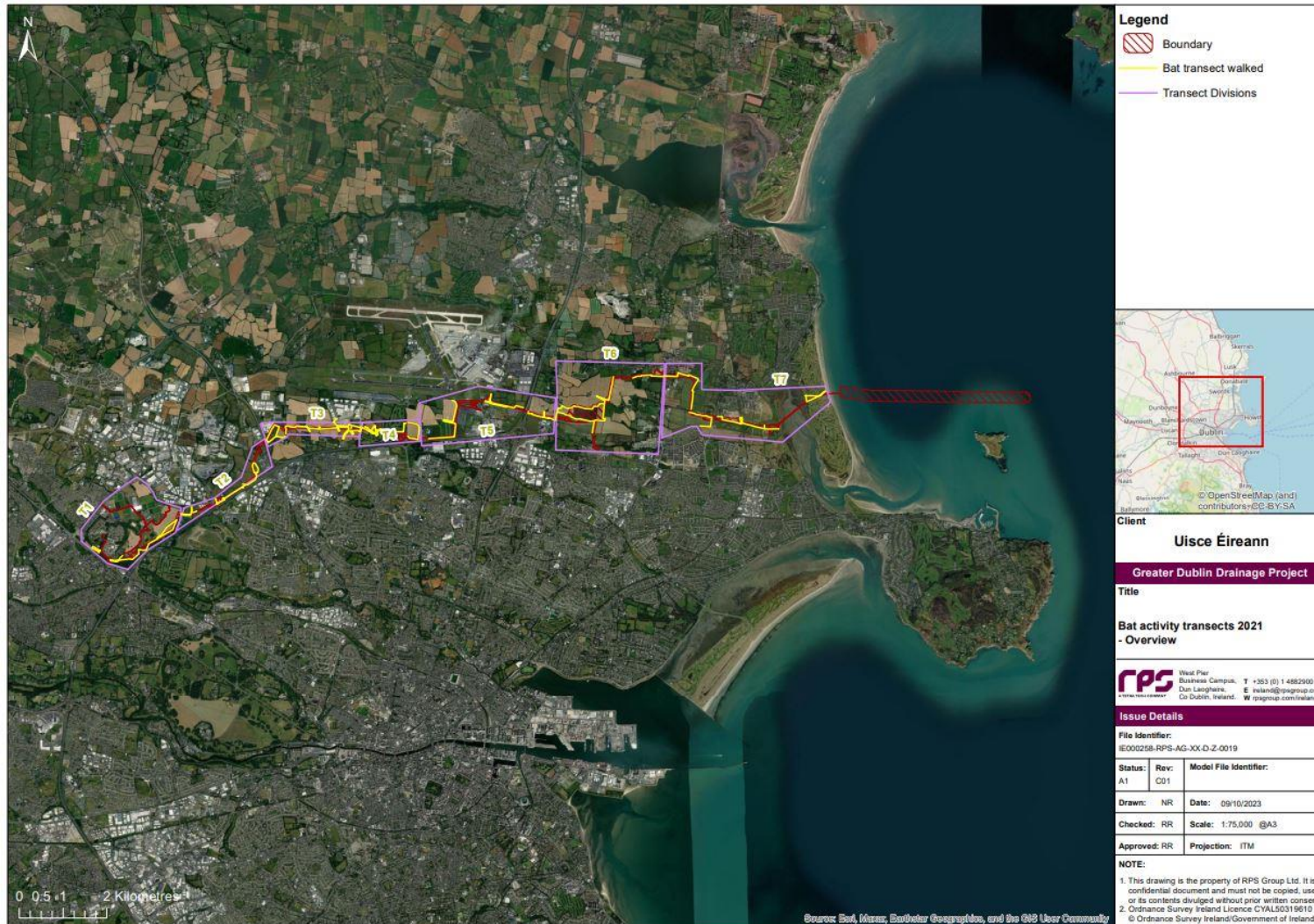


Figure E-4. Bat activity transects 2020 Transect 2



Figure E-5. Bat activity transects 2020 Transect 1

APPENDIX F Bat Activity Transects 2021



Legend

-  Boundary
-  Bat transect walked
-  Transect Divisions



Client
Uisce Éireann

Greater Dublin Drainage Project

Title
Bat activity transects 2021 - Overview

rps West Pier Business Campus, T +353 (0) 1 4882900
Dan Langan, E Ireland@rpsgroup.com
Dublin, Ireland W rpsgroup.com/ireland

Issue Details

File Identifier: #E000258-RPS-AG-XX-D-2-0019	
Status: A1	Rev: C01
Model File Identifier:	
Drawn: NR	Date: 09/10/2023
Checked: RR	Scale: 1:75,000 @A3
Approved: RR	Projection: ITM

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Figure F-1 Bat activity transects 2021 (overview)



Figure F-2 Bat activity transects 2021 T1



Figure F-3 Bat activity transects 2021 T2



Figure F-4 Bat activity transects 2021 T3

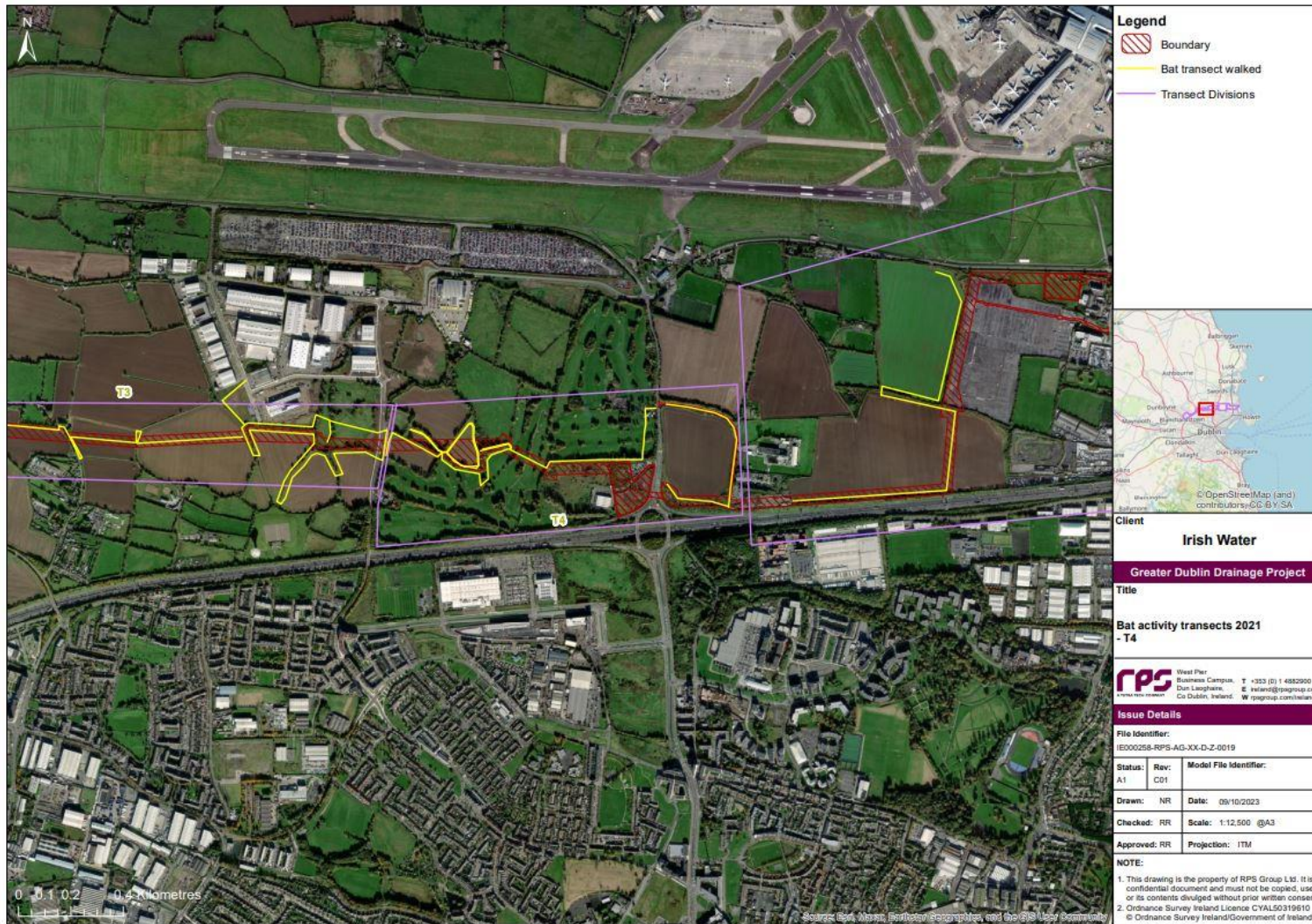


Figure F-5 Bat activity transects 2021 T4



Figure F-6 Bat activity transects 2021 T5



Figure F-7 Bat activity transects 2021 T6



Legend

- Boundary
- Bat transect walked
- Transect Divisions

Client
Irish Water
Greater Dublin Drainage Project

Title
Bat activity transects 2021
- T7

Issue Details

File Identifier:
IED00258-RPS-AG-XX-D-Z-0019

Status:	Rev:	Model File Identifier:
A1	CD1	
Drawn:	NR	Date: 09/10/2023
Checked:	RR	Scale: 1:12,500 @A3
Approved:	RR	Projection: ITM

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Figure F-8 Bat activity transects 2021 T7

APPENDIX G Listening Points for Bat Activity Survey 2021



Figure G-1 Listening points for bat activity survey 2021 (Overview)



Figure G-2 Listening points for bat activity survey 2021 (1)



Figure G-3 Listening points for bat activity survey 2021 (2)



Figure G-4 Listening points for bat activity survey 2021 (3)

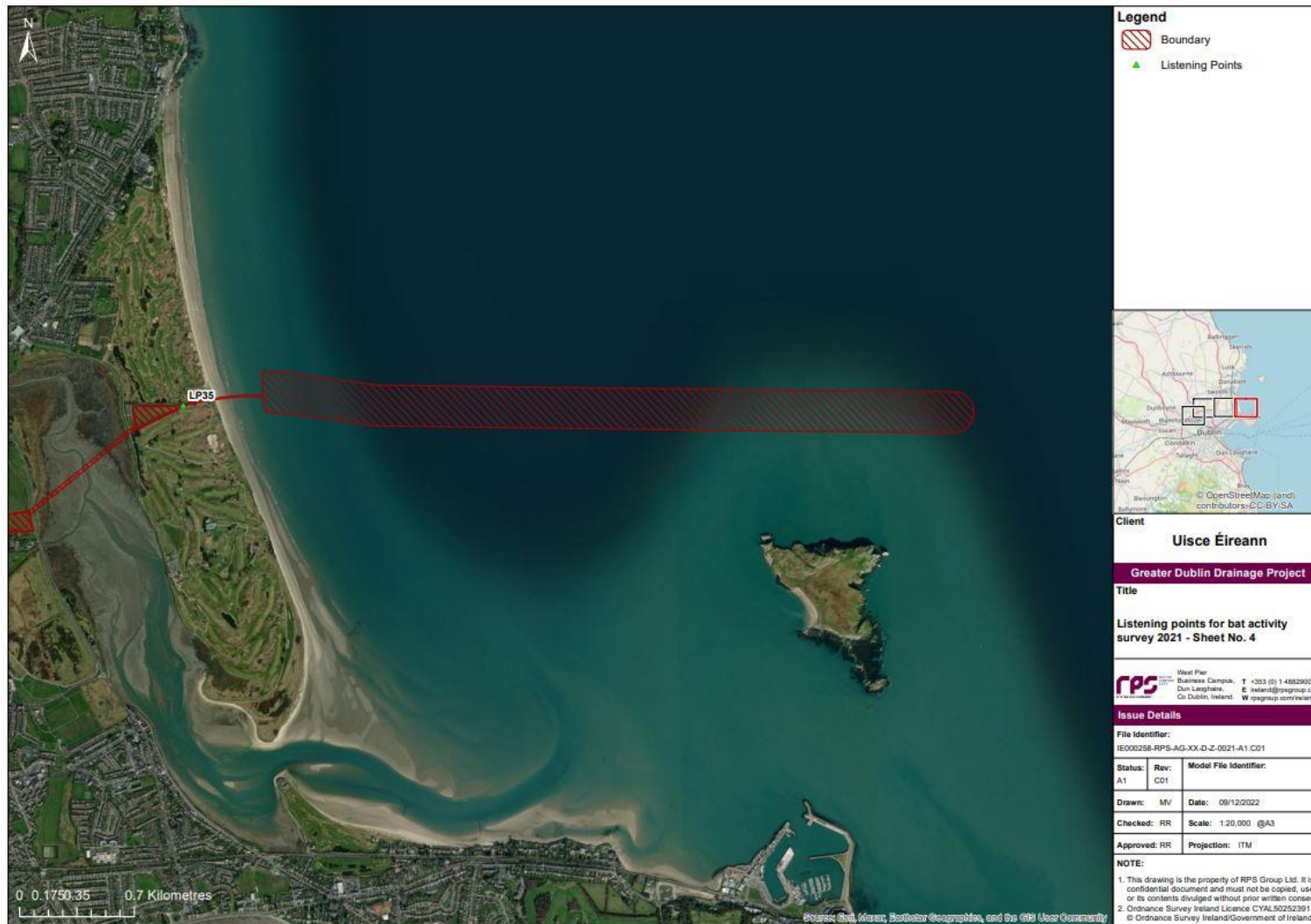


Figure G-5 Listening points for bat activity survey 2021 (4)

APPENDIX H Bat Static Detector Locations 2021



Figure H-1 Bat static detector locations 2021 (Overview)



Figure H-2 Bat static detector locations 2021 (1)



Figure H-3 Bat static detector locations 2021 (2)



Figure H-4 Bat static detector locations 2021 (3)

