Dunkettle EIAR

Appendices

Volume III

November 2024

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O'Flynn Group
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Appendices

November 2024

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Appendices

CHAPTER 11	**Biodiversity**
Appendix 11.1	Legislation and Policy
Appendix 11.2	Value of Ecological Resources
Appendix 11.3	Bat Report
CHAPTER 12	**Noise & Vibration**
Appendix 12.1	Acoustic Design Statement
Appendix 12.2	Glossary of Acoustic Terminology
CHAPTER 15	**Cultural Heritage**
Appendix 15.1	Archaeological Inventory Entries
Appendix 15.2	Geophysical Survey Report
Appendix 15.3	Archaeological Test Trenching Report
Appendix 15.4	Photographic Record

November 2024

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CHAPTER 7 Material Assets: Built Services

Appendix 7.1 Surface Water drainage Scheme with SuDS Elements - Maintenance Plan

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Appendix 7.1 Surface Water drainage Scheme with SuDS Elements - Maintenance Plan

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JODA
ENGINEERING CONSULTANTS
ESTD 1961

O’Flynn Construction Co. Unlimited Co.

Residential Development at Dunkettle

Cork

Surface Water drainage Scheme with SuDS Elements –

Maintenance Plan

Prepared By

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DOCUMENT VERIFICATION

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<tr><td>Project Title</td><td colspan="4">Dunkettle Development</td></tr>
<tr><td>Document Title</td><td colspan="4">Surface Water Drainage System with SuDS elements – Maintenance Plan</td></tr>
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</table>

Revision	Date	Comments	Author
-	**14.10.24**	**LRD Planning Application issue (Phase 1)**	**PM**

Contents

1.0 INTRODUCTION

1.1 Scope of this document

This is a maintenance plan for a surface water drainage scheme containing SuDS components.
This is a live document that shall be adopted and updated as necessary during the construction phase and operation phase of the scheme to reflect the understanding of the maintenance requirements of the system.

The current status of this document is

Issued in support of Dunkettle Development Phase 1.

1.2 Site Location

The site is located on the east side of Cork city, centered at grid reference E:572700m, N573700m ITM as outlined in red on Figure 3-1 below