APPENDIX I Bat Static Detector Data 2021

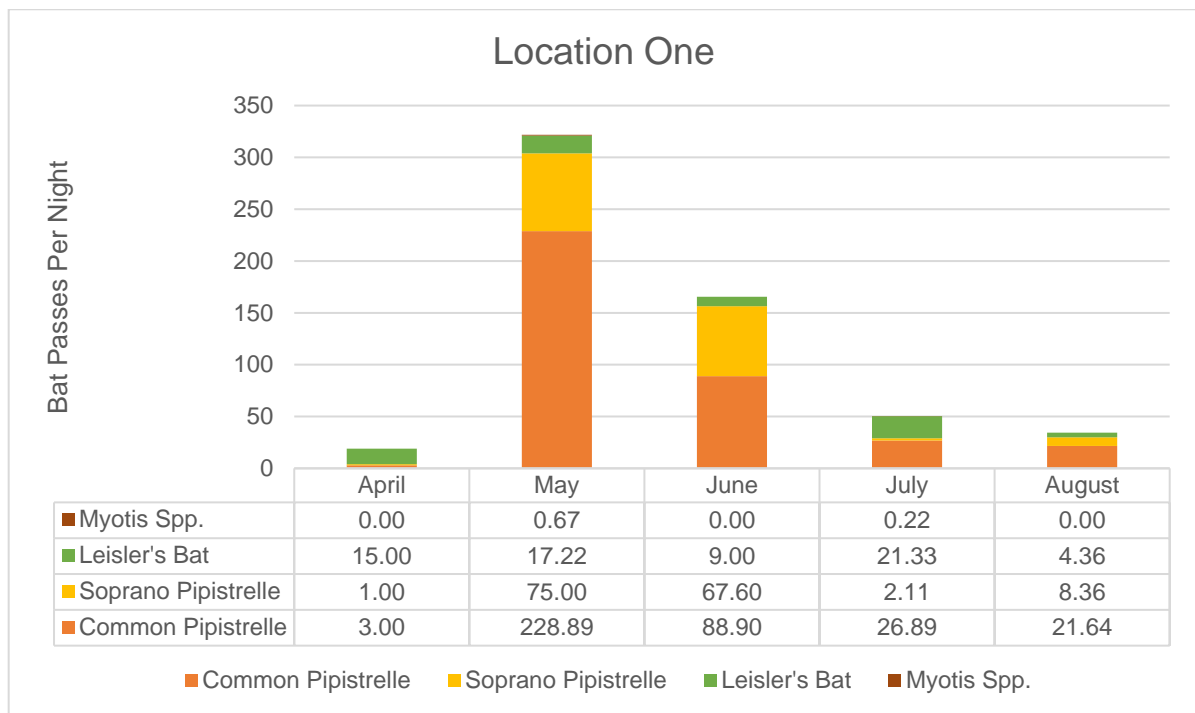


Figure I-1: Data Summary at Location One

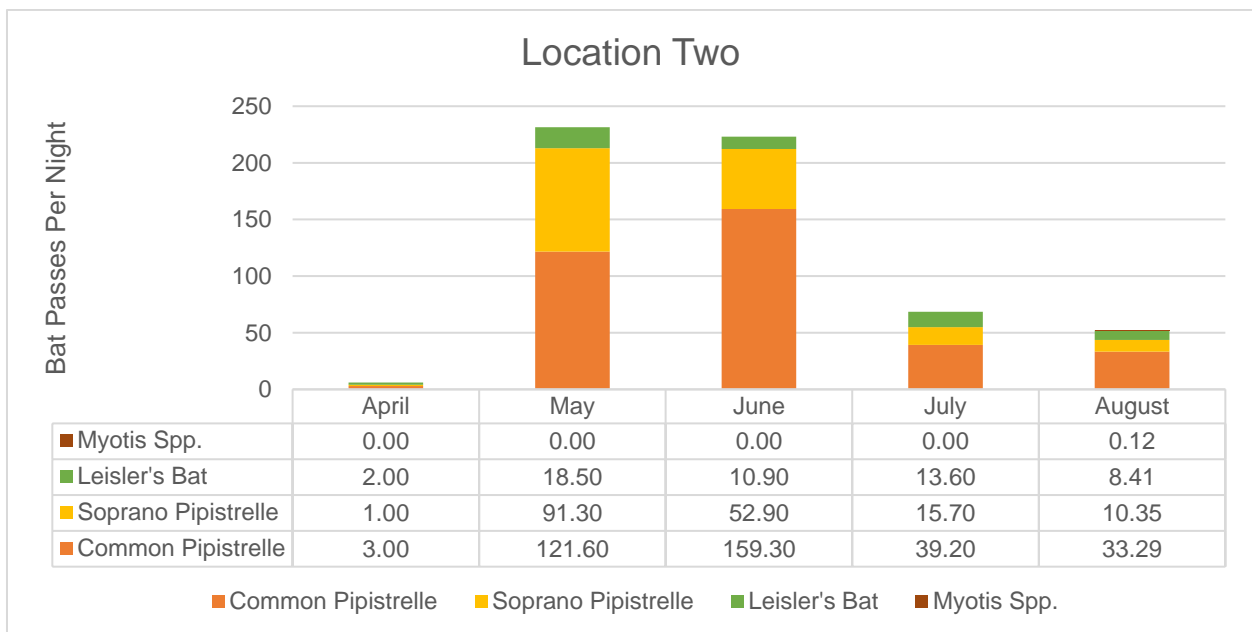


Figure I-2: Data Summary at Location Two

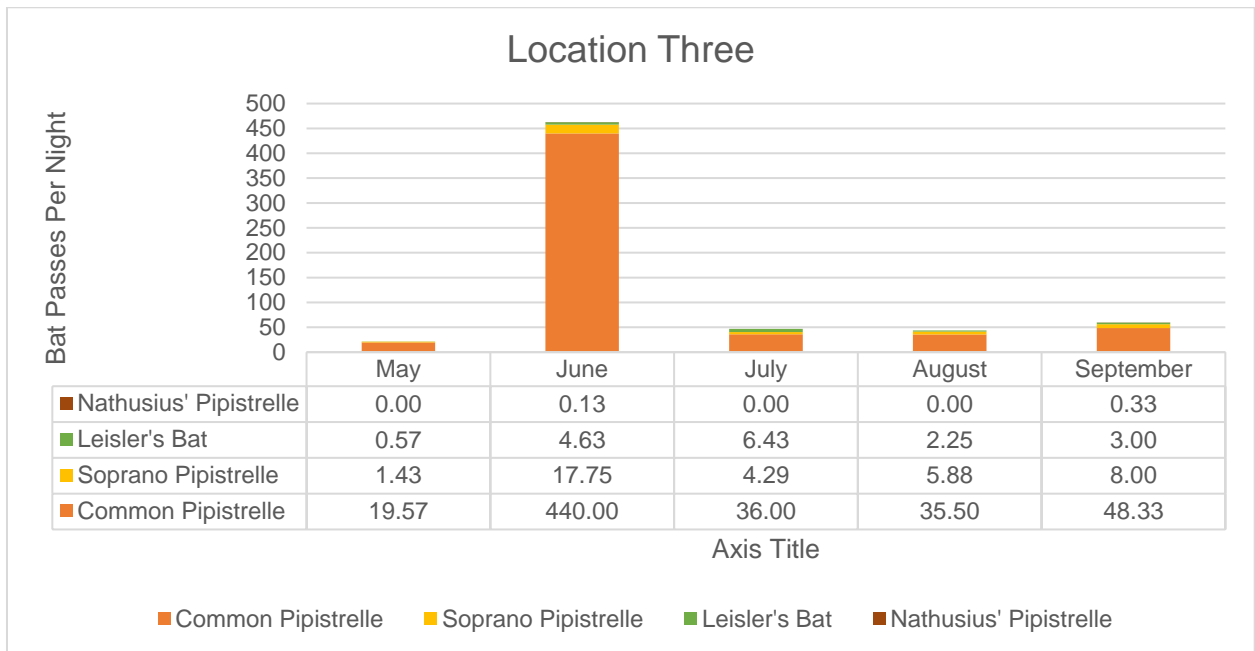


Figure I-3: Data Summary at Location Three

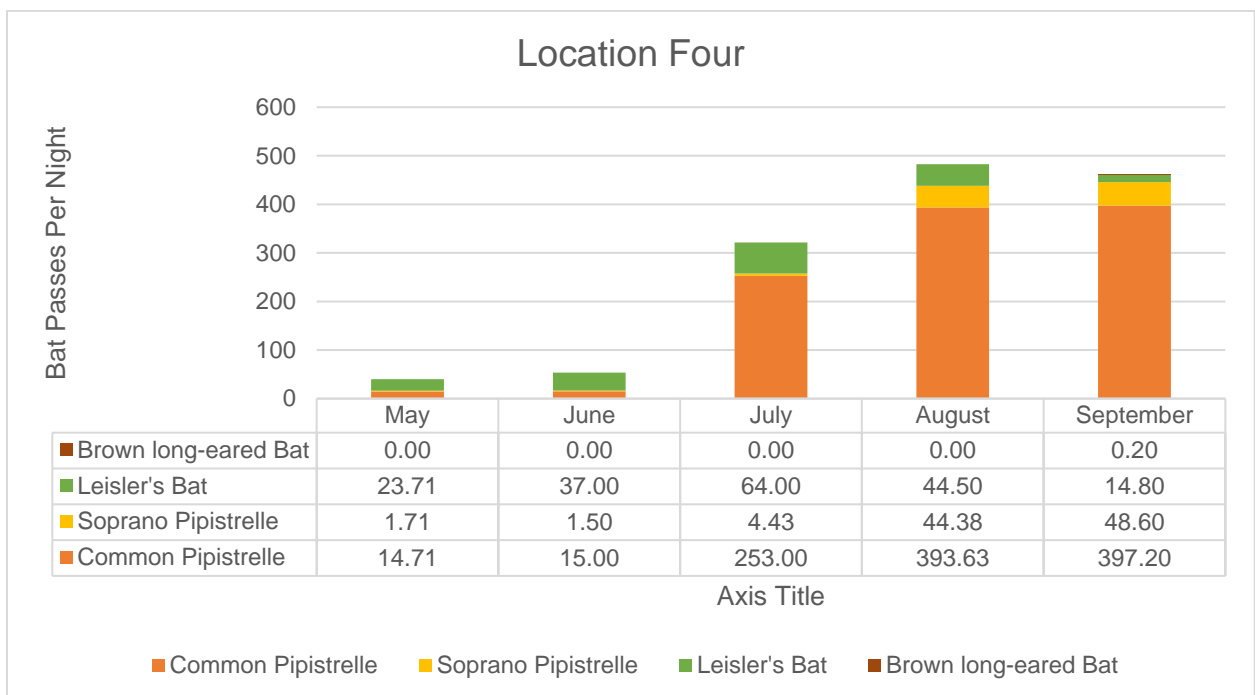


Figure I-4: Data Summary at Location Four

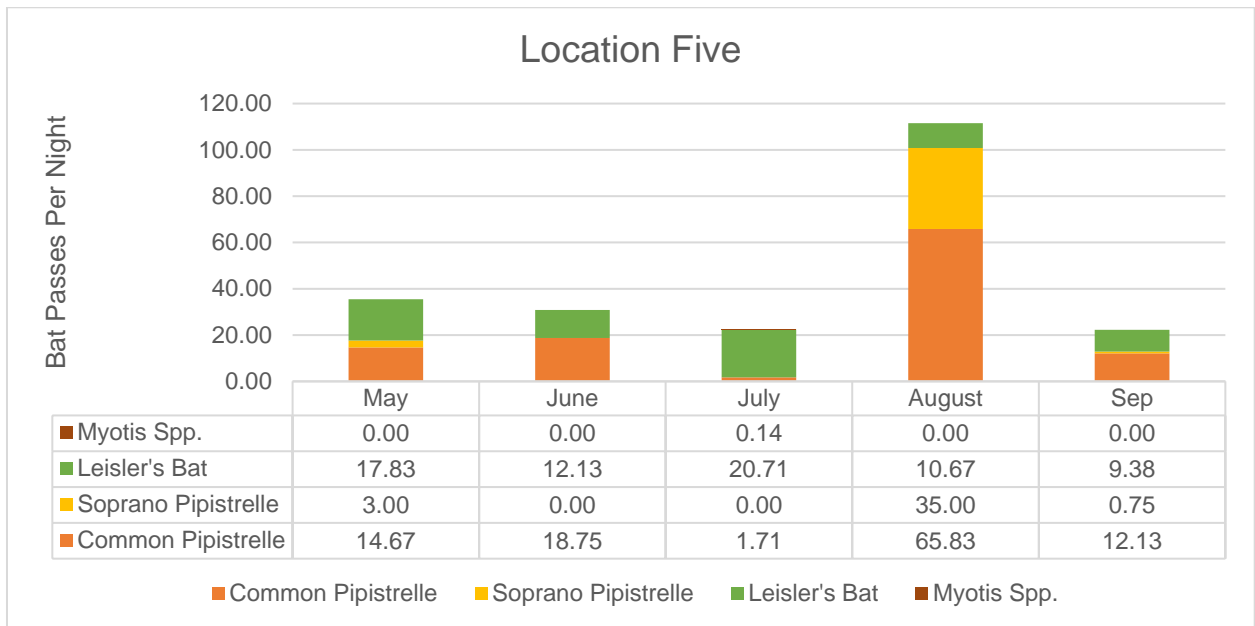


Figure I-5: Data Summary at Location Five

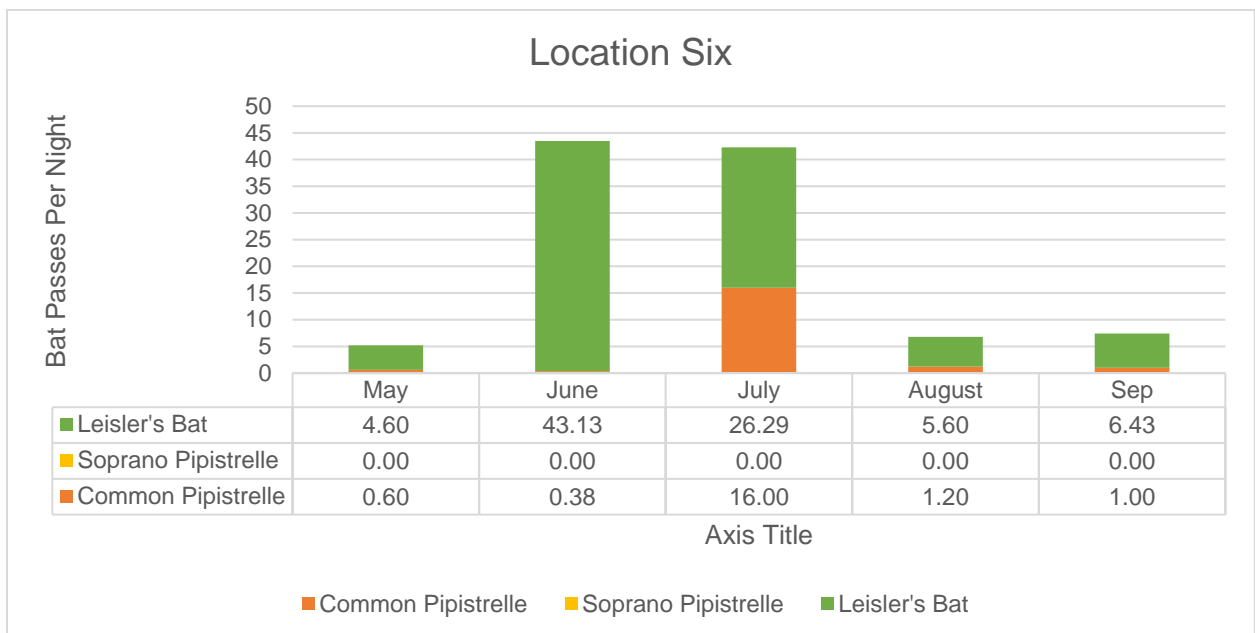


Figure I-6: Data Summary at Location Six

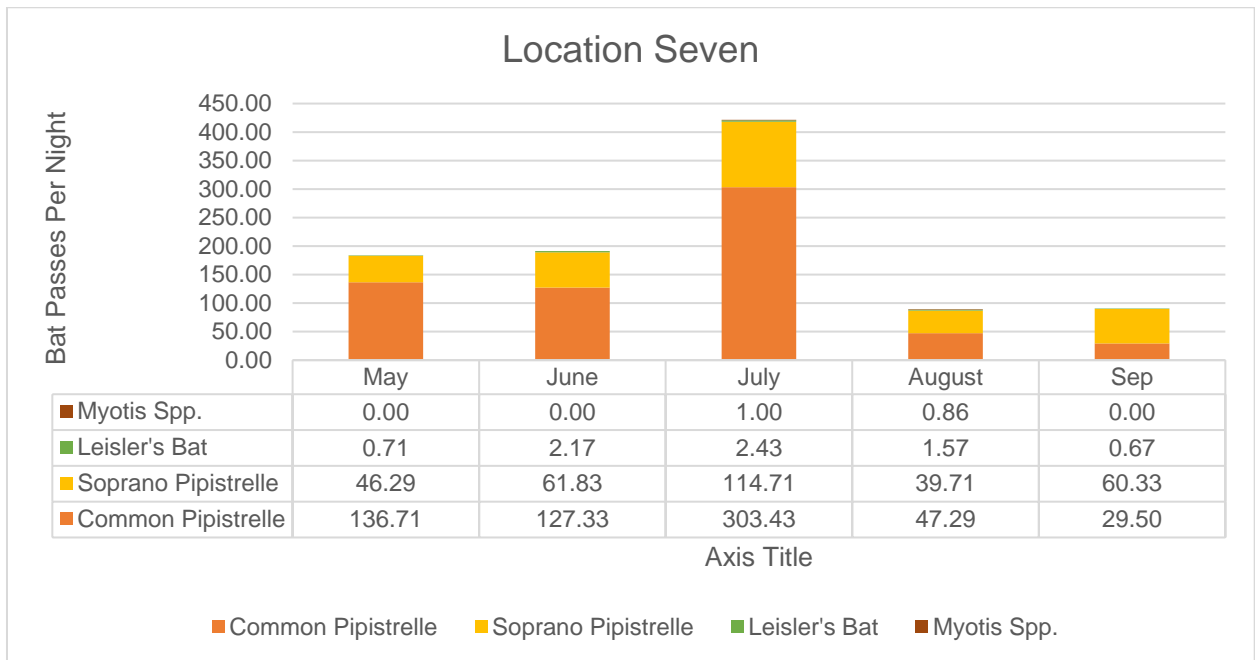


Figure I-7: Data Summary at Location Seven

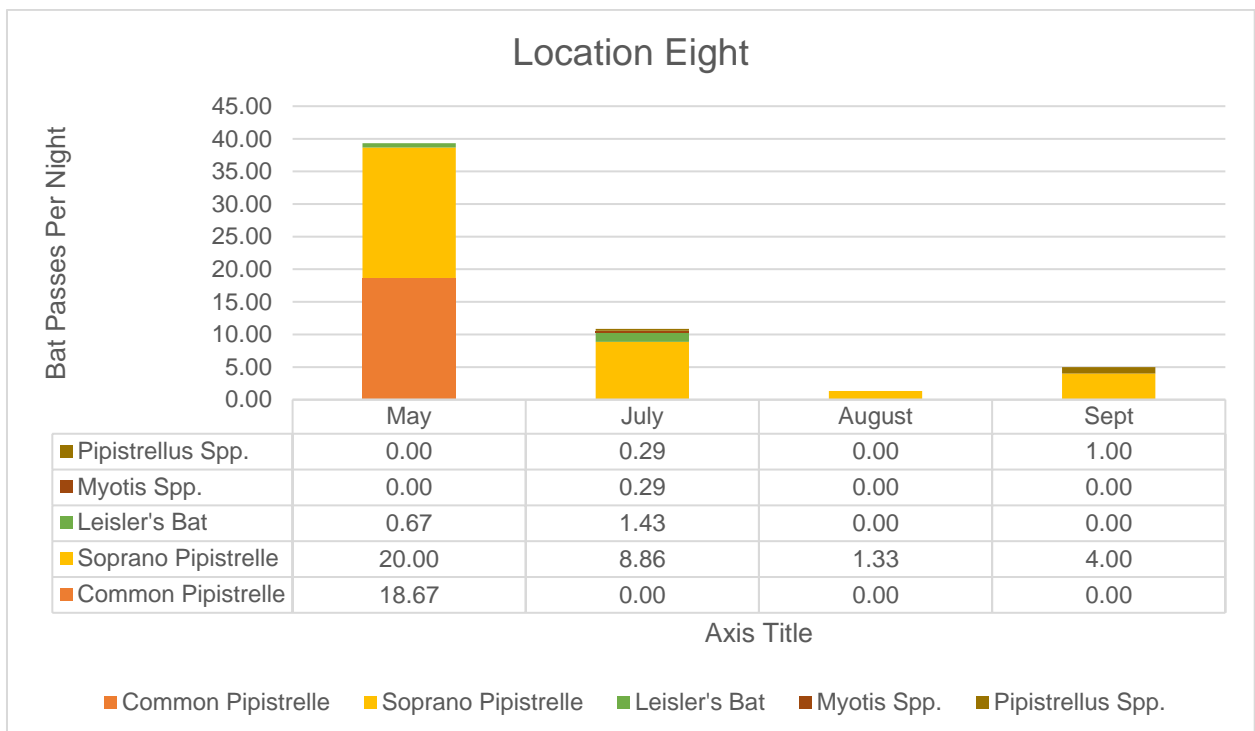


Figure I-8: Data Summary at Location Eight

Total Bat Passes Per Night 2021 Static Data

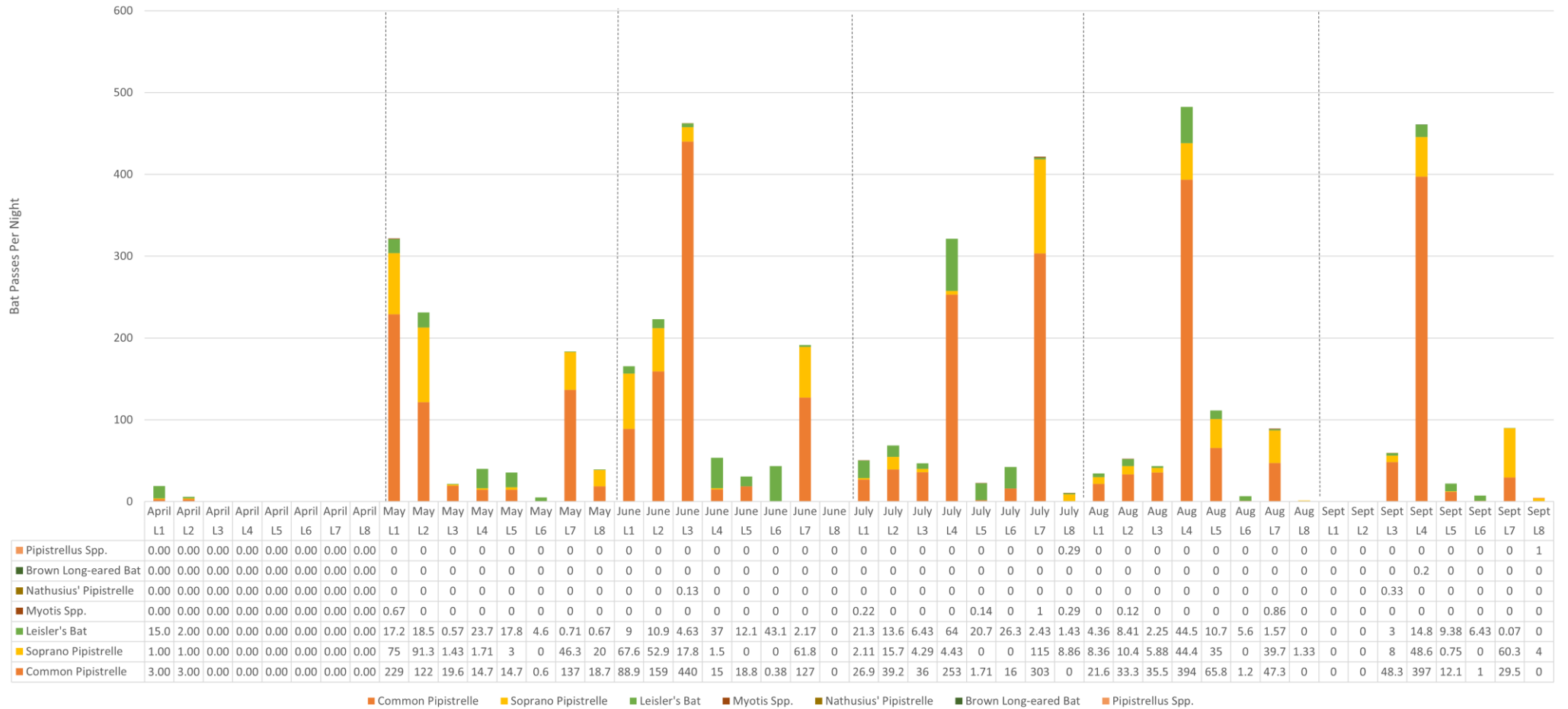


Figure I-9: Data Summary at All Locations

APPENDIX J Trees with Potential Bat Roosts along the Proposed Project Boundary 2022



Figure J-1 Trees with potential bat roosts along the Proposed Project Boundary 2022 (Overview)



Figure J-2 Trees with potential bat roosts along the Proposed Project Boundary 2022 (1)



Figure J-3 Trees with potential bat roosts along the Proposed Project Boundary 2022 (2)

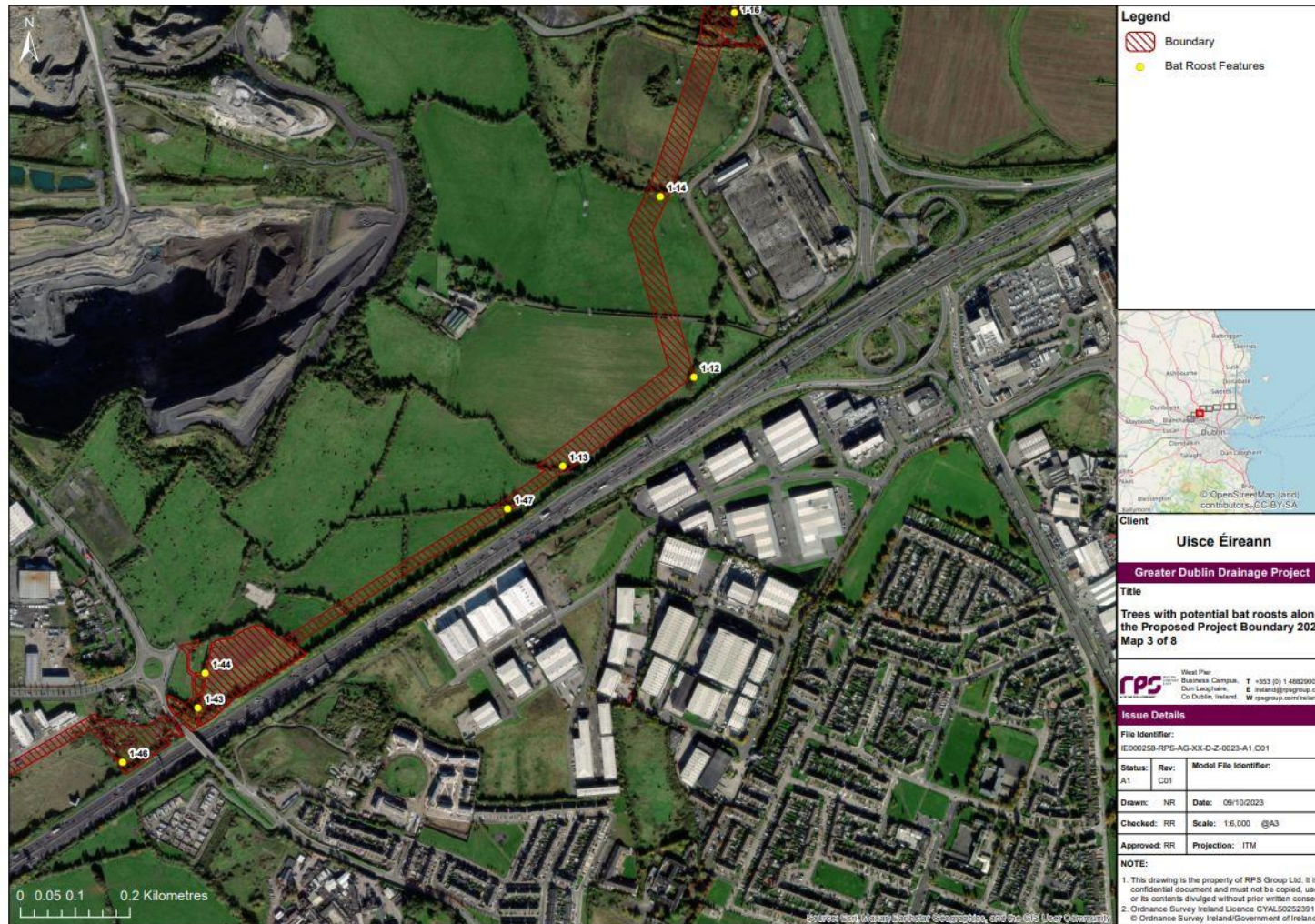


Figure J-4 Trees with potential bat roosts along the Proposed Project Boundary 2022 (3)



Figure J-5 Trees with potential bat roosts along the Proposed Project Boundary 2022 (4)



Figure J-6 Trees with potential bat roosts along the Proposed Project Boundary 2022 (5)



Figure J-7 Trees with potential bat roosts along the Proposed Project Boundary 2022 (6)





Figure J-8 Trees with potential bat roosts along the Proposed Project Boundary 2022 (7)






Figure J-9 Trees with potential bat roosts along the Proposed Project Boundary 2022 (8)

APPENDIX K Potential Bat Roost Features in Trees surveyed along the Proposed Project Boundary 2022

Table K-1 Potential bat roost features in trees surveyed along the Proposed Project Boundary

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
1-1	Unknown	708723.235 738612.905	Unknown tree with ivy  Partially detached ivy with stem diameter in excess of 50mm/Low	Low
1-2	Beech	708721.601 738628.796	Beech tree with ivy and knotholes.  Partially detached ivy with stem diameter in excess of 50mm/Low	Moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 835 1082 864">Knothole from shed branches/moderate</p>  <p data-bbox="655 1267 1082 1296">Knothole from shed branches/moderate</p> 	
1-3	Ash	708745.003 738620.579	Ash tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-4	Elm	708892.196 738648.815	<p>Elm with loads of small branches growing out of base. Knotholes present.</p> 	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low



Knothole from shed branches/low



Knothole from shed branches/low



Knothole from shed branches/low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-5	Cypress	708953.745 738644.751	Large cypress with ivy, knotholes, and horizontal cracks.	Moderate
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Partially detached ivy with stem diameter in excess of 50mm/Low



Knothole from shed branches/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
				
				
1-6	Unknown	708971.844 738642.317	Unknown tree with ivy and knotholes.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low



Knothole from shed branches/low



Knothole from shed branches/low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-7 Beech - dead 708989.625 738666.401

Dead tree with knothole and compression feature.

Moderate



Knothole from shed branches/moderate



Vertical crack/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-8 Unknown - dead 708994.273 738683.474

Dead tree with shed branches.

Low



Knothole from shed branches/low



Knothole from shed branches/low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-9 Beech - dead 708997.165 738688.253

Dead tree with knotholes.

Moderate



Knothole from shed branches/moderate



Knothole from shed branches/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-10	Horse chestnut	709075.763 738780.259	Horse chestnut with knot holes and compressed branches.	Low
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Knothole from shed branches/low



Gaps between overlapping stem or branch/low

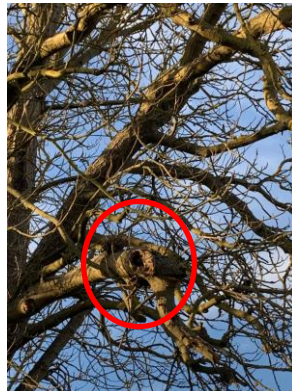
Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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1-11	Horse chestnut	709090.428 738772.264	Horse chestnut with knot holes.	Low
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Knothole from shed branches/low









Knothole from shed branches/low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 824 1015 853">Knothole from shed branches/low</p> 	
1-12	Ash	711888.103 740515.836	<p data-bbox="655 1249 839 1279">Ash tree with ivy.</p>  <p data-bbox="655 1675 1230 1736">Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-13	Ash	71 1647.943 740352.116	Ash tree with ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
1-14	Ash	711826.378 740845.95	Ash tree with ivy. 	Low
			Partially detached ivy with stem diameter in excess of 50mm/Low 	
1-15	Ash	711961.767 741199.863	Ash tree with vertical crack. 	Low
			Partially detached ivy with stem diameter in excess of 50mm/Low	

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-16	Ash	711961.499 741182.783	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
1-17	Oak	708355.072 738801.172	<p>Large oak. Horizontal cracks.</p>	Moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Horizontal crack/low</p>  <p>Horizontal crack/moderate</p> 	
1-18	Oak	708339.297 738834.582	Large oak with ivy. Horizontal cracks.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	
			 <p>Horizontal crack/low</p>	
				
1-19	Sycamore	708339.999 738855.1	Large sycamore with knothole and overlapping branches.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 835 1015 864">Knothole from shed branches/low</p>  <p data-bbox="655 1267 1155 1296">Gaps between overlapping stem or branch/low</p> 	
1-20	Sycamore	708286.206 738869.067	Massive tree with ivy and knotholes.	High

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low






Knothole from shed branches/high



Knothole from shed branches/high

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-21	Hawthorn	708559.228 738659.87	Hawthorn with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-22	Californian redwood	708677.196 738606.766	Redwood. Vertical cracks, overhanging branches.	Moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 845 860">Vertical crack/low</p>  <p data-bbox="655 1256 1098 1321">Cavity created by branch tearing out from stem/moderate</p> 	
1-23	Beech	708403.621 739085.686	Beech tree with knothole.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low









1-24	Ash	709200.694 738804.749	Large ash tree with ivy and a knothole.	Low
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Partially detached ivy with stem diameter in excess of 50mm/Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 1015 860">Knothole from shed branches/low</p> 	
1-25	Ash	709244.491 738869.01	<p data-bbox="655 1261 839 1290">Ash tree with ivy.</p>  <p data-bbox="655 1691 1230 1751">Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-26	Unknown	709249.358 738880.342	Unknown tree covered in ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
1-27	Unknown	709255.239 738864.465	Unknown tree covered in ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-28	Unknown	709262.798 738885.575	<p>Unknown tree covered in ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-29	Unknown	709272.579 738883.676	Unknown tree covered in ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
1-30	Unknown	709285.234 738870.727	Unknown tree covered in ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-31	Sycamore	709283.996 738870.78	<p>Large sycamore covered in ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-32	Sycamore	709299.429 738890.175	<p>Sycamore covered in ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
1-33	Sycamore	709292.043 738913.696	<p>Large sycamore covered in ivy.</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low



1-34	Unknown - dead	709486.8 739049.193	Large dead tree with knotholes.	Moderate
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Knothole from shed branches/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 1082 860">Knothole from shed branches/moderate</p>  <p data-bbox="655 1263 1082 1292">Knothole from shed branches/moderate</p> 	
1-35	Beech	709522.385 739051.374	Large beech with a knothole and two cavities.	Moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low



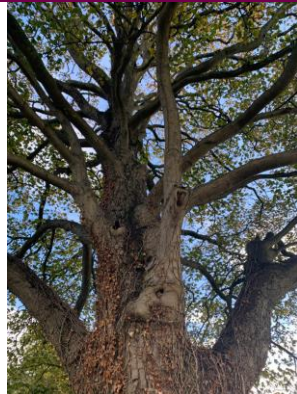
Cavity created by rot/moderate



Cavity created by rot/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-36	Horse chestnut	709618.976 739122.11	Horse chestnut with knothole.	Low
				
			Knothole from shed branches/low	
				
1-37	Sycamore	709472.722 739511.682	Sycamore with knotholes.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low









Knothole from shed branches/low









Knothole from shed branches/low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-38	Ash	709802.676	Huge ash tree covered in ivy with knotholes.	Low
		739621.771		
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
			Knothole from shed branches/low	




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 1013 860">Knothole from shed branches/low</p>	
				
1-39	Ash	709818.217 739675.257	Large ash tree covered in ivy.	Low
			 <p data-bbox="655 1680 1230 1740">Partially detached ivy with stem diameter in excess of 50mm/Low</p>	




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-40	Ash	712779.433 741674.335	Ash tree with ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
1-41	Ash	712774.762 741662.088	Ash tree with ivy.	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-42	Ash	712787.067 741689.054	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-43	Ash	710980.667 739908.856	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
1-44	Ash	710994.134 739972.998	<p>Ash tree with ivy.</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	
				
1-45	Unknown	712590.974 741697.542	Unknown tree with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-46	Unknown	710842.377 739810.309	Unknown tree with ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
1-47	Ash	711547.265 740273.314	Ash tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	
				
1-48	Beech	708253.013 738840.767	Beech tree with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-49	Unknown	708239.058 738843.562	Unknown tree with vertical crack.	Low
				
			Vertical crack/low	
				
1-50	Unknown	708204.05 738862.526	Unknown tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low






1-51	Horse chestnut	708203.203 738869.033	Beech tree with large knothole.	High
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Knothole from shed branches/high

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-52	Beech	708210.709 738872.959	Beech tree with ivy and knot hole.	Moderate
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
			Knothole from shed branches/moderate	

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
1-53	Unknown	708146.198 738914.862	Unknown tree with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
1-54	Beech	708247.291 738856.517	Beech tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low



2-1	Sycamore	713060.361 741650.219	Sycamore with knotholes	Moderate
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Knothole from shed branches/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/moderate



2-2	Ash	713749.997 741666.642	Ash tree covered in ivy with knot hole.	Low
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Partially detached ivy with stem diameter in excess of 50mm/Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low



2-3	Ash	713743.261 741677.742	Ash tree with knothole.	Moderate
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Knothole from shed branches/moderate

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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2-4 Ash 714131.305
741602.206

Ash tree with ivy.

Low






Partially detached ivy with stem diameter in excess of 50mm/Low









2-5 Ash 714135.7
741603.966




Ash tree with ivy.


Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
2-6	Ash	714160.295 741602.783	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-7	Ash	714182.271 741603.384	Ash tree with ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
2-8	Ash	714270.982 741606.763	Ash tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
2-9	Ash	714452.374 741599.787	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-10	Ash	714529.088 741559.162	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
2-11	Ash	714571.216 741535.419	<p>Sycamore with ivy.</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
2-12	Ash	714612.31 741528.468	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-13	Ash	714709.309 741606.557	Ash tree with ivy and a knothole.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
			Knothole from shed branches/low	

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-14	Ash	714726.299 741606.478	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
2-15	Canadian poplar	714898.519 741531.875	<p>Canadian poplar with ivy.</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Partially detached ivy with stem diameter in excess of 50mm/Low









2-16	Canadian poplar	714893.495 741525.172	Canadian poplar with ivy.	Low
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Partially detached ivy with stem diameter in excess of 50mm/Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-17	Unknown	714893.436 741514.247	Unknown tree covered in ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
2-18	Sycamore	715151.147 741546.708	Sycamore with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	
				
2-19	Sycamore	715197.59 741547.494	<p>Sycamore with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-20	Ash	719868.358 742219.734	<p>Ash tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
2-21	Ash	719910.903 742273.506	<p>Ash tree with knotholes.</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 1015 860">Knothole from shed branches/low</p>  <p data-bbox="655 1261 1015 1290">Knothole from shed branches/low.</p> 	
2-22	Ash	719952.172 742259.286	Ash tree with knotholes.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Knothole from shed branches/low



Knothole from shed branches/low



Knothole from shed branches/low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-23	Ash	719970.617 742266.818	Ash tree with knothole.	Low
				
			Knothole from shed branches/low	
				
2-24	Ash	716459.726 742031.535	Ash with overhanging branches.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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Gaps between overlapping stem or branch/low









2-25	Birch	717260.912 742207.632	Birch with knothole.	Low
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Knothole from shed branches/low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-26	Birch	717264.634 742206.958	<p>Birch with knothole.</p>  <p>Knothole from shed branches/low</p> 	Low
2-27	Unknown	717613.093 742145.631	<p>Unknown tree with ivy.</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
2-28	Ash	719681.161 742043.274	<p>Ash with vertical crack.</p>  <p>Vertical crack/low</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-29	Willow	719670.958 741991.324	Willow with big cavity.	Moderate
			 <p>Cavity created by rot/moderate</p>	
				
2-30	Ash	719689.246 742089.544	Ash tree with knothole.	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 831 1015 857">Knothole from shed branches/low</p> 	
2-31	Beech	719728.711 741827.101	<p data-bbox="655 1249 1015 1276">Beech tree with ivy and knothole.</p>  <p data-bbox="655 1677 1015 1704">Knothole from shed branches/low</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
2-32	Beech	719659.814 741830.538	Beech tree with knotholes.	Moderate
				
			Knothole from shed branches/low	
				
			Knothole from shed branches/moderate	




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p data-bbox="655 837 1082 869">Knothole from shed branches/moderate</p> 	
3-1	Unknown	721176.087 742821.024	<p data-bbox="655 1265 898 1296">Unknown tree with ivy.</p>  <p data-bbox="655 1697 1230 1756">Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
3-2	Poplar	721172.65 742821.267	<p>Poplar with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
3-3	Poplar	721083.268 742821.084	<p>Poplar with ivy.</p>	Low


Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
3-4	Poplar	721058.781 742822.136	<p>Poplar with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low



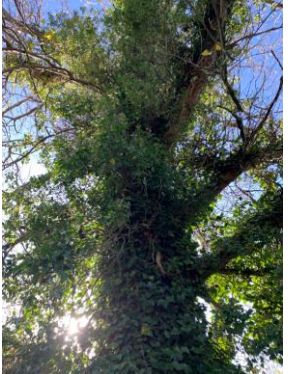
Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
3-5	Poplar	721014.742 742824.987	<p>Poplar with cavity from rot.</p>  <p>Cavity created by rot/low</p> 	Low
3-6	Sycamore	720884.556 742842.923	<p>Sycamore with ivy.</p>	Low




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	
				
3-7	Sycamore	720878.498 742844.023	Sycamore with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	




Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
3-8	Sycamore	720868.356 742843.527	Sycamore with ivy.	Low
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
3-9	Ash	720839.476 742842.894	Ash tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
3-10	Unknown	720817.609 742841.732	<p>Unknown tree with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
3-11	Unknown	720813.597 742843.304	Unknown tree with ivy.	Low
				
			Partially detached ivy with stem diameter in excess of 50mm/Low	
				
3-12	Unknown	720788.369 742839.605	Unknown tree with ivy.	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
3-13	Sycamore	721544.423 742812.399	<p>Sycamore with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p>	Low

Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
				
3-14	Poplar	721581.144 742887.75	<p>Poplar with ivy.</p>  <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	Low
3-15	Ash	722130.77 741953.924	<p>Ash tree with ivy.</p>	Low





Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
			 <p>Partially detached ivy with stem diameter in excess of 50mm/Low</p> 	
3-16	Ash	721838.954 742004.014	 <p>Ash tree with cavity in branch.</p> <p>Cavity created by rot/low</p>	Low



Map Code	Tree Species	Grid Reference (ITM)	Feature Description / Suitability	Overall Suitability
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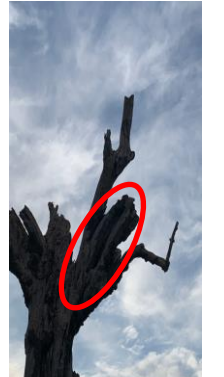




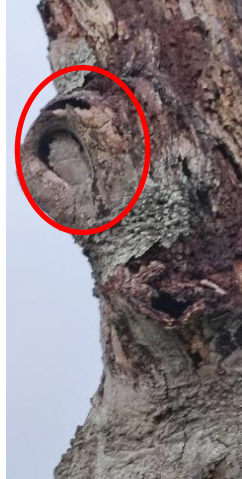





APPENDIX L TREE CLIMBING PRF INSPECTION SURVEY








Table L-1 Tree Climbing PRF Inspection Survey





Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-2	Beech	53.38662249	-6.36561428		Mature Beech Tree with ivy and large wound cavity and knotholes	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u> F3 – <u>Moderate</u>	Moderate F1 – <u>Low</u> F2 – <u>Moderate</u> F3 – <u>Low</u>		Dense Ivy – Limited Roosting Suitability.		East facing large wound cavity, with knothole feature at base, approx. 8m high on tree.		Knothole 4m high on tree. Limited Roosting Suitability		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.






Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-x	Lime	53.386577	-6.365871		Lime tree with burl feature at base	<u>Moderate</u>	<u>Low</u>		Small, shallow cavity approx. 1.2m high on burl feature with low dome apex. Relatively exposed to the elements.						Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.




Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-5	Cypress	53.386718	-6.362120582		Large Cypress Tree with Ivy knothole and horizontal cracks	Moderate F1 – <u>Low</u> F2 – <u>Moderate</u> F3 – <u>Moderate</u>	Low F1 – <u>Low</u> F2 – <u>Negligible</u> F3 – <u>Low</u>		Ivy – Limited Roosting Suitability		Knothole unsuitable upon inspection.		Hazzard Beam /horizontal Split – 5m high on tree. End of limb broken off, hole in roof of part of feature. Daylight visible above, and therefore it relatively exposed to rain.		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.
1	1-7	Beech	53.38690509	-6.361573987		Dead beech tree with large knothole and wound feature	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u> F3 – <u>Not Assessed</u>	Moderate F1 – <u>Moderate to Low</u> F2 – <u>Negligible</u> F3 – <u>Moderate</u>		Knothole 3m high on main stem, connected to larger feature 3. There is limited shelter inside, slightly exposed to the elements.		Wound cavity. Limb was rotten and has fallen off since ground level assessment – No longer suitable.		Wound/tear out approximately 4m high on main stem. 10cm deep, upward cavity, with small ram's horn cavity on left side. Second cavity at top of feature 25cm x 5cm full of debris.		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.




Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-9	Beech	53.38709983	-6.361453143		Dead beech tree with pruning cur PRF, breakage and vertical crack.	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u> F3 – <u>Not Assessed</u>	Moderate F1 – <u>Negligible</u> F2 – <u>Moderate</u> F3 – <u>Moderate</u>		Knothole Considered unsuitable upon inspection.		Knothole Rotten branch approx. 7m up travels around in 25cm, 13cm internal diameter, rough texture inside with lots of debris and webs, some smaller narrow cavities, slightly exposed.		Vertical crack on bark. Approximately 2-3m wide at widest part and 12cm deep. Sufficient room inside the cavity for a small number of bats.	Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.	
1	1-17	Oak	53.38824626	-6.371062654		Large oak. Horizontal cracks, transverse snap	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u>	Low F1 – <u>Low</u> F2 – <u>Low</u>		Horizontal crack. Old bird's nest present– lower part not suitable, shallow depression and exposed to wind. Upper part has limited space for a bat to shelter, however, it may be suitable for a single bat to roost in fair weather.		Horizontal crack / Transfer snap. Shallow, slightly exposed cavity – 6m high on tree. May have potential to support individual bats on a sporadic basis/in fair weather.			Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.	




Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
2	1-20	Sycamore	53.3888703	-6.372074212		Large sycamore with ivy and knotholes	High F1 – <u>Low</u> F2 – <u>High</u> F3 – <u>High</u>	Moderate F1 – <u>Low</u> F2 – <u>Moderate</u> F3 – <u>Low</u>		Ivy – limited Bat Roosting Suitability.		Storm break damage, 3.5m high stem. Cavity splits into 3 parts: (1) 20 cm deep, 5cm high (2) narrow opening, 30cm x 30cm, exposed, dry inside – frass (3) small internal transverse snap.		Knothole -very exposed, wet/flooded at base, 60cm external entrance height, 40cm external width, Internal depth 25cm, 30cm width, mildew, rotten wood.		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.
2	1-22	Californian Redwood	53.3864372	-6.366289095		Californian Redwood. Raised/lifting bark cavities, and compression type groove in bark under overhanging limb.	Moderate F1 – <u>Low</u> F2 – <u>Moderate</u>	Moderate F1 – <u>Moderate</u> F2 – <u>Negligible</u>		Vertical crack/low All under 2m bark plate cavities from 10 – 25cm – moderate. There are other smaller cavities on all aspects of tree, considered to have Low Bat Roosting Suitability.		unsuitable upon close inspection.				Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.



Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-34	Beech	53.39024099	-6.353970711		Large Dead beech tree with knotholes	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u> F3 – <u>Moderate</u>	Negligible F1 – <u>Negilible</u> F2 – <u>Negilible</u> F3 – <u>Negilible</u>		Knothole – not suitable upon inspection		No cavity present – not suitable		Knothole-downward facing cavity – not suitable upon inspection		No actions required.



Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-35	Beech	53.39025321	-6.353435219		Large twin stemmed beech with knotholes, rot cavities and crack.	Moderate F1 – <u>Low</u> F2- <u>Moderate</u> F3 – <u>Moderate</u> F4 – <u>Not Assessed</u> F5 – <u>Not Assessed</u> F6 – <u>Not Assessed</u>	High F1 – <u>Low</u> F2- <u>Moderate/High</u> F3 – <u>Moderate/High</u> F4 – <u>High</u> F5- <u>Moderate</u> F6- <u>High</u>		Knothole 9m high on main lower single stem. 12cm tall x 10cm wide, bracket fungus inside, wet, internal depth 13cm, exposed to weather.		5m high, east facing, bracket fungus, partially damp, 12cm wide x 15cm tall depth 15cm internal upwards cavity travels approximately 40cm – debris inside.		Large cavity, south facing cavity, rotting leading into a canker feature lower down, >1m– non uniform in shape, partially damp inside, rough texture, cavity travels into heartwood of tree.		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present. Other PRFs- Feature 5 – Vertical crack Approx. 8m high on one of two stems, 90cm long, 2-3cm wide which leads into a narrow cavity. Active honeybee nest present at time of survey. Feature 6- wound cavity above Feature 5. Entrance height 25cm, entrance width 7cm, internal height 80cm, depth 25cm. Three knotholes located at 13m, 11m, and 10m were inspected and found to be unsuitable.





Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
	1-51	Horse Chestnut	53.388887	-6.373321507		Horse chestnut tree with knot hole and wound.	High F1 – <u>High</u> F2 – <u>Not Assessed</u>	Negligible F1 – <u>Negligible</u> F2 – <u>Negligible</u>		Large Knot hole 5m high. Upon close inspection it is considered unsuitable.		Wound 10 m high. Upon close inspection it is considered unsuitable due to insufficient cavity size and exposure to the elements.				No actions required.

Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
1	1-52	Beech	53.38892073	-6.373207361		Beech tree with ivy and knothole	Moderate F1 – <u>Low</u> F2 – <u>Moderate</u>	High F1 – <u>Low</u> F2 – <u>High</u>		Ivy – limited Roosting Suitability.		Knothole 6m high, external diameter 10cm, depth approx. 75cm, width 35cm, 80cm high, damp ground, dry inside, various sections, dome apex.				Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.

Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
2	2-1	Sycamore	53.41285313	-6.299339517		Sycamore with knotholes.	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u>	Moderate F1 – <u>Moderate</u> F2 – <u>Moderate</u>		Knothole 4m high on tree, 4cm deep, 10cm wide x 8cm high, damp and rough inside.		Knothole 4.5m high on tree, 6cm deep, diameter 12cm x 10cm high, damp and rough inside.				Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.

Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
2	2-3	Ash	53.41295368	-6.289062384		Ash tree with knothole	<u>Moderate</u>	<u>Moderate</u>		<p>Knothole approximately 1.3m high.</p> <p>Cavity depth 40cm x 5cm x 5cm, travels horizontally into the stem, dirty and damp inside.</p>						Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.

Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
2	2-29	Ash	53.41446004	-6.199825465		Ash with large cavity at the base	<u>Moderate</u>	<u>Low</u>		Limb has broken off near base of tree (approx. 30cm high), large limb tear out, limited places for bats to shelter inside, very exposed and at high risk to predation.						Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.

Section	Tree No.	Tree Species	Grid Ref		Tree Photo	Tree	Ground Level Roost Assessment	Roost Suitability after Tree Climbing PRF Inspection	Feature 1	Notes	Feature 2	Notes	Feature 3	Notes	Feature 4	Comments
			X	Y												
2	2-32	Beech	53.41301832	-6.200054018		Beech tree with knotholes.	Moderate F1 – <u>Low</u> F2 – Moderate F3 – <u>Moderate</u>	Low F1 – <u>Low</u> F2 - <u>Negligible</u> F3 – <u>Negligible</u>		Wound/limb breakage 4m high. Small cavity in bottom corner of larger feature. External 5cm x 5cm – depth 13cm, dry inside.		Knothole considered unsuitable upon close inspection.		Knothole considered unsuitable upon close inspection		Prior to felling, an inspection must be carried out by a licenced ecologist to ensure that there are no roosting bats present.

APPENDIX M Smooth Newt Survey Locations 2021

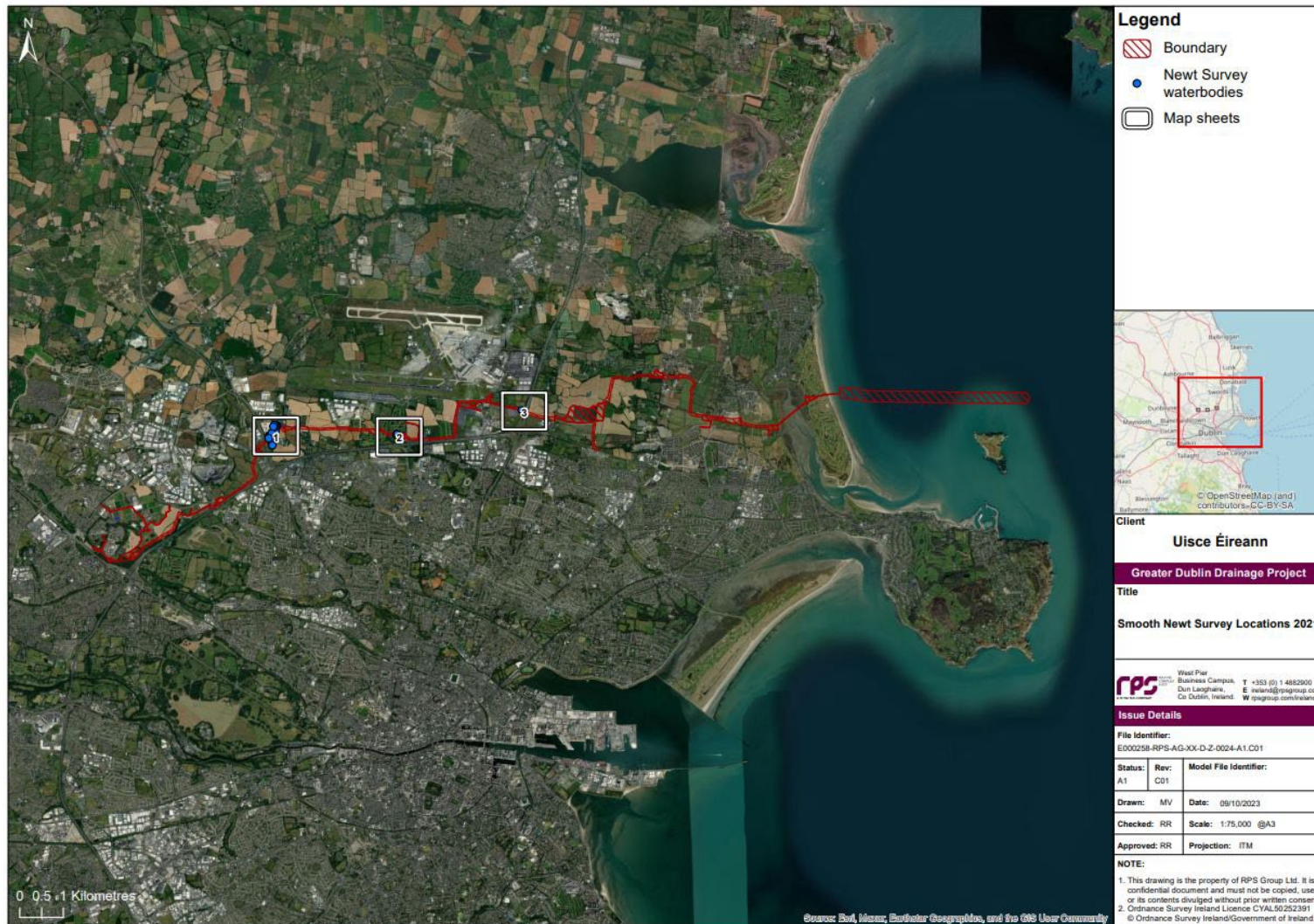


Figure M-1 Smooth Newt survey locations 2021 (Overview)



Figure M-2 Smooth Newt survey locations 2021 (1)



Figure M-3 Smooth Newt survey locations 2021 (2)



Figure M-4 Smooth Newt survey locations 2021 (3)

Appendix N

Smooth Newt survey 2023

SMOOTH NEWT SURVEY REPORT

Greater Dublin Drainage Project



NI1350 Greater Dublin
Drainage Project
Smooth Newt survey
A01
June 2023

REPORT

Document status

Status	Revision	Purpose of document	Authored by	Reviewed by	Approved by	Review date
draft	D01	PM review	DMC	JMC	JMC	14.06.2023
Issued	A01	Client review	DMC	JMC	JMC	16.06.2023

Approval for issue

JMC

19 June 2023

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Prepared by:

RPS

Prepared for:

Uisce Éireann

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Appendix I.....

Smooth Newt Survey Licence

1 INTRODUCTION

During Extended Phase 1 Habitat Surveys along the proposed Greater Dublin Drainage (GDD) Project route, several semi-natural and artificial water bodies were recorded considered having the potential to support breeding smooth newt *Lisotriton vulgaris*. Surveys were initially undertaken, under wildlife licences obtained from NPWS, in 2015, 2017 and 2021.

The most recent survey was undertaken in the months April and May 2023, again under terms of a wildlife disturbance licence issued by NPWS.

This report presents details of the results of the 2023 surveys and should be read with the following appendices, figures, and references:

- Appendix 1: Survey Licence [Ref: C124/2021]
- Figure 3.1: Site locations
- Figure 3.2: Site 1 waterbodies and indication of proposed wayleave
- Figure 3.3: Site 2 waterbodies and indication of proposed wayleave
- Figure 3.4: Site 3 waterbodies and indication of proposed wayleave
- RPS 2015 Smooth Newt Survey
- RPS 2017 Smooth Newt Survey
- RPS 2021 Smooth Newt Survey

1.1 Statement of Authority

The lead surveyor, licence holder and report author is David McCormick. David is a Senior Ecologist with RPS. He holds a BSc (Hons) in Physical Geography and English Studies and an MSc in Ecological Management and Conservation Biology. He has over eleven years' experience of ecological field survey including peatland and wetland habitats, mammal, amphibian, and invertebrate survey and is a protected species license holder. David is an associate member of the Chartered Institute of Ecology and Environmental Management (ACIEEM).

The supporting surveyor is James McCrory. James is a Technical Director of Ecology with RPS. He holds a BA (Hons) in Natural Sciences (Mod) Botany and a MSc in Habitat Creation and Management. James is a Chartered Environmentalist (CEnv), a Chartered Ecologist (CEcol) and a Chartered Biologist (CBiol) and a full member of CIEEM (MCIEEM) and the Royal Society of Biology (MRSB). He is a former member of the CIEEM Policy Review Group in Ireland and the CIEEM technical committee updating the Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. He currently sits on the CIEEM Technical Working Group for EclA accreditation across the Institutes practitioner network.

This report has been approved for issue by James McCrory.

The information prepared and provided is true and accurate at the time of issue of the report and has been prepared and provided in accordance with the CIEEM Code of Professional Conduct (CIEEM, 2022) and BS 42020:2013 Biodiversity - Code of Practice for Planning and Development (BSI, 2013). We confirm that

REPORT

the professional judgement expressed herein is the true and bona fide opinion of our professional ecologists.

2 SMOOTH NEWT ECOLOGY AND STATUS

There are three species of amphibians found in Ireland: the smooth newt *Lissotriton vulgaris*; the common frog *Rana temporaria* and the natterjack toad *Epidalea calamita*. The current distribution of the natterjack toad is restricted to Counties Kerry and Wexford (Beebee, 2002).

2.1 Smooth Newt

Smooth newts can be found in a diversity of terrestrial and aquatic habitats including uplands, woodlands, marshland, farmland, open moorland, and urban areas. They are also widespread in agricultural lowlands (O'Neil *et al.*, 2004). Smooth newts hibernate on land during the winter months (under logs, hedgerows, or other well-hidden sites), returning to wetlands sites to breed in February and March, remaining there until June (O'Neil *et al.*, 2004; Inns, 2009). Breeding habitats are also variable, but typically include waterbodies with still or very slow-flowing water and range from large lakes to small and medium ponds and densely weeded ditched (O'Neil *et al.*, 2004; Meehan, 2013). Generally, newts are more likely to be found in ponds (non-linear) than ditches (linear), with small ponds (<200m²) between 0.5-1.0m deep and partly vegetated being the ideal breeding habitat for smooth newts (O'Neil *et al.*, 2004).

Recent Irish Wildlife Trust (IWT) surveys (2010 - 2014) produced records of smooth newt from bogland pools and drains, with some sites sustaining several individuals. They conclude 'the suitability of Irish boglands for smooth newt requires further investigation as the numbers of such bogland records, collected to date by IWT, do not offer enough evidence to agree or disagree with the 'bogland avoidance' theory' (Meehan, 2013:p14). Previously, it was assumed that smooth newts in Ireland tend to avoid boglands due to unsuitable pH related factors (Meehan, 2013).

Courting, mating, and egg-laying occur both day and night during the breeding season March - June (Inns, 2009). Females conceal each of their several hundred eggs individually in the folds of broad-leaved vegetation in or near the water using their hind feet. The eggs take two weeks to hatch and are often rarely seen in the field. Larvae are solitary and secretive remaining near the waterbody bottom to avoid predation by birds and mammals. They develop slowly with the majority emerging between July and September (Inns, 2009). During the breeding season, males are distinguished from females based on the presence of a conspicuous dorsal crest and heavily and darkly spotted throat (Inns, 2009).

2.2 Factors Likely to Affect Newt Presence

As outlined above, newts are found in a wide diversity of habitats. Garden ponds have also become extremely important for this species as ponds in the countryside have become fewer and more polluted (NIMARS website, 2015). Due to the broad habitat preference, it remains difficult to predict the likelihood of their occurrence on habitat alone (O'Neill *et al.*, 2004).

Excluding habitat, the key factors affecting newt presence appear to be the presence of fish, frogs, and carnivorous birds. Suitable refuges are also important. Logs or tree stumps appear to be a highly significant factor in site preference (O'Neill *et al.*, 2004), whilst the increasing percentage cover of submerged vegetation is associated with the declining probability of newt presence (O'Neil *et al.*, 2004). Smooth newts will co-habit with the common frog and will predate tadpoles as a source of food. The presence of frogs may, therefore, be positively correlated with newt presence. In contrast, fish predate newt eggs and larvae, so their presence is likely to be inversely correlated with newt presence. However, newts have been

recorded in lakes which contain fish. One theory explaining their presence in lakes is that they use dense vegetation such as reed canary-grass *Phalaris arundinacea* and bulrush *Typha latifolia* around lake margins to act as a refuge from predating fish (Meehan, 2013).

Carnivorous birds found in water may also predate newt larvae, and so may decrease the probability of newts occurring at a site where they occur.

2.3 Legislative Protection

Smooth newts are protected in Ireland under Schedule 5 of the Wildlife Act, 1976. The species is also afforded additional protection under Appendix III of the Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention).

3 SURVEY METHODOLOGY

The methodology used primarily follows techniques for smooth newt survey outlined by the NRA (2008) and NIEA (2017). Additional guidance was gathered from Inns (2009), the Newt Survey of Northern Ireland (O'Neill *et al.*, 2004) and the National Newt Survey of Ireland (Buckley, 2012).

Three locations listed in **Table 3.1** were surveyed. Smooth newts were recorded at Site 1 in 2015, 2017 and 2021. Smooth newts were not recorded in Sites 2 and 3 (Ballymun and Toberbunny respectively) in any year.

The site locations are presented in **Figure 3.1** (overview map), **Figure 3.2** (Site 1), **Figure 3.3** (Site 2) and **Figure 3.4** (Site 3).

Table 3.1: Survey Locations

Site no.	Location	No of waterbodies	Description
1	Coldwinters	20	A mixture shallow depressions with deeper pools or ponds
2	Ballymun	8	One large, interconnected waterbody (variable depths) with seven aligned smaller pools (old foundation works) adjacent
3	Toberbunny	4	One shallow depression and 3 drainage ditches

The peak number of breeding adults within suitable waterbodies occurs between late-March and late-May. Surveys can be undertaken until late June, after which NPWS will not issue licences to conduct surveys.

Waterbodies were visited on three separate occasions in the months April and May, during which a two-pronged survey approach was undertaken: (a) dip netting and (b) torchlight surveys.

Netting to confirm the presence of newts is undertaken by ecologists using long-handled dip nets, walking the perimeter of waterbodies to net adults. This technique was conducted during dusk/twilight conditions and if a waterbody was found to contain newts, netting was ceased.

Dip-netting was not undertaken in all instances. For example, where a pool or drainage ditches was shallow or too densely vegetated netting wasn't appropriate. Excess disturbance, particular to sediments had on occasion lead to poor visibility during subsequent torchlight surveys. In this latest 2023 survey netting ceased entirely on all but one occasion. Torchlight survey only was considered most effective.

Dip-netting was followed by a torchlight survey during the hours of darkness, which involves slowly walking the perimeter of each waterbody with a powerful hand torch to locate, identify and record newts within waterbodies, typically to observe individuals swimming to the surface to take gulps of air. Torchlight surveys were undertaken using rechargeable torches. Any newts encountered were sexed where identifiable. Unsexed adults and juveniles were recorded as 'unsexed'.

Weather conditions can influence the results of newt surveys, with newt activity considered to drop considerably below 5°C and with rainfall and wind decreasing water clarity, surveys should not be conducted in these conditions.

REPORT

For each waterbody surveyed the following information was collected:

- Presence of fish, frogs, and birds.
- The number of individual newts identified in each waterbody.

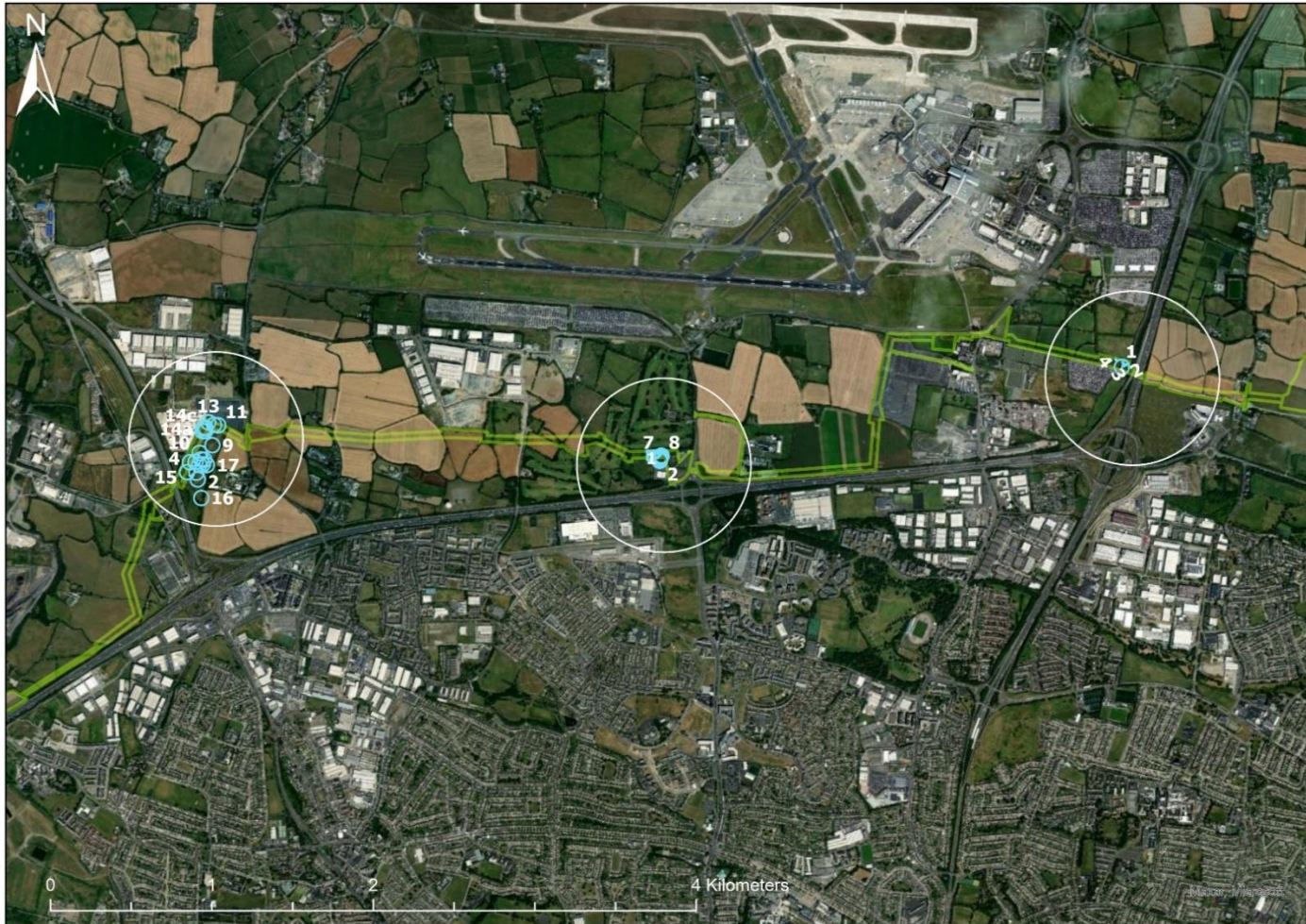


Figure 3.1: Site 1, Site 2 and Site 3 Locations – Overview Map



Figure 3.2: Site 1 waterbodies and indication of proposed wayleave



Figure 3.3: Site 2 waterbodies and indication of proposed wayleave



Figure 3.4: Site 3 waterbodies and indication of proposed wayleave

4 SMOOTH NEWT SURVEY RESULTS

This section details notable observations from each surveyed waterbody. All survey visits were undertaken in suitable conditions, with no visits made in ambient air temperatures below 5°C. It is desirable survey does not take place during rainfall. Results of the smooth newt surveys, undertaken in line with the methodology described in section 3 are set out below. A brief site summary precedes the results. **Table 4.1** presents survey dates and weather conditions.

Prior to the survey, a “Licence to Capture Protected Wild Animals for Educational, Scientific or Other Purposes” was obtained from NPWS Wildlife Licensing Unit (Licence No: C117/2023). A copy of the licence is provided in Appendix I.

Table 4.1: Survey dates, approximate times, and survey conditions

Date	Site no.	Site name	Netting		Torching		Weather conditions
			Start time	End time	Start time	End time	
20.04.23	3	Tobberbunny	n/a	n/a	21.30	21.40	Temp 10°C, calm, cloud cover 0/10
	2	Ballymun	n/a	n/a	20.30	21.05	Temp 10°C, calm, cloud cover 0/10
	1	Coldwinters	19.30	20.10	22.00	23.32	Temp 09°C, calm, cloud cover 0/10
03.05.23	3	Tobberbunny	n/a	n/a	21.17	21.28	Temp 10°C, calm, cloud cover 10/10, no rain
	2	Ballymun	n/a	n/a	21.45	22.14	Temp 8°C, calm, cloud cover 10/10, no rain
	1	Coldwinters	n/a	n/a	22.35	23.45	Temp 9°C, breezy, cloud cover 10/10, no rain
17.05.23	3	Tobberbunny	n/a	n/a	21.30	21.46	Temp 13°C, calm, cloud cover 10/10, no rain
	2	Ballymun	n/a	n/a	22.03	22.50	Temp 13°C, calm, cloud cover 10/10, no rain
	1	Coldwinters	n/a	n/a	23.05	00.25	Temp 12°C, calm, cloud cover 0/10, no rain

4.1 Site 1 - Coldwinters

The site (circa 8.8ha) (**Figure 3.2**) consists entirely of worked spoil and rubble presumably all from nearby road development. The site best resembles the habitat 'Recolonising bare ground (ED3)' described in Fossitt (2000). Many hollows and/or depressions created by these works have evolved into permanent and seasonal waterbodies, some with established flora including emergent, floating, and submerged macrophytes as well as a diverse array of freshwater invertebrate species. Photos of each of the individual waterbodies described below are found in the 2015 survey report (RPS, 2015).

Of the 16 waterbodies identified on this site, waterbody 1 almost certainly retains water year-round. The site has been grazed by horses, but this grazing was not authorised. The site was overgrazed in 2015 and 2017 with evidence of supplementary feeding. Smooth newt was present in several of these waterbodies in 2015, 2017 and 2021.

In 2023, a number of additional water-filled depressions or pools were noted in the vicinity of waterbody 14. As such, waterbody 14 was transposed into four broadly separate waterbodies namely 14a, 14b, 14c and 14d. An additional water-filled depression namely waterbody 17 was also noted and subject to survey. The

REPORT

site continues to be grazed by several horses. The sward is uniformly short thus lacking structure and flowering is likely restricted. There was supplementary feeding taking place southeast of waterbody 11.

4.1.1 Results - 2023

Results are a listed in **Table 4.2** below.

20 April 2023

Eighteen of the twenty waterbodies supported water. Waterbodies 2 and 10 were dry. Newts were recorded in five waterbodies; numbers 1, 3, 4, 6, 7, 11, 12 and 14a. Waterbody 1 recorded the highest score of twenty-four. Some netting took place but was discontinued.

03 May 2023

Waterbodies 2, 3, 10, 13 were dry. Newts were recorded in waterbodies 1, 4, 6, 7, 12 and 15. Numbers in waterbody 1 were exceptionally high; forty in total. Survey was by torching only. There was a high abundance of tadpoles in waterbody 11.

26 May 2021

Newts were recorded in waterbodies 1, 8, 9, 14a, 14c and 15. Waterbodies 2, 3, 10 and 13 were dry. Newts were recorded in waterbody 9 for the first time.

Just two juveniles were recorded in waterbody 1. Horses had been drinking in the pond, dispersing fine sediment. Vision was significantly reduced. Survey was by torching only.

Table 4.2: Waterbodies surveyed at Coldwinters 2023

Date	Waterbody	Male	Female	Unsexed / Juvenile	Total
20.04.23	1	.3	21	-	24
	2	-	-	-	-
	3	-	1	-	1
	4	-	3	-	3
	5	-	-	-	-
	6	-	1	-	1
	7	-	1	-	1
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	1	-	1
	12	-	2	-	2
	13	-	-	-	-
	14a	-	1	-	1
	14b	-	-	-	-
	14c	-	-	-	-
	14d	-	-	-	-
15	-	-	-	-	
16	-	-	-	-	

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Date	Waterbody	Male	Female	Unsexed / Juvenile	Total
	17	-	-	-	-
03.05.23	1	4	36	-	40
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	1	1
	5	-	-	-	-
	6	-	2	1	3
	7	-	-	1	1
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
	11	-	-	-	-
	12	-	3	-	3
	13	-	-	-	-
	14a	-	-	-	-
	14b	-	-	-	-
	14c	-	-	-	-
	14d	-	-	-	-
15	-	-	1	1	
16	-	-	-	-	
17	-	-	-	-	
17.05.23	1	-	-	2	2
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	1	-	1
	9	-	1	-	1
	10	-	-	-	-
	11	-	-	-	-
	12	-	-	-	-
	13	-	-	-	-
	14a	1	3	-	4
	14b	-	-	-	-
	14c	-	-	1	1
	14d	-	-	-	-
15	-	-	1	1	
16	-	-	-	-	
17	-	-	-	-	

4.2 Site 2 - Ballymun

This site (**Figure 3.3**) has similarities with Site 1. These ponds have also evolved from past disturbance / construction works on what is now an abandoned site. Construction had begun on a large structure here, but these works were abandoned. These consist of foundations with steel mesh and concrete. The main pond (Waterbody 1) is more accurately a series of interconnected pools and deeper ponds. The other 7 ponds are an alignment of foundation works with only seasonal water.

An array of emergent, floating and submerged aquatic plants have established in the succeeding years along with a diverse invertebrate fauna evidenced again by the array of insect larvae as well as adult damsel and dragonflies.

The habitat was formerly recolonising bare ground (ED3) but is now a grassland. There is no active management. The site was found to be negative for the presence of smooth newt (torchlight and netting) in 2015, 2017 and 2021. Photos of each of the individual waterbodies described below are found in the 2015 survey report.

4.2.1 Results - 2023

20 April 2023

Survey was torching only. No newts were recorded.

03 May 2023

Survey was torching only. No newts were recorded.

17 May 2023

Survey was torching only. No newts were recorded.

4.3 Site 3 - Toberbunny

This enclosed site (**Figure 3.4**) is a Surface Water Monitoring Location adjacent to the long stay (Red) car park at Dublin Airport, east of Dardistown Cemetery. It consisted of a small pool beneath some willows along with 3 drainage ditches. The drainage ditches were already heavily vegetated since the initial 2015 survey.

In 2015, the wider habitat was described as recolonising bare ground (ED3) but it is now well vegetated. The site is disadvantaged by its proximity to large carpark along with road and motorway to the south and east. Previous surveys noted evidence of hydrocarbons on water surfaces.

Smooth newt was not recorded in 2015, 2017 or 2021.

4.3.1 Results - 2023

Typically, this site dries out relatively quickly but on this occasion there was water present on all three visits.

20 April 2023

Survey was torching only. No newts were recorded.

03 May 2023

REPORT

Survey was torching only. No newts were recorded.

17 May 2023

Survey was torching only. No newts were recorded.

5 SUMMARY AND CONCLUSIONS

Smooth newts were recorded at Site 1 - Coldwinters only. Results of this most recent 2023 survey are again consistent with previous survey findings in that no smooth newts were recorded at sites 2 or 3.

This survey report does not include prescriptive measures to comprehensively mitigate the negative ecological effects of development on this protected species. It serves to inform an associated ecological impact assessment as part of an EIAR.

NRA (2008) provides the following guidance on mitigation, compensation, and enhancement:

“In those situations where capturing and relocating important newt populations is considered appropriate, breeding ponds should be encircled by drift fencing and pitfall traps prior to the spring migration period, and newts captured on their way to breed. Netting and draining-down of ponds should also take place to remove as many of the remainder as possible.

Where large populations of newts are found close to the proposed works, amphibian-proof fencing can be helpful in protecting the resident animals. Permanent fencing can also be used to guide newts to purpose-built tunnels and other safe crossing structures, although their effectiveness for newts remains largely unknown.”

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Appendix I

Smooth Newt Survey Licence



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreacht
Department of Housing,
Local Government and Heritage

Licence No. C 117/2023

NATIONAL PARKS & WILDLIFE SERVICE

Wildlife Acts 1976 to 2018 – Sections 23 and 34

**LICENCE TO CAPTURE PROTECTED WILD ANIMALS FOR EDUCATIONAL, SCIENTIFIC
OR OTHER PURPOSES**

The Minister for Housing, Local Government and Heritage in exercise of the powers conferred on him by Sections 9, 23 and 34 of the Wildlife Acts 1976 to 2018 authorises:

David McCormick of Elmwood House, 74 Boucher Road, Belfast, BT12 6RZ

To disturb specimens of the species specified in Column 1 of the Schedule hereunder in the area specified in Column 2 by the means specified in column 3 for scientific, educational or other purposes during the period beginning on **19 April 2023** and ending on **31 May 2023** subject to the conditions listed overleaf.

SCHEDULE

1	2	3
Species	Area	Means of capture
Smooth Newt (<i>Lissotriton vulgaris</i>)	The townlands of Coldwinters, Ballymun, Toberbunny in North Co. Dublin	Dip netting – catch and release using a long handled net

Dated 19 April 2023

For the Minister for Housing, Local Government and Heritage

Conditions

1. This licence shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or any person appointed by the Minister for Housing, Local Government and Heritage under Section 72 of the Wildlife Acts 1976 to 2018, to be an authorised person for the purposes of the Acts.
2. The local NPWS District Conservation Officer or Conservation Ranger must be contacted prior to the activity commencing under the terms of this licence. Please contact Bridget.Sheerin@npws.gov.ie
3. Newts should be returned to where they were caught after minimum necessary holding time.
4. Licensees are encouraged to submit all amphibian and reptiles records to the National Biodiversity Data Centre.
5. **On expiry of this licence a return stating the work carried out must be provided to the National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, 90 North King Street, Dublin 7, D07 N7CV, email wildlifelicence@npws.gov.ie. Any subsequent applications for a Section 23 & 34 licence will be judged against the full, proper and timely submission of returns under the licence. (A 'Nil' return should be submitted if applicable.)**
6. Any query in relation to this licence should be addressed to National Parks and Wildlife Service, 90 North King Street, Dublin 7, D07 N7CV or email at wildlifelicence@npws.gov.ie.

Note: This licence does not confer right of entry onto any lands.

APPENDIX O Aquatic Survey Locations 2021



Figure O-1 Aquatic survey locations 2021 (Overview)



Figure O-2 Aquatic survey locations 2021 (1)



Figure O-3 Aquatic survey locations 2021 (2)



Figure O-4 Aquatic survey locations 2021 (3)

APPENDIX P Aquatic Survey of the Proposed Boundary 2021

Table P-1 Evidence of Aquatic Invertebrates and Fish Recorded During the Field Surveys

Waterbody	Results Description
Location 1a- Tolka River	A macroinvertebrate sample was not possible due to the river channels being underground at the sports council.
Location 1b – Downstream of Abbotstown Bridge - Tolka_040	<p>This stretch of the Tolka_040 river is 12m wide and approx. 60cm in depth, with heavy siltation. The stream is very slow flowing. It is bordered by broadleaved woodland with abundant scrub habitat, mostly to the south, and scrub/amenity grassland to the immediate northwest moving into built up areas.</p> <p>The riparian vegetation on the left and right banks consists of broadleaved trees/scrub. Riparian vegetation included: sycamore (<i>Acer pseudoplatanus</i>), alder (<i>Alnus glutinosa</i>), nettles (<i>Urtica dioica</i>), ivy (<i>Hedera hibernica</i>), laurel, and a variety of grasses. Instream habitat was riffle (10%) and glide (90%). Aquatic vegetation consisted of a layer of filamentous algae (25%).</p> <p>The macroinvertebrate sample recorded 10 taxa altogether with Class C taxa (moderately pollution tolerant) forming most of the sample (five taxa). Three Class D taxa were recorded, one in low numbers (<i>Lymnaeidae</i>), one common throughout the sample (<i>Hirudinea</i>), and one numerous (<i>Asellus</i> sp.). One Class E taxa was recorded in low numbers (<i>Tubificidae</i>), and one Class B taxa was recorded in low numbers (<i>Leptoceridae</i>). No single taxon was dominant. No Class A taxa were recorded. A Q2-3 was assigned (moderate).</p> <p>The site may be a suitable habitat for salmon and lamprey spawning as even though there was heavy siltation, there is a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide present, although 90% was glide. It was assigned a rating of 'Fair'.</p> <p>For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe. The heavy siltation conditions are not representative of juvenile salmonid habitat, however, a number of juvenile salmonids were observed, therefore the location was assigned a rating of 'Fair'.</p> <p>The site may suitable habitat for a lamprey nursery as there is slow flow, the presence of silt in the margins, and good water depth (60cm). It was assigned a rating of 'Fair'</p> <p>The site may be a suitable habitat for adult lamprey as even though the flow is slow, there are no barriers to migration, there is instream vegetation, and undercut banks with sand and silt present. It was assigned a rating of 'Fair'</p> <p>No crayfish were present within the kick sample. With instream boulders and cobbles, over hanging banks, aquatic vegetation and detritus, there is suitable crayfish habitat available. A habitat rating of 'Fair' was assigned.</p> <p>The results of the aquatic survey at this location are summarised in Table M-2.</p>
Location 1c – Upstream of Abbotstown Bridge	<p>This stretch of the Tolka_040 river is 8m wide and approx. 10-30cm in depth, with heavy siltation. The stream has moderate flow. It is bordered by broadleaved woodland with abundant scrub habitat, mostly to the north and northwest, and the N3 runs to its south with an access road to the east.</p> <p>The riparian vegetation on the left and right banks consists of broadleaved trees/scrub. Riparian vegetation included: sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), beech (<i>Fagus sylvatica</i>), brambles (<i>Rubus fruticosus</i>), ivy (<i>Hedera hibernica</i>), and laurel. Instream habitat was riffle (75%), glide (20%), and pool (5%). Aquatic vegetation consisted of a layer of green and white/cream-coloured filamentous algae (30%). The substrate was dominated by coarse substrate with cobble comprising ca. 50% of the grain size fraction.</p> <p>The macroinvertebrate sample recorded 14 taxa altogether with Class C taxa (moderately pollution tolerant) forming most of the sample. Three Class B taxa were recorded in in low numbers (<i>Baetidae</i> sp. (<i>B.muticus</i>), <i>Ephemerellidae</i> (<i>S. ignita</i>), & <i>Leptoceridae</i>). Two Class D taxa were recorded, one in low numbers (<i>Hirudinea</i>), and one common throughout the sample (<i>Asellus</i> sp.). One Class E taxa was recorded in low numbers (<i>Tubificidae</i> sp.). No single taxon was dominant. No Class A taxa were recorded. A Q2-3 was assigned (moderate).</p>

Waterbody	Results Description
	<p>The site may be a suitable habitat for salmon and lamprey spawning as even though there was heavy siltation, there is a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide/pool present. It was assigned a rating of 'Fair'.</p> <p>For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe. The heavy siltation conditions are not representative of juvenile salmonid habitat, however, due to suitable cover, moderate flowing water and coarse substrate, the location was assigned a rating of 'Fair'.</p> <p>The site may be suitable habitat for a lamprey nursery as although the flow is moderate, the silt was present in the margins, and there was a good water depth (10-30cm). Therefore, this location was assigned a rating of 'Fair'</p> <p>The site may be a suitable habitat for adult lamprey as the flow is moderate, there are no barriers to migration, there is instream vegetation, and undercut banks with sand and silt present. It was assigned a rating of 'Fair'</p> <p>No crayfish were present within the kick sample. With instream boulders and cobbles, over hanging banks, aquatic vegetation and detritus, there is suitable crayfish habitat available. A habitat rating of 'Fair' was assigned.</p> <p>The results of the aquatic survey at this location are summarised in Table M-3.</p>
<p>Location 2 – Santry River (Sillogue golf course)</p>	<p>This stretch of the Santry_010 river is 2m wide and approx. 5cm in depth, with heavy siltation. The stream is very slow flowing to stagnant. It is bordered by arable land to the west, and improved agricultural grassland to the east.</p> <p>The right bank is steep, and tree dominated. The left bank is flatter, and scrub dominated. Riparian vegetation included: sycamore (<i>Acer pseudoplatanus</i>), beech (<i>Fagus sylvatica</i>), elder (<i>Sambucus nigra</i>), hawthorn (<i>Crataegus monogyna</i>), ivy (<i>Hedera hibernica</i>), and common hogweed (<i>Heracleum sphondylium</i>). Instream habitat was riffle (10%), glide (80%), and pool (10%). Aquatic vegetation consisted of some filamentous algae (2%). The substrate consisted of a mixture of coarse and fine material with 45% of the grain size fraction comprising cobble and 20% comprising silt.</p> <p>The macroinvertebrate sample recorded 7 taxa altogether with Class C taxa (moderately pollution tolerant) forming most of the sample. One Class B taxon was recorded in low numbers namely the cased caddis fly <i>Hydroptilidae</i>. An empty cased caddisfly case was recorded, as was a single <i>Polycentropodidae</i> individual. These were not included in the Q value assessment. One Class D taxon was recorded in low numbers (<i>Hirudinea</i>). No single taxon was dominant. No Class A or E taxa were recorded. A Q2-3 was assigned (moderate) and this corresponds with quality for this location in 2017.</p> <p>The site may be a suitable habitat for salmon and lamprey spawning as there is a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide/pool present, although most was glide (80%). However, due to was heavy siltation, extremely low flow, and barriers such as concrete blocks and debris, it was assigned a rating of 'Poor-Fair'.</p> <p>For juvenile salmonids, some overhanging vegetation was present along with cobbles. Dissolved oxygen levels could not be measured at the time due to a faulty probe. The heavy siltation conditions are not representative of juvenile salmonid habitat, and, although there was some suitable cover, slow to stagnant flowing water means the location was assigned a rating of 'Poor'</p> <p>This is not a suitable habitat for lamprey nursery due to the stagnant nature of the flow over the silty deposits within the stream and low water depth (5-10cm). Therefore, this location was given a rating of 'Poor'.</p> <p>This habitat is not suited to adult lamprey as there is a low flow, and a barrier to migration with the presence of concrete blocks and debris. Additionally, there are no suitable hiding places. The channel was straightened but not recently. Therefore, this location was given a rating of 'Poor'</p> <p>No crayfish were present within the kick sample. With over hanging banks, aquatic vegetation and leaf litter, there is some suitable crayfish habitat available. However, due to cobbles</p>

Waterbody	Results Description
	<p>dominating the substrate and water depth being 0.1-0.5cm a habitat rating of 'Poor-Fair' was assigned.</p> <p>The results of the aquatic survey at this location are summarised in Table M-4.</p>
Location 3 – Mayne_10	<p>A macroinvertebrate sample was not possible due to the absence of the watercourse. Only a dry drainage ditch remains. There is no potential for salmonids, lamprey or crayfish at any life stage at the site surveyed and habitat rating of None was assigned. The second sample point was not accessible.</p>
Location 4 – Mayne_010 (Stockhole lane)	<p>This stretch of the Mayne_010 river is 3.5m wide and approx. 5cm in depth, with heavy siltation. The stream is stagnant. It is bordered by tilled land to the south and north.</p> <p>The right bank consists of a 2m buffer into the tilled land. The left bank consists of a treeline/hedgerow. Riparian vegetation on the left bank was dominated by sycamore (<i>Acer pseudoplatanus</i>), and hawthorn (<i>Crataegus monogyna</i>), and also included willow (<i>Salix</i> sp.), ash (<i>Fraxinus excelsior</i>), brambles (<i>Rubus fruticosus</i>) thistles, ivy (<i>Hedera hibernica</i>), and nettles (<i>Urtica dioica</i>). Instream habitat was glide (100%). Aquatic vegetation consisted of some filamentous algae (10%) on the cobbles in sections.</p> <p>The macroinvertebrate sample recorded 6 taxa altogether with Class C taxa (moderately pollution tolerant) forming most of the sample. Two Class D taxa were also recorded, one in low numbers (<i>Hirudinea</i> sp.), and one numerous (<i>Asellus</i> sp.). No single taxon was dominant. No Class A, B or E taxa were recorded. A Q2-3 was assigned (moderate) and this corresponds with quality for this location in 2017.</p> <p>The site may be a suitable habitat for salmon and lamprey spawning as even though there was heavy siltation, there is a mixture of suitable substrate (coarse/gravel/cobble). However, instream habitats were near 100% glide, and the flow was extremely low. It was assigned a rating of 'Poor-Fair'.</p> <p>For juvenile salmonids, some overhanging vegetation was present along with some coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe. The heavy siltation conditions are not representative of juvenile salmonid habitat, and the extremely low flow mean the location was assigned a rating of 'Poor-Fair'.</p> <p>This is not a suitable habitat for a lamprey nursery due to the absence of areas with slow flow/backwater and shallow water depth (5cm). There were some areas of deposited silt/mud. It was given a rating of 'None-Poor'.</p> <p>This habitat is not suited to adult lamprey as there is a low flow, and there are no suitable hiding places. The channel was straightened but not recently. Therefore, this location was given a rating of 'None-Poor'.</p> <p>No crayfish were present within the kick sample. With some instream boulders and cobbles, little over hanging banks, and flooded tree roots at heavy rainfall events, there is some suitable crayfish habitat available. A habitat rating of 'Poor-Fair' was assigned.</p> <p>The results of the aquatic survey at this location are summarised in Table M-5.</p>
Location 5 – Mayne River	<p>This stretch of the Mayne_010 river is 2m wide and approx. 5-10cm in depth, with heavy siltation. The stream is slow moving. It is bordered by scrub to the east and an access road to the west with scrubland after that. The access road runs to the north and southeast.</p> <p>There are steep bankside buffers approx. 5m wide, with heavy scrub. Riparian vegetation on the right bank was primarily ivy (<i>Hedera hibernica</i>), and sycamore (<i>Acer pseudoplatanus</i>). Ash (<i>Fraxinus excelsior</i>), and bramble (<i>Rubus fruticosus</i>) was also present. The left bank was more bare ground with bramble (<i>Rubus fruticosus</i>) and ash (<i>Fraxinus excelsior</i>) present. Instream habitat was riffle (30%), and glide (70%). No aquatic vegetation was noted.</p> <p>The macroinvertebrate sample recorded 5 taxa altogether with Class C taxa (moderately pollution tolerant) forming most of the sample. Two Class D taxa were also recorded, in low numbers (<i>Hirudinea</i> sp.), and one numerous (<i>Asellus</i> sp.). One Class E taxa was recorded in low numbers (<i>Tubificidae</i> sp.). No single taxon was dominant. No Class A or B taxa were recorded. A Q3 was</p>

Waterbody	Results Description
	<p>assigned (moderate). The quality for this location was Q2 in 2017, therefore there has been an improvement in quality since then.</p> <p>The site may be a suitable habitat for salmon and lamprey spawning as even though there was heavy siltation, there is a mixture of suitable substrate (coarse/gravel/cobble) with instream habitats of riffle/glide present. It was assigned a rating of 'Fair'.</p> <p>For juvenile salmonids, some overhanging and in-stream vegetation was present along with some large rocks and coarse substrates. Dissolved oxygen levels could not be measured at the time due to a faulty probe. The heavy siltation conditions and slow flow are not representative of juvenile salmonid habitat, however, due to suitable cover, and coarse substrate, the location was assigned a rating of 'Fair'.</p> <p>The site may suitable habitat for a lamprey nursery due to the presence of silt in the margins, and some instream debris. However, due to the extremely low flow it was assigned a rating of 'Poor-Fair'</p> <p>The site may be a suitable habitat for adult lamprey as even though the flow is slow, there are no barriers to migration and there is some instream vegetation and undercut banks with silt present. It was assigned a rating of 'Poor-Fair'</p> <p>No crayfish were present within the kick sample. With some instream boulders and many cobbles, siltation gathering along banksides, aquatic vegetation and detritus, there is some suitable crayfish habitat available. A habitat rating of Fair was assigned.</p> <p>The results of the aquatic survey at this location are summarised in Table M-6.</p>

Table P-2 Location 1b – Downstream of Abbotstown Bridge

Site name	ITM	Q-value	Invasive sp.	Land use
Location 1b – Downstream of Abbotstown Bridge	708671.358, 738527.738	2-3	None	Broadleaf woodland. Scrub habitat. Suburban.

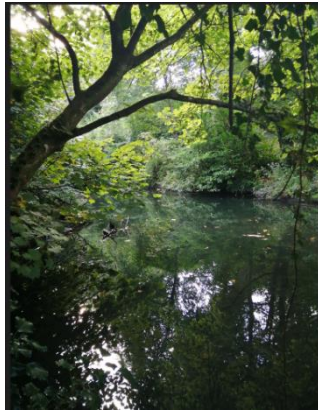


Image 1 Location 1b (a)



Image 2 Location 1b (b)

Taxa	Group	Abundance
<i>Asellus sp.</i>	Group D	Numerous
<i>Chironomidae spp.</i>	Group C	Numerous
<i>Hirudinea</i>	Group D	Common
<i>Lymnaeidae</i>	Group D	Few
<i>Rhyacophilidae</i>	Group C	Few
<i>Tipulidae</i>	Group C	Few
<i>Tubificidae</i>	Group E	Few
<i>Gammaridae sp.</i>	Group C	Few
<i>Hydropsychidae</i>	Group C	Few
<i>Leptoceridae</i>	Group B	Few
Salmonids	Spawning: Fair Juveniles: Fair	
Lamprey	Spawning: Fair Nursery Habitat: Fair	
Crayfish	Habitat: Fair 0 CPUE, No crayfish found in kick sample.	
Comment	Very organic substrate, strong smell, black at margins. Algae present.	
Instream parameters	Dissolved Oxygen	n/a Probe malfunction n/a Probe malfunction
	Temp	15°C
	Conductivity	810 µs
	Total Dissolved Solids	392 ppm
	pH	8.6

Table P-3 Location 1c – Upstream of Abbotstown Bridge

Site name	ITM	Q-value	Invasive sp.	Land use
Location 1c – Upstream of Abbotstown Bridge	708480.725, 738566.793	2-3	None	Broadleaf woodland. Scrub habitat. Suburban.



Image 3 Location 1c (a)



Image 4 Location 1c (b)

Taxa	Group	Abundance
<i>Chironomidae spp.</i>	Group C	Numerous
<i>Baetidae spp. (B.rhodani)</i>	Group C	Common
<i>Asellus sp.</i>	Group D	Common
<i>Rhyacophilidae (Trichoptera)</i>	Group C	Few
<i>Hydropsychidae (Trichoptera)</i>	Group C	Few
<i>Baetidae spp. (B.muticus)</i>	Group B	Few
Water lice (not included in Q value)	N/A	Few
<i>Hirudinea</i>	Group D	Few
<i>Ephemerellidae (S. ignita)</i>	Group B	Few
<i>Gammaridae sp.</i>	Group C	Few
<i>Diptera Larvae</i>	Group C	Few
Snail TBI (Gastropoda but only one)	Group C	Few
<i>Tubificidae sp.</i>	Group E	Few
<i>Leptoceridae</i>	Group B	Few
<i>Coleoptera larvae</i>	Group C	Few
Salmonids	Spawning: Fair Juveniles: Fair	
Lamprey	Spawning: Fair Nursery Habitat: Fair	
Crayfish	Habitat: Fair 0 CPUE, No crayfish found in kick sample.	
Comment	Difficult to kick in riffle areas due to high cobble content.	
Instream parameters	Dissolved Oxygen	n/a Probe malfunction n/a Probe malfunction
	Temp	15°C
	Conductivity	785 µs
	Total Dissolved Solids	392 ppm
	pH	8.0

Table P-4 Location 2 – Santry River (Silloogue golf course)

Site name	ITM	Q-value	Invasive sp.	Land use
Location 2 – Santry River (Silloogue golf course)	714643.023, 741583.555	2-3	None	Broadleaf woodland. Scrub habitat.



Image 5 Location 2 (a)



Image 6 Location 2 (b)

Taxa	Group	Abundance
<i>Gammaridae sp.</i>	Group D	Numerous
<i>Chironomidae spp.</i>	Group C	Numerous
<i>Elmidae (Riffle beetle)</i>	Group D	Common
<i>Hirudinea</i>	Group D	Few
<i>Caddis – family/spp</i> <i>TBC (Trichoptera)</i>	Group B	Few (but caddis not in use so can't include).
<i>Hydroptilidae</i>	Group B	Few
<i>Polycentropodidae (Trichoptera)</i>	Group C	Only one cannot include.
Salmonids	Spawning: Poor-Fair Juveniles: Poor	
Lamprey	Spawning: Poor Nursery Habitat: Poor	
Crayfish	Habitat: Poor-Fair 0 CPUE, No crayfish found in kick sample.	
Comment	Difficult to kick due to low flow. Heavily silted.	
Instream parameters	Dissolved Oxygen	n/a Probe malfunction n/a Probe malfunction
	Temp	13.2°C
	Conductivity	894 µs
	Total Dissolved Solids	447 ppm
	pH	7.63

Table P-5 Location 4 – Mayne_010 (Stockhole lane)

Site name	ITM	Q-value	Invasive sp.	Land use
Location 4 – Mayne_010 (Stockhole lane)	719146.293, 742159.685	2-3	None	Tillage. Scrub.



Image 7 Location 4 (a)

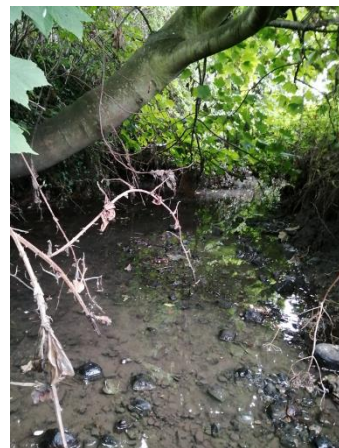


Image 8 Location 4 (b)

Taxa	Group	Abundance
<i>Asellus sp.</i>	Group D	Numerous
<i>Baetidae spp. (rhodani)</i>	Group C	Numerous
<i>Chironomidae spp.</i>	Group C	Common
Water lice (not included in Q value)	N/A	Few
<i>Hirudinea sp.</i>	Group D	Few
<i>Coleoptera Larvae</i>	Group C	Few
Salmonids	Spawning: Poor-Fair	
	Juveniles: Poor-Fair	
Lamprey	Spawning: None-Poor	
	Nursery Habitat: None-Poor	
Crayfish	Habitat: Poor-Fair	
	0 CPUE, No crayfish found in kick sample.	
Comment	Very high siltation.	
Instream parameters	Dissolved Oxygen	n/a Probe malfunction n/a Probe malfunction
	Temp	13.9°C
	Conductivity	775 µs
	Total Dissolved Solids	385 ppm
	pH	7.52

Table P-6 Location 5 – Maybe River

Site name	ITM	Q-value	Invasive sp.	Land use
Location 5 – Maybe River	719703.574, 741227.313	3	None	Rough Pasture. Scrub habitat.



Image 9 Location 5 (a)



Image 10 Location 5 (b)

Taxa	Group	Abundance
<i>Gammaridae sp.</i>	Group C	Numerous
<i>Tubificidae sp.</i>	Group E	Few
<i>Hirudinea sp.</i>	Group D	Few
<i>Asellus sp.</i>	Group D	Few
<i>Baetidae spp. (rhodani)</i>	Group C	Few
Salmonids	Spawning: Fair Juveniles: Fair	
Lamprey	Spawning: Poor-Fair Nursery Habitat: Poor-Fair	
Crayfish	Habitat: Fair 0 CPUE, No crayfish found in kick sample.	
Comment	Heavily silted. Easy to kick but little riffle.	
Instream parameters	Dissolved Oxygen	n/a Probe malfunction n/a Probe malfunction
	Temp	15.3°C
	Conductivity	711 µs
	Total Dissolved Solids	366 ppm
	pH	7.74

Appendix Q

Aquatic survey of the Proposed Project Boundary 2023

1 FIELD SURVEY RESULTS

1.1 Site 1a

Site 1a is located within the National Sports Campus. The route crosses the Abbotstown Stream (IE_EA_09T011000) at this location. Aquatic ecology surveys were not undertaken at this site as the stream could not be found and is assumed to be culverted at this location.

1.2 Site 1b

Site 1b is located southeast of Connolly Hospital on the Abbotstown Stream. The stream is channelised, with high banks (ca. 1.6m). The stream flows into a man-made pool and over a waterfall before discharging into the mainstem of the River Tolka. The left bank comprises a concrete wall. The stream was approximately 1m wide and shallow (4cm deep) on the day of survey. Siltation at the site was moderate, and a high silt plume was noted when the bed was disturbed. Flow discharge was low with slow velocity. No colour and low turbidity were noted. The substrate was dominated by fine gravel. The river habitat comprised riffles (30%) and pools (70%). The substrate within the riffle habitat was embedded as a result of calcification. Shading was heavy, with ivy, sycamore, beech, hart's tongue fern and hogweed recorded adjacent to the stream.

As the riffles were small in size and difficult to kick, it was necessary to collect the kick sample within the pool habitat as well as riffle habitat. A total of 14 macroinvertebrate taxa were recorded at this site. Group A and B taxa were absent. Group C taxa were dominant in the sample, Group D taxa were numerous and Group E taxa few. A Q-value of 2-3 (poor status) was inferred. It should be noted that the Q-value score could be affected by the calcareous nature of the substrate in addition to the fact that some of the kick sample had to be collected from pool habitat (for Q-value assessments, macroinvertebrates are preferably collected from the faster flowing riffle habitats). It is possible that the observed Q-value is lower than expected due to these factors. Nevertheless, the score is in keeping with the poor status assigned to the river by the EPA. The mainstem of the River Tolka, downstream of Abbotstown Bridge, was assigned a Q-Value of 3 (poor status) in 2022 by the EPA (station number RS09T011000).

Salmonid and lamprey spawning and adult habitat was assigned a rating of 'none'. No spawning habitat was available due to the presence of calcareous deposits which were binding the gravel substrate. The stream was too shallow and slow flowing to support adult fish, with little cover or hiding places noted. The waterfall located downstream of the survey location would act as a barrier to upstream migration. Juvenile salmonid habitat was assigned a rating of 'none-poor' as instream habitat was shallow, slow flowing with the substrate dominated by fine gravel. There was a lack of cover from riparian vegetation.

Some small areas of deposited silty-sand which could support lamprey ammocetes were noted. However, a rating of 'none-poor' was assigned due to shallow water depth and limited extent of this habitat in the survey area.

No crayfish habitat was available due to shallow water levels and general lack of coarse substrates. The left bank comprises a concrete wall, whereas the right bank comprises earth. However, the right bank was not soft and is unlikely to be suitable for burrowing. No submerged tree roots which could provide cover for crayfish were noted. A rating of 'none' was assigned.

1.3 Site 1c

Site 1c is located on the mainstem of the River Tolka, upstream of Abbotstown Bridge. The river is approximately 8 metres in width (wetted width between 2-8m), with water depth ranging between 10 and 45cm. The banks are approximately 2m in height. A culvert pipe (most likely a storm water outflow) is located on the right bank, with bank reinforcement (concrete and boulders) located around this point. Siltation at the site was moderate, and a high silt plume was noted when the bed was disturbed. Flow discharge was normal

with moderate velocity. No colour and low turbidity were noted. The substrate was dominated by cobble (50%), with bedrock, boulder and coarse gravel making up the remaining substrate grain sizes. The river habitat comprised riffle (50%) and run (50%) habitat. The substrate was slightly compacted. Filamentous green algae covered approximately 70% of the substrate. Shading was heavy, with cherry laurel, ivy, sycamore, alder, ash, hart's tongue fern, cleavers, meadowsweet, nettles and fool's watercress *Helosciadium nodiflorum* recorded adjacent to the stream. Dippers were recorded within the river channel, and a Kingfisher was recorded flying downstream.

A total of 18 macroinvertebrate taxa were recorded at this site. Group A taxa were absent, Group B taxa were few, Group C taxa were excessive, Group D taxa were common and Group E taxa were absent. *Serratella ignita* was numerous, whereas *Baetis rhodani/atlanticus*, Chironomidae, Simuliidae and *Hydropsyche* sp. were common. Based on the relative abundance of the various macroinvertebrate groups recorded, a Q-value of 3 (poor status) was inferred. The presence of silt, excessive filamentous green algae and low dissolved oxygen concentration (75.1%) within the river support this assessment. This Q-value is in-keeping with the Q-value assigned to the river by the EPA in 2022 (Q3), at a monitoring point located immediately downstream of the M50 motorway (RS09T011000).

Salmonid spawning and adult habitat at this location was assigned a rating of 'fair'. Riffle/run habitat which could be utilised as spawning habitat is present, however it is silted and comprises a considerable amount of coarse substrate (cobbles) which may limit spawning activity. Holding pools are present downstream for adult salmonids. Large adult brown trout were observed within the river. Juvenile salmonid habitat was assigned a rating of 'fair'. The physical habitat available is generally good with overhanging vegetation present along with shallow, fast flowing water over large rocks and coarse substrates which could provide cover for this life stage. However, water quality is likely to be an issue for salmonids in this river with siltation, low dissolved oxygen and low Q-value recorded.

Lamprey spawning and adult habitat was assigned a rating of 'fair'. Suitable hiding places are available within the river channel for adults. Some spawning habitat is available however the substrate is quite coarse, silted and water quality is unsatisfactory. Lamprey nursery habitat was assigned a rating of 'none-poor'. Some sandy/silt deposits were noted on the margins of the river, however these were small relative to the size of the surveyed reach. However, it should be noted that silty/sand deposits were noted upstream of the bedrock waterfall/cascade upstream of the survey reach, which could provide juvenile lamprey nursery habitat.

Crayfish habitat was assigned a rating of 'good'. The coarse substrate (boulders and cobbles) within the river could provide refuge habitat. Furthermore, exposed tree roots were noted on the left bank. Some areas of deeper water were noted. Water quality and siltation is likely to be an issue for this species. No crayfish were observed during the survey.

1.4 Site 2

Site 2 is located on the Santry River (Santry_010) just north of Silloge Park Golf Club. The stream was approximately 1.2m in width at the survey location, with water depth measured at approximately 5cm. The stream appears to have been straightened and deepened in the past. The right bank was very steep and approximately 3m in height whereas the left bank was approximately 0.5m in height. Calcareous deposits were noted on some of the cobbles in stream. Siltation at the site was heavy, and a high silt plume was noted when the bed was disturbed. Flow discharge was normal with slow velocity. The substrate was dominated by fine sediment grain sizes, namely sand (35%), silt (35%), fine gravel (15%), coarse gravel (10%) and cobble (5%). The river habitat comprised riffle (20%), glide (40%) and pool (40%) habitat. Shading was heavy, with ash, nettles, dog rose, bramble, elder, hart's tongue fern, meadow buttercup, bush vetch, cleavers and ivy recorded adjacent to the stream.

A total of eight macroinvertebrate taxa were recorded within the stream. Group A, B and E macroinvertebrate taxa were absent. Group C taxa were dominant whereas Group D were numerous. *Asellus aquaticus* and *Potamopyrgus antipodarum* were numerous whereas Simuliidae and Hirudinea were common. Based on the relative abundance of the macroinvertebrate groups recorded within the stream, a Q-value of 2-3 (poor WFD status) was inferred. This is consistent with the Q-value assigned to the Santry River by the EPA (Q2-3) in 2022 at a monitoring location downstream of the site near North Side Shopping Centre (station code: RS09S010300).

Salmonid spawning and adult habitat was assigned a rating of 'none'. The substrate was dominated by fine sediment (sand, fine gravel, silt) and therefore did not provide suitable spawning conditions. Only very small areas of riffle habitat were present within the stream. Juvenile salmonid habitat was assigned a rating of 'none-poor'. The substrate was dominated by fine sediment, the flow was slow and had limited cobbles and boulders. Some overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue for salmonids in this stream.

Lamprey spawning and adult habitat was assigned a rating of 'none-poor'. There is a small possibility that brook lamprey could spawn in the small riffles within this stream. Some limited hiding places were available within the river channel for adults. Siltation is likely to be an issue, however. Lamprey nursery habitat was assigned a rating of 'fair', as some sandy/silt deposits were noted on the margins of the river.

Crayfish habitat was assigned a rating of 'none-poor'. The stream was very shallow with no large coarse substrates which could provide habitat. There is a small chance that the banks could be burrowed into by crayfish, and overhanging vegetation was noted along the margins. Water quality and siltation is likely to be an issue for this species. No crayfish were observed during the survey.

1.5 Site 3

Site 3 is located in the upper reaches of the Mayne River in a field south of the L2015. The stream at this location has been straightened and resembles a ditch with low flow discharge and stagnant velocity. The substrate comprised 100% silt and instream habitat was best described as 100% pool. Dissolved oxygen was low at 44.7% and 4.46mg/l. Wetted and bankfull width was approximately 1m and water depth was 10cm. Siltation was heavy and some light bank erosion was noted. Shading was heavy, with ivy, hawthorn, cleavers, bramble, meadow thistle, dog rose, hogweed, dock and ash recorded in the riparian buffer. The site was not suitable for kick-sampling or Q-value assessment. However, a sweep of the margins and substrate identified a number of pollution tolerant species including *Asellus aquaticus*, *Gammarus* sp., Gerridae, *Chironomus* sp., Planorbidae and excessive numbers of pea/orb mussels (Sphaeriidae).

Given the ditch-like nature of the stream with stagnant flow conditions and high levels of siltation, it is deemed unlikely to support salmonids, lamprey or crayfish. The silty substrate could potentially support lamprey ammocetes, however, the stagnant conditions and potential lack of upstream spawning habitat (assuming the habitat is similar upstream in this watercourse) makes this very unlikely.

1.6 Site 4

Site 4 is located on the Cuckoo Stream, a tributary of the Mayne River. The stream was approximately 1.8m wide and 10cm deep. The stream appears to have been straightened in the past. Bank height was approximately 1.4m. Siltation at the site was low, however a high silt plume was noted when the bed was disturbed and turbidity was high. Flow discharge was high with fast velocity. Rain the previous night resulted in elevated water levels at this site. However, the river was not in flood and the increased water levels observed were not deemed to have affected the survey undertaken. The Q-value inferred was consistent with the Q-value assigned to the Mayne river in 2022 (Q3) by the EPA. *Vaucheria*, filamentous green algae and *Fontinalis* sp. were noted within the stream. The substrate comprised 50% coarse gravel, 30% cobble, 10% fine gravel and 10% sand. Bank erosion and undercutting was noted within the channel. The river habitat at the biomonitoring location comprised riffle (70%) and glide (30%) habitat. Shading was light, with sycamore, ash, nettles, dog rose, bramble, great willowherb, cleavers and ivy recorded adjacent to the stream.

A total of 15 macroinvertebrate taxa were recorded at the site. Group A macroinvertebrate taxa were absent, Group B numerous, Group C numerous, Group D numerous and Group E absent. *Hydroptilia* sp. (group B) and *Asellus aquaticus* (Group D) were numerous whereas Chironomidae (Group C) were common. Based on the relative abundance of the various macroinvertebrate groups recorded, a Q-value of 3 (poor status) was inferred. This Q-value is in-keeping with the Q-value assigned to the river by the EPA in 2022 (Q3), at a monitoring point located downstream of the site at Hole-in-the-Wall Road Bridge (RS09M030500).

Salmonid spawning and adult habitat was assigned a rating of 'fair'. The physical habitat was suitable for spawning and holding pools were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for salmonids. Juvenile salmonid habitat was assigned a rating of 'fair'.

The physical habitat was suitable with shallow, fast flowing water over coarse substrates. Some overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue, however.

Lamprey spawning and adult habitat was assigned a rating of 'fair'. The physical habitat was suitable for spawning and hiding places for adults were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for lamprey spawning. Lamprey nursery habitat was assigned a rating of 'fair', as some silty/sand accumulations were noted along the stream margins.

Crayfish habitat was assigned a rating of 'fair'. No large boulders were noted in the stream, with some siltation and high turbidity noted. However, soft banks for burrowing, undercut banks and overhanging vegetation and submerged tree roots were noted. No crayfish were observed during the survey.

1.7 Site 5

Site 5 is located on the Mayne (Mayne_010). The stream is approximately 1.5m wide and 10cm deep. The channel has been straightened and valley sides reprofiled. The stream was surveyed downstream of a culverted section of the stream. Siltation was heavy and a high plume was noted when the bed was disturbed. A slight hydrocarbon sheen was noted. The substrate was dominated by fine material (small cobbles, gravel and sand). The river habitat comprised 50% riffle and 50% glide habitat. Flow discharge was normal and velocity slow. Shading was heavy throughout the majority of the surveyed reach. Fool's watercress and dense *Vaucheria* growth was observed in the less heavily shaded sections of the stream immediately downstream of the culvert. Dense bramble scrub is causing a tunnelling effect within the stream. Butterfly bush *Buddleia davidii* was noted within the surveyed reach and Japanese Knotweed *Reynoutria japonica* was noted downstream of the surveyed reach. Native flora recorded within the riparian buffer included bramble, dog rose, nettle, great willowherb, sycamore, creeping buttercup, horsetails and hogweed. Two active badger setts were recorded adjacent to the stream within the scrub habitat.

A total of 13 macroinvertebrate taxa were recorded in the stream. Group A and Group B taxa were absent from the sample, whereas Group C taxa were excessive, Group D taxa common and Group E taxa few. The relative abundance of the group C species *Potamopygrus antipodarum* was excessive. *Asellus aquaticus* (group D) was common. Based on the relative abundance of the macroinvertebrate groups recorded within the stream, a Q-value of 2-3 (poor WFD status) was inferred. This is slightly lower than the Q-value assigned to the Mayne River by the EPA in 2022 (Q3), at a monitoring point located downstream of the site at Hole-in-the-Wall Road Bridge (RS09M030500). It is possible that the heavy shading at this site influenced the Q-value score. Nevertheless, the score is in keeping with the poor status assigned to the river by the EPA.

Salmonid spawning and adult habitat was assigned a rating of 'none-poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted and poor water quality would be an issue for salmonids in this stream. Juvenile salmonid habitat was assigned a rating of 'none-poor'. The physical habitat was unsuitable with shallow, slow flowing water over predominantly fine substrates (gravel and sand) noted. Overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue.

Lamprey spawning and adult habitat was assigned a rating of 'none-poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted. Lamprey nursery habitat was assigned a rating of 'none-poor'. The physical habitat was unsuitable with only very small areas of silty sand accumulations noted on the river margins. Unsatisfactory water quality is likely to be an issue.

Crayfish habitat was assigned a rating of 'none-poor'. No large boulders and cobbles which could provide cover were noted in the stream, with heavy siltation observed. Some instream vegetation was noted in the less shaded part of the stream immediately downstream of the culvert. No crayfish were observed during the survey.

2 SUMMARY OF CHANGES IN AQUATIC ECOLOGY BASELINE

No change in the ecological baseline at site 1a between 2021 and 2023 was observed. The stream was not surveyed during both time periods as it has been culverted.

The survey location of Site 1b was corrected in 2023 to the crossing point on the Abbotstown Stream. During the 2021 surveys, site 1b was located on the Tolka River, ca. 200m downstream of site 1c, which was also located on the Tolka River. Due to the revised location of this survey site (from the mainstem of the River Tolka to a small tributary of the Tolka), there are differences in the survey results. Notwithstanding this, the inferred ecological status does not differ (Q2-3 was recorded in both 2021 and 2023). Furthermore, the value of the Abbotstown Stream for fish and crayfish at the 2023 survey location is lower than the area surveyed on the Tolka River in 2021. Salmonid and lamprey spawning and adult habitat was assigned a rating of 'none' on the Abbotstown Stream in 2023 whereas a rating of 'fair' was assigned to the Tolka in 2021. Juvenile salmonid habitat was assigned a rating of 'none-poor' on the Abbotstown Stream in 2023, whereas a rating of 'fair' was assigned to the Tolka in 2021. Lamprey nursery habitat was assigned a rating on 'none-poor' on the Abbotstown Stream in 2023, whereas a rating of 'fair' was assigned to the Tolka. Finally, crayfish habitat was assigned a rating of 'none' on the Abbotstown Stream in 2023, whereas a rating of 'fair' was assigned to the Tolka in 2021.

At site 1c, an improvement in the Q-value from 2-3 to 3 was observed between 2021 and 2023. However, these Q-value scores are both indicative of 'poor' status. There was no change in the quality assessment for adult and juvenile salmonid habitat and lamprey spawning habitat. Lamprey nursery habitat was assessed as 'fair' in 2021 but 'none-poor' in 2023. Crayfish habitat was assessed as 'fair' in 2021 but 'good' in 2023.

At site 2, there was no change in the Q-value (Q2-3 was recorded in both 2021 and 2023). Adult salmonid habitat was assigned a rating of 'none' in 2023, whereas a rating of 'poor-fair' was assigned in 2021. Juvenile salmonid habitat was assigned a rating of 'none-poor' in 2023, whereas a rating of 'poor' was assigned in 2021. Lamprey spawning and nursery habitat was assigned a rating of 'poor' in 2021, whereas ratings of 'none-poor' and 'fair' were assigned respectively in 2023. For crayfish, a rating of 'none-poor' was assigned in 2023 whereas a rating of 'poor-fair' was assigned in 2021.

Site 3 was dry during the surveys undertaken in 2021. A macroinvertebrate sample was not collected and there was no potential for salmonids, lamprey or crayfish at any life stage at the site surveyed. The site was not suitable for kick-sampling or Q-value assessment in 2023, however, a sweep of the margins and substrate identified a number of pollution tolerant species. Given the ditch-like nature of the stream in 2023, it was deemed unlikely to support salmonids, lamprey or crayfish.

At site 4, an improvement in the Q-value from 2-3 to 3 was observed between 2021 and 2023. However, these Q-value scores are both indicative of 'poor' status. Salmonid habitat for both juveniles and spawning was assigned a rating of 'fair' in 2023, whereas a rating of 'poor-fair' was assigned in 2021. Lamprey spawning and juvenile habitat was slightly improved at this site in 2023 with a rating of 'fair' assigned. A rating of 'none-poor' was assigned in 2021. Crayfish habitat was assessed as 'fair' in 2023 whereas a rating of 'poor-fair' was assigned in 2021.

At site 5, the Q-value score disimproved from Q3 to Q2-3 between 2021 and 2023. Salmonid, lamprey and crayfish habitat was assigned a rating of 'none-poor' at this site, whereas ratings of 'poor-fair' to 'fair' were assigned in 2021.

Table Q-1. Summary of aquatic ecology survey results in 2021 and 2023.

Survey	1a		1b		1c		2		3		4		5	
	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023
Q-Value	n/a	n/a	2-3	2-3	2-3	3	2-3	2-3	n/a	n/a	2-3	3	3	2-3
Adult and Spawning Salmonid Habitat	n/a	n/a	Fair	None	Fair	Fair	Poor-Fair	None	None	None	Poor-Fair	Fair	Fair	None-poor
Juvenile Salmonid Habitat	n/a	n/a	Fair	None-Poor	Fair	Fair	Poor	None-Poor	None	None	Poor-Fair	Fair	Fair	None-poor

Survey	1a		1b		1c		2	3		4	5			
Lamprey Spawning Habitat	n/a	n/a	Fair	None	Fair	Fair	Poor	None-Poor	None	None	None-Poor	Fair	Fair	None-poor
Lamprey Nursery Habitat	n/a	n/a	Fair	None-Poor	Fair	None-Poor	Poor	Fair	None	None	None-Poor	Fair	Poor-Fair	None-poor
Crayfish Habitat	n/a	n/a	Fair	None	Fair	Good	Poor-Fair	None-Poor	None	None	Poor-Fair	Fair	Fair	None-poor

Overall, while some minor changes in either Q-value status or the quality of fish or crayfish habitat were noted, no significant changes in the baseline were noted. The only exception was site 1b. Changes in the baseline are to be expected for this site however, as the survey location was corrected in 2023 from the mainstem of the River Tolka to a small tributary of the Tolka. For the remaining sites, the Q-values did not markedly improved/ disimproved. Similarly, the habitat assessment for fish and crayfish rarely deviated by more than one rating on the categorical scale used (None/Poor/Fair/Good/Very Good/Excellent). Differences observed are likely a result of slight differences in survey location (due to access, dense vegetation growth etc), potential differences in surveyor judgement (mainly for the fish and crayfish habitat assessment) and natural temporal variation in local conditions and river habitat.

3 SUMMARY OF DATA SHEETS

Table Q-2. Aquatic ecology survey data sheet for site 1b.

Abbotstown Stream (Tolka 040)				Date: 12/6/2023	
Site ID:	Site 1b	GPS Location:	53.380598, -6.366002	Site info:	Accessed from Connolly Hospital.
DO (%):	88.7	Bedrock:	0%	Flow discharge:	Low
DO (mg/l):	8.64	Boulder (>250mm):	5%	Velocity:	Slow
Temp (°C):	16.5	Cobble (65-250mm):	10%	Turbidity:	Low
Conductivity (µS/cm):	-	Gravel (17-64mm):	10%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	60%	Siltation:	Moderate
Bank height (m):	1.6	Sand (<2mm):	7.5%	Sewage Fungus:	None
Bank width (m):	1	Silt (<0.06mm):	7.5%	Filamentous Algae:	None
Wet width (m):	1	Main land use US:	Broadleaf forestry and urban	Shading:	Heavy
Avg depth (cm):	4	Cattle Access US/DS:	None	Substrate condition:	Calcareous
Comments:	Channel straightened, calcareous deposits on gravel and cobbles. Substrate embedded in riffle habitat. Steep banks with concrete wall on left bank. Group A and B taxa absent. Group C taxa dominant in sample, Group D taxa numerous, Group E taxa few. Q2-3 inferred, however embedding due to calcareous deposits and heavy shading could be influencing this score.				
Macroinvertebrate list			EPA Sensitivity Group	Abundance	
Veliidae			C	Numerous	
<i>Asellus aquaticus</i>			D	Numerous	
<i>Serratella ignita</i>			C	Common	
Chironomidae			C	Common	
Simuliidae			C	Common	
Lumbriculidae			-	Few	
<i>Rhyacophila dorsalis</i>			C	Few	
<i>Potamopyrgus antipodarum</i>			C	Few	
Tubificidae			E	Few	
<i>Radix balthica</i>			D	Single	
Dytiscidae			C	Single	
Elmidae			C	Single	
Ceratopogonidae			C	Single	
Platyhelminthes			C	Single	
Total No. of Taxa = 14					
Q-value = Q2-3					
Fisheries Habitat: Summary					
<p>Salmonids- No spawning habitat available due to calcareous deposits on gravel substrate which is binding the substrate. Stream is too shallow to support adult salmonids. The waterfall located downstream of the survey location would act as a barrier to fish. Juvenile salmonid habitat is limited as instream habitat is shallow and slow flowing, with substrate dominated by fine gravel. There is a lack of cover from riparian vegetation.</p> <p>Lamprey- No spawning habitat available due to calcareous deposits on gravel substrate which is binding the substrate. There is no habitat to support adult lamprey. The waterfall located downstream of the survey location would act as a barrier to fish. There are some small areas of deposited silty-sand which could support lamprey ammocetes however a rating of none-poor was assigned due to shallow water depth and limited extent of this habitat in the survey area.</p>					

Crayfish- No crayfish habitat available due to shallow water levels and general lack of coarse substrates. The left bank comprises a concrete wall, whereas the right bank is earth. However, the right bank was not soft and is unlikely to be suitable for burrowing. No submerged roots.

Images:



From left to right: the survey location looking upstream, the survey location looking downstream, the outfall of the pond downstream of the survey location, the waterfall downstream of the survey location.

Table Q-3. Aquatic Ecology Data Sheet for Site 1c.

River Tolka (Tolka_040)				Date: 12/6/2023	
Site ID:	Site 1c	GPS Location:	53.3860704, -6.3691983	Site info:	Accessed from Connolly Hospital.
DO (%):	75.1	Bedrock:	20%	Flow discharge:	Normal
DO (mg/l):	7.29	Boulder (>250mm):	10%	Velocity:	Moderate
Temp (°C):	16.9	Cobble (65-250mm):	50%	Turbidity:	Low
Conductivity (µS/cm):	-	Gravel (17-64mm):	15%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	0%	Siltation:	Moderate
Bank height (m):	2	Sand (<2mm):	5%	Sewage Fungus:	None
Bank width (m):	8	Silt (<0.06mm):	0%	Filamentous Algae:	70%
Wet width (m):	2-8	Main land use US:	Broadleaf forestry and urban	Shading:	Moderate
Avg depth (cm):	30	Cattle Access US/DS:	None	Substrate condition:	Compacted
Comments:	Substrate slightly embedded. Steep banks with culvert pipe on right bank. Macroinvertebrate sample collected upstream of pipe. <i>Fontinalis</i> sp. noted in river.				
Macroinvertebrate list			EPA Sensitivity Group	Abundance	
<i>Serratella ignita</i>			C	Numerous	
<i>Baetis rhodani/atlanticus</i>			C	Common	
Chironomidae			C	Common	
Simuliidae			C	Common	
<i>Hydropsyche</i> sp.			C	Common	
<i>Valvata</i> sp.			C	Few	
<i>Hydroptilia</i> sp.			B	Few	
<i>Rhyacophila dorsalis</i>			C	Few	
<i>Alainites muticus</i>			B	Few	
Limnephilidae			B	Few	
<i>Potamopyrgus antipodarum</i>			C	Few	
Lumbriculidae			-	Few	
Ceratopogonidae			C	Few	
Hirudinea			D	Few	
<i>Asellus aquaticus</i>			D	Few	
Sphaeriidae			D	Few	
<i>Eiseniella</i> sp.			-	Single	
<i>Bithynia</i> sp.			C	Single	
Total No. of Taxa = 18					
Q-value = Q3					
Fisheries Habitat: Summary					
<p>Salmonids- Spawning and adult habitat assigned a rating of fair. Substrate quite coarse, water quality unsatisfactory and siltation evident. Holding pools available. Adult fish observed in river. Juvenile salmonid habitat was assigned a rating of fair. Some overhanging vegetation was present along with shallow, fast flowing water over large rocks and coarse substrates. As with adult fish, unsatisfactory water quality is likely an issue.</p>					
<p>Lamprey- Spawning and adult habitat assigned a rating of fair. Suitable hiding places are available within the river channel for adults. Some spawning habitat available however the substrate is quite coarse, silted and water quality is unsatisfactory. Lamprey nursery assigned a rating of none-poor. Some sandy/silt deposits were noted on the margins of the river, however these were small relative to the size of the surveyed reach. However, it should be noted that</p>					

silty/sand deposits were noted upstream of the bedrock waterfall/cascade upstream of the survey reach, which could provide juvenile lamprey nursery habitat.

Crayfish- Crayfish habitat was assigned a rating of 'good'. The coarse substrate (boulders and cobbles) within the river could provide refuge habitat. Furthermore, exposed tree roots were noted on the left bank. Some areas of deeper water were noted. Water quality and siltation is likely to be an issue for this species. No crayfish were observed during the survey.

Images:



From left to right: the survey location looking upstream, the survey location looking downstream, the culvert pipe located on the right bank, the waterfall/bedrock outcrop upstream of the survey location.

Table Q-4. Aquatic Ecology Data Sheet for Site 2.

Santry River (Santry_010)				Date: 12/6/2023	
Site ID:	Site 2	GPS Location:	53.4127390, -6.2758239	Site info:	Accessed from Horizon Logistics Park.
DO (%):	83.6	Bedrock:	0%	Flow discharge:	Normal
DO (mg/l):	8.27	Boulder (>250mm):	0%	Velocity:	Slow
Temp (°C):	15.6	Cobble (65-250mm):	5%	Turbidity:	Low
Conductivity (µS/cm):	-	Gravel (17-64mm):	10%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	15%	Siltation:	Heavy
Bank height (m):	3 (RB), 0.5 (LB)	Sand (<2mm):	35%	Sewage Fungus:	None
Bank width (m):	1.2	Silt (<0.06mm):	35%	Filamentous Algae:	None
Wet width (m):	1.2	Main land use US:	Tillage	Shading:	Heavy
Avg depth (cm):	5	Cattle Access US/DS:	None	Substrate condition:	Normal
Comments:	Calcium carbonate deposition noted on cobbles within the stream. Instream habitat comprised riffle (20%), glide (40%) and pool (40%) habitat. Stream historically straightened and over deep. Moderate bank erosion noted. Group A, B and E macroinvertebrate taxa absent. Group C dominant, Group D numerous.				
Macroinvertebrate list			EPA Sensitivity Group	Abundance	
<i>Asellus aquaticus</i>			D	Numerous	
<i>Potamopyrgus antipodarum</i>			C	Numerous	
Simuliidae			C	Common	
Hirudinea			D	Common	
Veliidae			C	Single	
Lumbriculidae			-	Few	
Hydracarina			C	Few	
<i>Elmis aenea</i>			C	Few	
Total No. of Taxa = 8					
Q-value = 2-3					
Fisheries Habitat: Summary					
<p>Salmonids- Spawning and adult habitat assigned a rating of 'none'. Substrate dominated by fine sediment (sand, fine gravel, silt) and silted. Only very small areas of riffle habitat present. Juvenile salmonid habitat was assigned a rating of 'none-poor'. The substrate was dominated by fine sediment, the flow was slow and had limited cobbles and boulders. Some overhanging vegetation was present. Unsatisfactory water quality is likely an issue.</p>					
<p>Lamprey- Spawning and adult habitat assigned a rating of 'none-poor'. There is a small possibility that brook lamprey could spawn on the small riffles within this stream. Some limited hiding places are available within the river channel for adults. Siltation is likely to be an issue, however. Lamprey nursery habitat was assigned a rating of 'fair'. Some sandy/silt deposits were noted on the margins of the river.</p>					
<p>Crayfish- Crayfish habitat was assigned a rating of 'none-poor'. The stream was very shallow with no large coarse substrates which could provide habitat. There is a small chance that the banks could be burrowed into by crayfish, and overhanging vegetation was noted along the margins. Water quality and siltation is likely to be an issue for this species. No crayfish were observed during the survey.</p>					
Images:					



From left to right: the survey location looking upstream, the survey location looking downstream, the right bank, the left bank.

Table Q-5. Aquatic ecology data sheet for site 3.


Mayne River (Mayne_010)				Date: 12/6/2023	
Site ID:	Site 3	GPS Location:	53.4131850, -6.2497687	Site info:	Accessed from Collinstown Lane (L2015).
DO (%):	44.7	Bedrock:	0%	Flow discharge:	Low
DO (mg/l):	4.46	Boulder (>250mm):	0%	Velocity:	Stagnant
Temp (°C):	15.4	Cobble (65-250mm):	0%	Turbidity:	None
Conductivity (µS/cm):	-	Gravel (17-64mm):	0%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	0%	Siltation:	Heavy
Bank height (m)	1.6	Sand (<2mm):	0%	Sewage Fungus:	None
Bank width (m):	1.2	Silt (<0.06mm):	100%	Filamentous Algae:	None
Wet width (m):	1.2	Main land use US:	Tillage	Shading:	Heavy
Avg depth (cm):	10	Cattle Access US/DS:	None	Substrate condition:	Normal
Comments:	<p>The site was not suitable for kick-sampling or Q-value assessment. However, a sweep of the margins and substrate identified a number of pollution tolerant species including <i>Asellus aquaticus</i>, <i>Gammarus</i> sp., Gerridae, <i>Chironomus</i> sp., Planorbidae and excessive numbers of pea/orb mussels (Sphaeriidae).</p> <p>Given the ditch-like nature of the stream with stagnant flow conditions and high levels of siltation, it is deemed unlikely to support salmonids, lamprey or crayfish. The silty substrate could potentially support lamprey ammocetes, however, the stagnant conditions and potential lack of upstream spawning habitat (assuming the habitat is similar upstream in this watercourse) makes this very unlikely.</p>				
Images:	 <p>From left to right: the survey location looking downstream, the survey location looking upstream, the right bank, the left bank.</p>				

Table Q-6. Aquatic ecology datasheet for site 4.

Cuckoo Stream (Mayne_010)				Date: 13/6/2023	
Site ID:	Site 4	GPS Location:	53.4157525, -6.2042804	Site info:	Accessed from farm north of the site.
DO (%):	54.7	Bedrock:	0%	Flow discharge:	High
DO (mg/l):	5.27	Boulder (>250mm):	0%	Velocity:	Fast
Temp (°C):	17.1	Cobble (65-250mm):	30%	Turbidity:	High
Conductivity (µS/cm):	-	Gravel (17-64mm):	50%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	10%	Siltation:	Low
Bank height (m):	1.4	Sand (<2mm):	10%	Sewage Fungus:	None
Bank width (m):	1.8	Silt (<0.06mm):	0%	Filamentous Algae:	20%
Wet width (m):	1.8	Main land use US:	Tillage	Shading:	Light
Avg depth (cm):	10	Cattle Access US/DS:	None	Substrate condition:	Normal
Comments:	Rain the previous night resulted in increased water levels at this site. However, the river was not in flood and the increased water levels observed were not deemed to have affected the survey undertaken. The Q-value inferred was consistent with the Q-value assigned to the Mayne river in 2022 (Q3) by the EPA. <i>Vaucheria</i> , filamentous green algae and <i>Fontinalis</i> sp. were noted within the stream. Channel and banks have been straightened. Group A macroinvertebrate taxa absent, Group B numerous, Group C numerous, Group D numerous and Group E absent.				
Macroinvertebrate list			EPA Sensitivity Group	Abundance	
<i>Hydroptilia</i> sp.			B	Numerous	
<i>Asellus aquaticus</i>			D	Numerous	
Chironomidae			C	Common	
<i>Gammarus</i> sp.			C	Few	
<i>Baetis rhodani/atlanticus</i>			C	Few	
Simuliidae			C	Few	
Planorbidae			C	Few	
Hirudinea			D	Few	
Ceratopogonidae			C	Few	
Hydracarina			C	Few	
Sphaeriidae			D	Few	
Dytiscidae			C	Few	
<i>Valvata</i> sp.			C	Few	
Gyrinidae			C	Single	
Limnephilidae			B	Single	
Total No. of Taxa = 15					
Q-value = 3					
Fisheries Habitat: Summary					
<p>Salmonids- Spawning and adult habitat assigned a rating of 'fair'. The physical habitat was suitable for spawning and holding pools were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for salmonids. Juvenile salmonid habitat was assigned a rating of 'fair'. The physical habitat was suitable with shallow, fast flowing water over coarse substrates. Some overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue, however.</p>					
<p>Lamprey- Spawning and adult habitat assigned a rating of 'fair'. The physical habitat was suitable for spawning and hiding places for adults were noted within the channel. However, siltation, low DO levels and poor water quality limits the suitability of this site for lamprey spawning. Lamprey nursery habitat was assigned a rating of 'fair', as some silty/sand accumulations were noted along the stream margins.</p>					

Crayfish- Crayfish habitat was assigned a rating of 'fair'. No large boulders were noted in the stream, with some siltation and high turbidity noted. However, soft banks for burrowing and overhanging vegetation and tree roots were noted. No crayfish were observed during the survey.

Images:



From left to right: representative image of the survey location, the survey location looking upstream, the right bank, the left bank.

Table Q-7. Aquatic ecology datasheet for site 5.

Mayne River (Mayne_010)				Date: 13/6/2023	
Site ID:	Site 5	GPS Location:	53.4077329, -6.2005508	Site info:	Accessed from track to the north of the site.
DO (%):	79.1	Bedrock:	0%	Flow discharge:	Normal
DO (mg/l):	7.55	Boulder (>250mm):	0%	Velocity:	Slow
Temp (°C):	17.5	Cobble (65-250mm):	30%	Turbidity:	None
Conductivity (µS/cm):	-	Gravel (17-64mm):	30%	Colour:	None
pH:	-	Fine Gravel (3-16mm):	30%	Siltation:	Heavy
Bank height (m):	0.5	Sand (<2mm):	10%	Sewage Fungus:	None
Bank width (m):	1.5	Silt (<0.06mm):	0%	Filamentous Algae:	50%
Wet width (m):	1.5	Main land use US:	Scrub	Shading:	Heavy
Avg depth (cm):	10	Cattle Access US/DS:	None	Substrate condition:	Normal
Comments:	Channel straightened and valley sides reprofiled. Dense <i>Vaucheria</i> growth observed in less heavily shaded section of the stream immediately downstream of the culvert. Dense bramble scrub causing tunnelling effect. Stream extremely overgrown. Butterfly bush <i>Buddleia davidii</i> noted within surveyed reach and Japanese Knotweed <i>Reynoutria japonica</i> noted downstream of surveyed reach. Two active badger setts located adjacent to the stream within the scrub habitat. Group A and B taxa absent, Group C excessive, Group D common and Group E few.				
Macroinvertebrate list			EPA Sensitivity Group	Abundance	
<i>Potamopygrus antipodarum</i>			C	Excessive	
<i>Asellus aquaticus</i>			D	Common	
<i>Baetis rhodani/atlanticus</i>			C	Few	
<i>Gammarus</i> sp.			C	Few	
Chironomidae			C	Few	
Simuliidae			C	Few	
Hydracarina			C	Few	
Ceratopogonidae			C	Few	
Sphaeriidae			D	Few	
Lumbriculiidae			-	Few	
Veliidae			C	Few	
Tubificidae			E	Few	
<i>Eiseniella</i> sp.			-	Few	
Total No. of Taxa = 13					
Q-value = 2-3					
Fisheries Habitat: Summary					
<p>Salmonids- Spawning and adult habitat assigned a rating of 'none-poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted and poor water quality would be an issue for salmonids in this stream. Juvenile salmonid habitat was assigned a rating of 'none-poor'. The physical habitat was unsuitable with shallow, slow flowing water over predominantly fine substrates (gravel and sand) noted. Overhanging vegetation was present. Unsatisfactory water quality is likely to be an issue, however.</p>					
<p>Lamprey- Spawning and adult habitat assigned a rating of 'none-poor'. Gravel/cobble habitat was observed in the channel however any potential spawning habitat was heavily silted and poor water quality would be an issue for lamprey in this stream. Lamprey nursery habitat was assigned a rating of 'none-poor'. The physical habitat was unsuitable with only very small areas of silty sand accumulations noted on the river margins. Unsatisfactory water quality is likely to be an issue.</p>					

Crayfish- Crayfish habitat was assigned a rating of 'none-poor'. No large boulders and cobbles which could provide cover were noted in the stream, with heavy siltation observed. Some instream vegetation noted in the less shaded part of the stream immediately downstream of the culvert. No crayfish were observed during the survey.

Images:



From left to right: the survey location looking upstream, the survey location looking downstream, the uppermost section of the surveyed reach, dense bramble growth within the stream valley.

APPENDIX R Proposed Construction Corridor, Access Routes, Compounds & Crossings

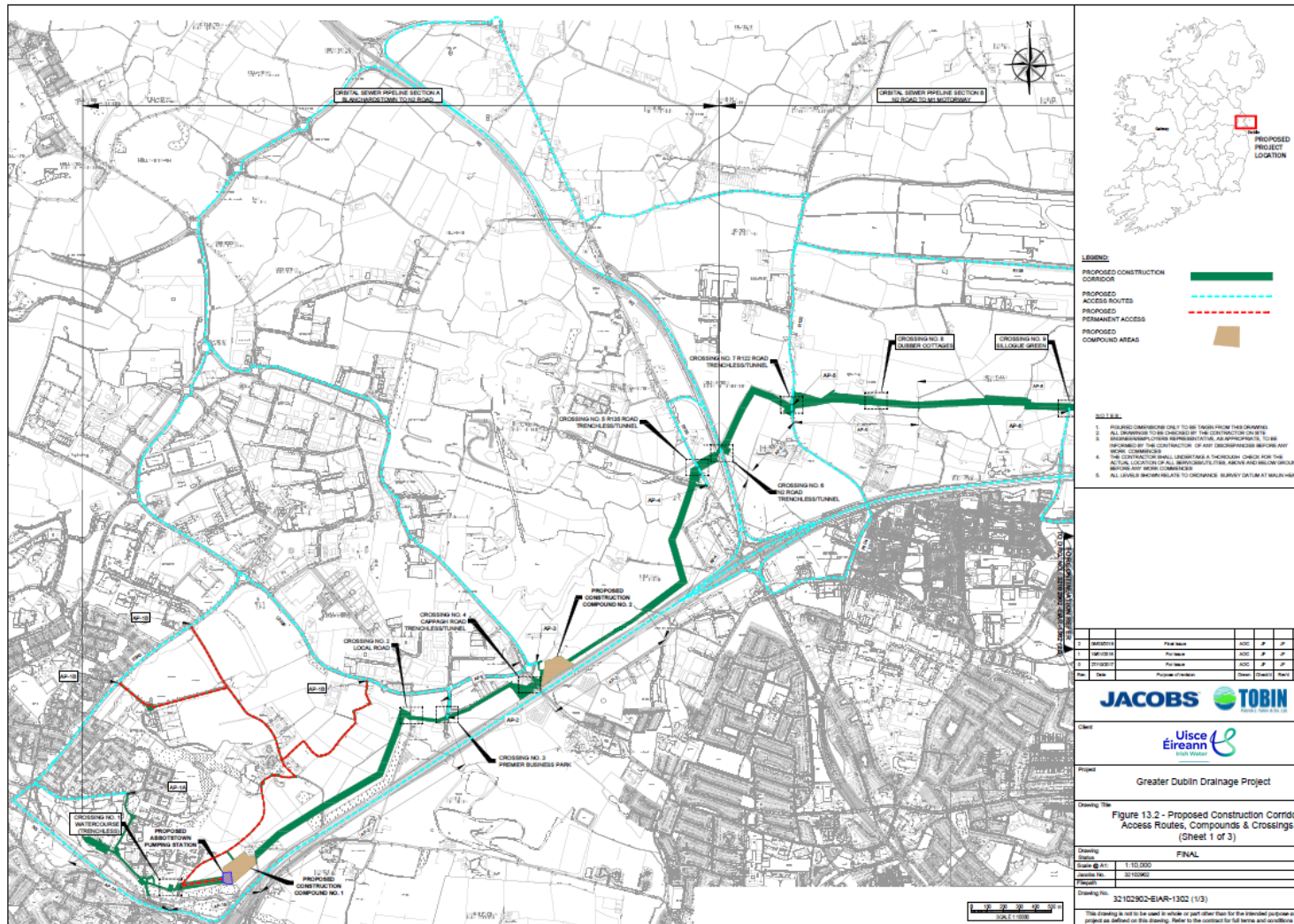


Figure R-1 Proposed Construction Corridor, Access Routes, Compounds & Crossings, Sheet (1-3)

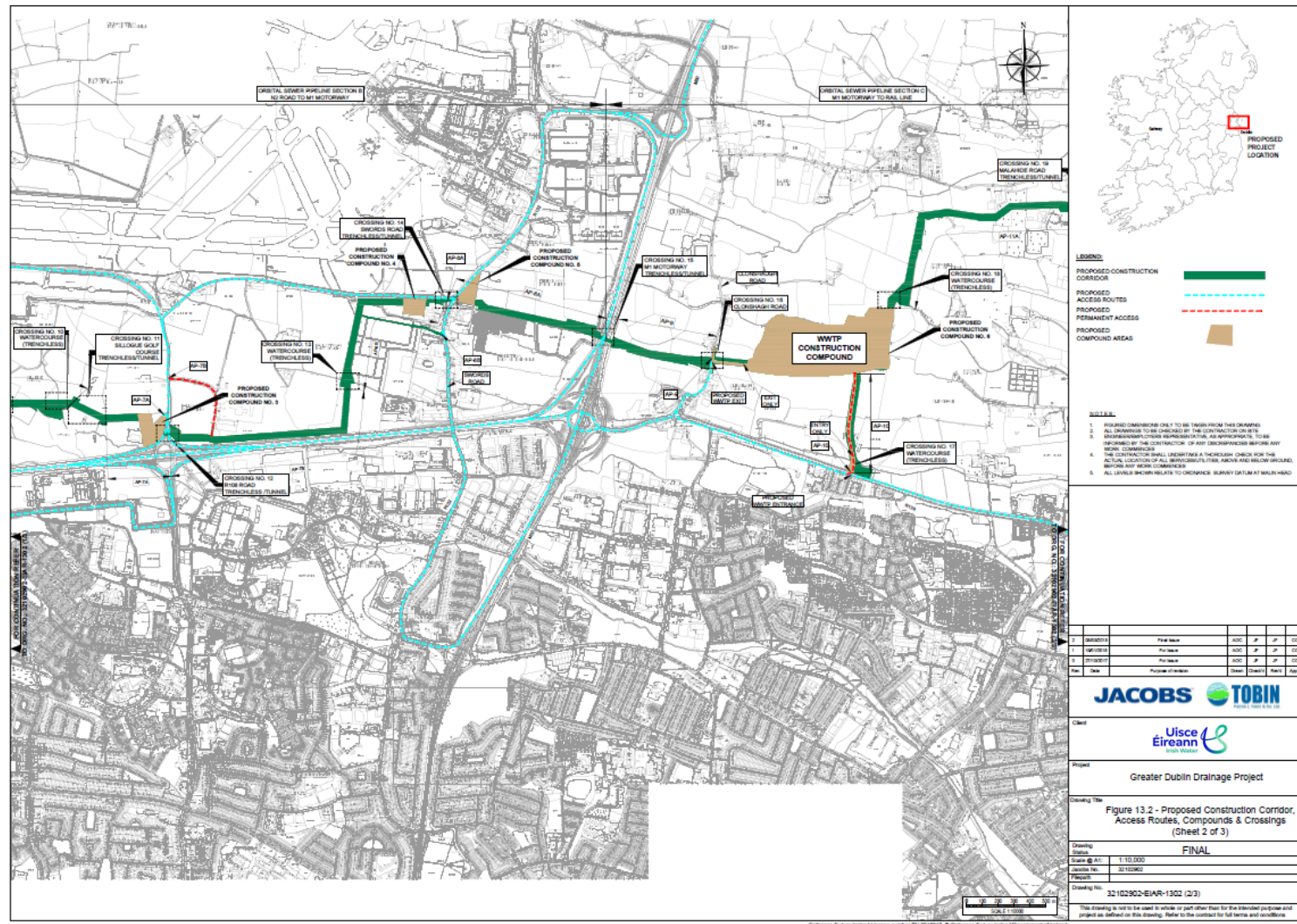


Figure R-2 Proposed Construction Corridor, Access Routes, Compounds & Crossings, Sheet (2-3)

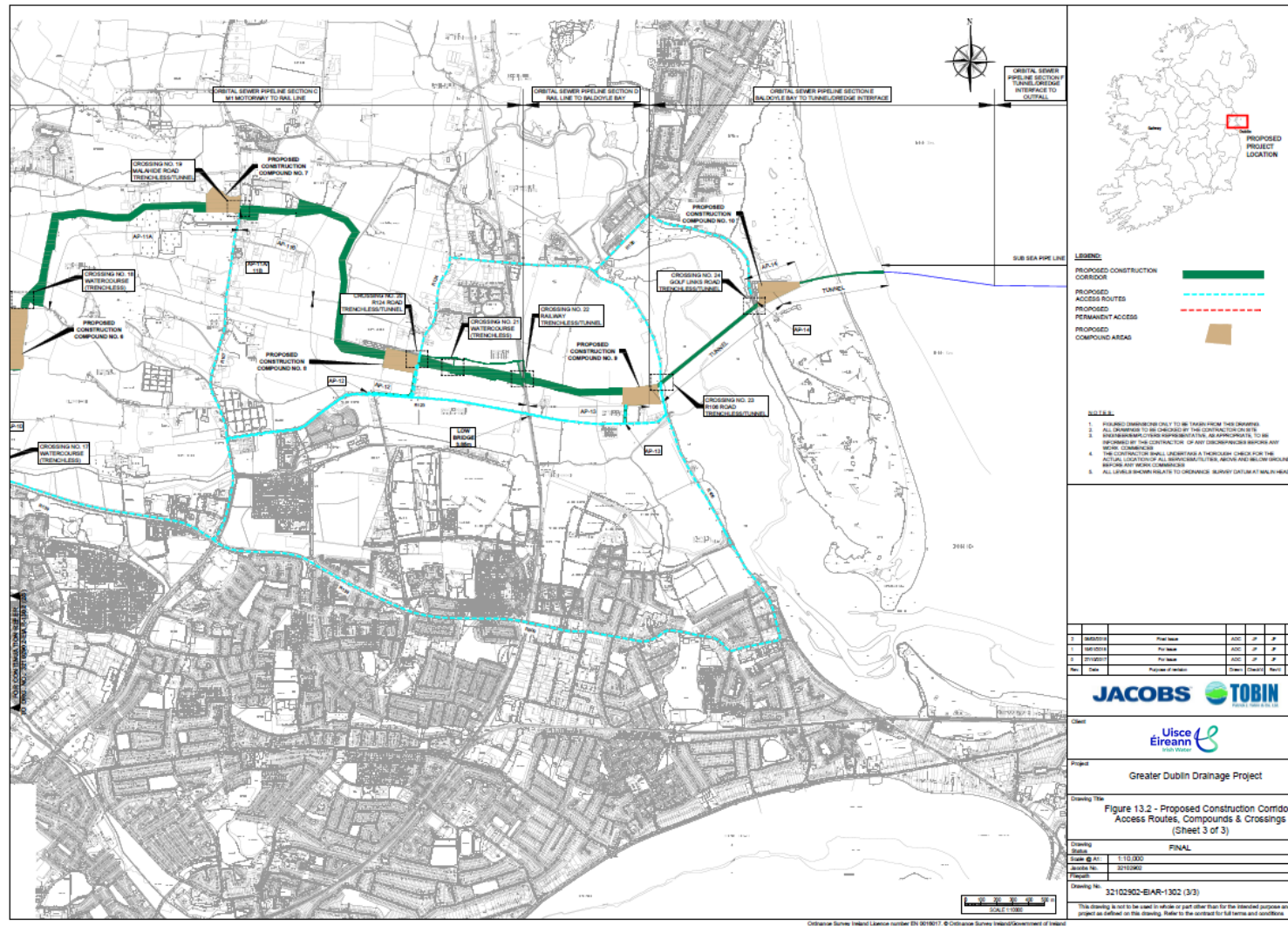


Figure R-3 Proposed Construction Corridor, Access Routes, Compounds & Crossings, Sheet (3-3)