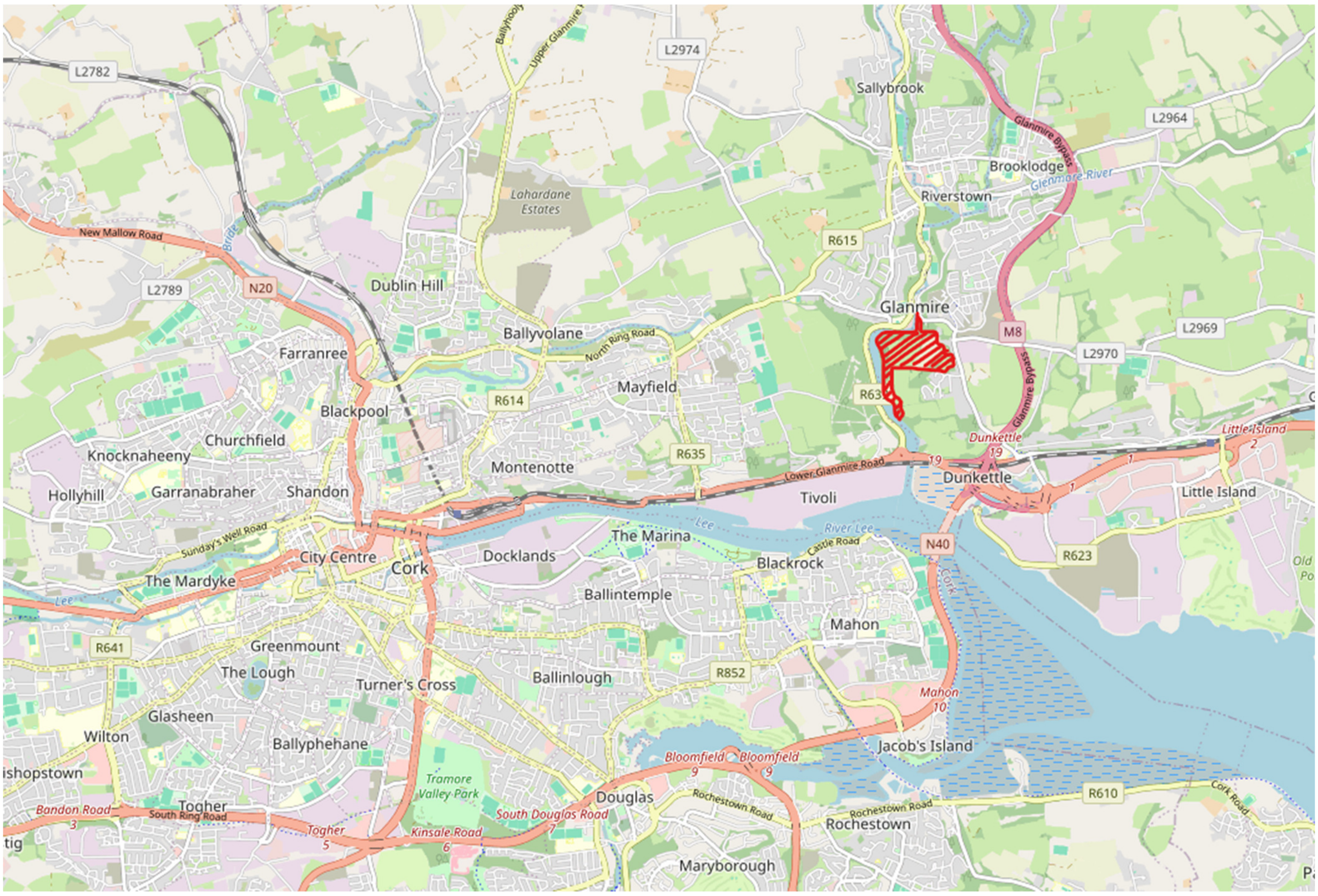

Figure 1-1 Site Location (Source map: Openstreetmap.org)

Near to the north of the site is historic centre of Glanmire village. The national primary road N8 passes near the southern side of the site with the Dunkettle Interchange near the south-east corner of the site. The Glashaboy river flows north to south adjacent to the western boundary of the site.

1.3 Development Overview

The development consists of 550 residential units in a mix of house and apartment types, a crèche and commercial units, as shown on Figure 1-2 below:

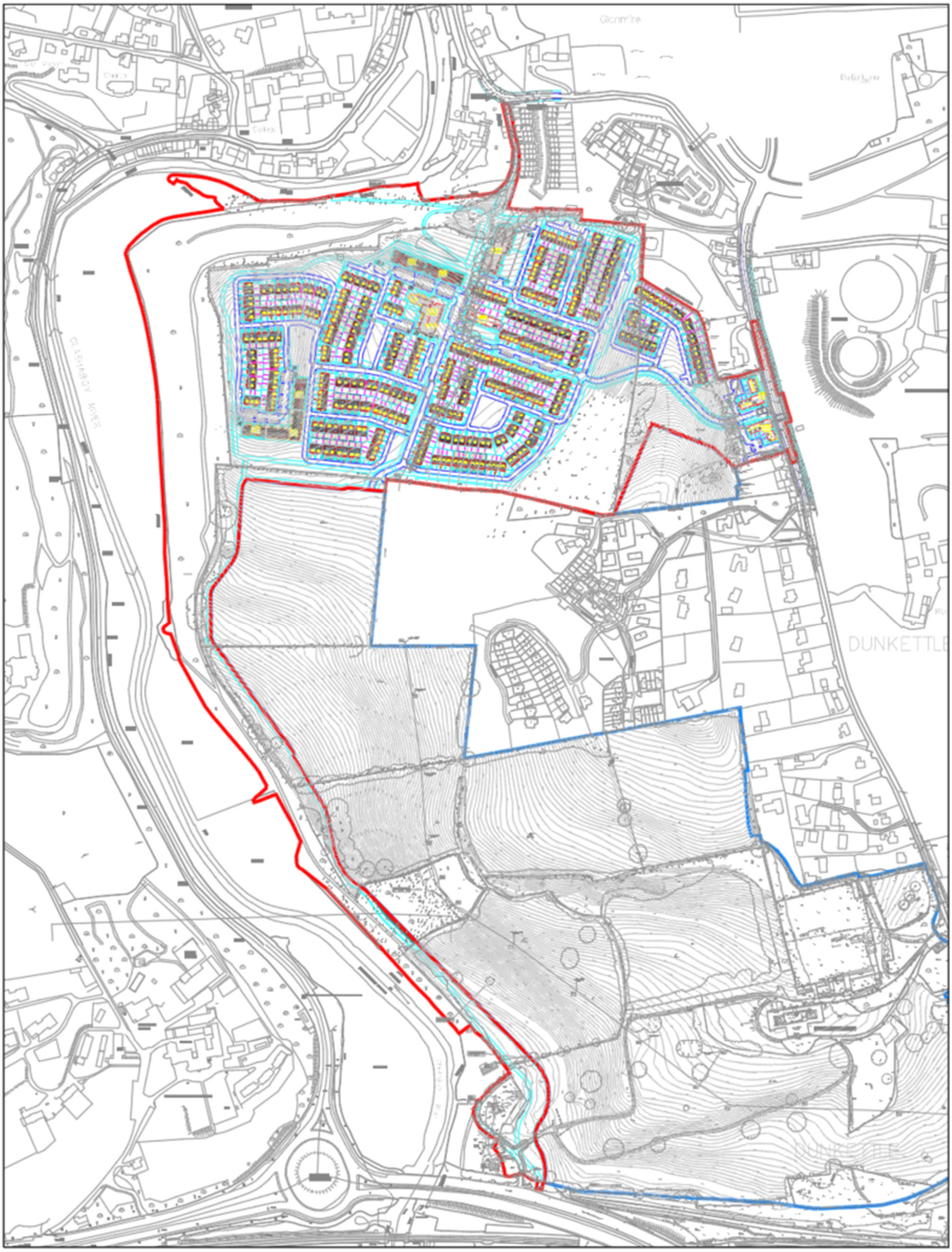

Figure 1-2 Proposed Development

The surface water drainage scheme layout is shown in the following drawings: -

Drawing Reference	Contents
3442 – Joda – 01-00 – DR – C – 2001	Surface water drainage and SuDS features layout – Overall site layout
3442 – Joda – 01-00 – DR – C – 2002	Surface water drainage and SuDs features layout – Sheet 1
3442 – Joda – 01–00 – DR – C - 2003	Surface water drainage and SuDs features layout – sheet 2
3442 – Joda – 01-00 – DR – C – 2004	Surface water drainage and SuDs features layout – Sheet 3
3442 – Joda – 01-00 – DR – C – 2005	Surface water drainage and SuDs features layout – sheet 4

2.0 Surface water drainage Scheme – System Overview

The surface water drainage system contains components as outlined in the Table below:

Present on This Scheme	Component Description
Yes	Piped drains with inspection chambers
Yes	Trapped inlet gullies in roads and paved surfaces
Yes	Kerb drains with sump outlets
Yes	Channel drains with sump outlets
-	Pervious pavement
Yes	Filter drain
-	Filter strip
Yes	Dry swale
-	Bioretention swale
-	Wet swale
-	Infiltration trench
-	Infiltration basin
-	Detention basin
Yes	Percolation area
Yes	Pond
-	Wetland
-	Modular storage
Yes	Concrete tank storage
Yes	Flow control device
Yes	Hydrocarbon/Silt separator
-	Green roof (in public domain)
Yes	Green roof (in private domain)
-	Proprietary treatment system

3.0 Maintenance Schedule

Roads and other pavement surfaces with surface-inlet drainage items	
Activity	**Frequency**
Sweep the road of debris	Monthly, generally Twice monthly Oct/Nov
Empty road gully sumps, kerb drain sumps, linear drain sumps	Twice Yearly (March, September)
Jet clean kerb drains, linear drains	Yearly (September)
Open inspection chamber covers, check chambers for cleanliness and free – flow of water	Yearly

Swales and Filter Strips	
Activity	**Frequency**
Litter Collect and remove from site all extraneous rubbish including paper, packaging materials, bottles, cans and similar debris.	Monthly
Grass Mowing Maintain height of grass between 100mm and 150mm. Cut when necessary and remove arisings to wildlife piles if grass exceeds 150mm. Generally, to surroundings and banks of swale, keep grass at 35mm – 50mm minimum and 75mm maximum Grass in the base of the channels should be longer to trap debris and oils. Keep between 100mm – 150mm First and last cut in season, or if grass longer than 150mm, disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works Where waterlogging or wetland develops due to wet conditions, review frequency with Client Representative	As Required
Scarifying and Removal of "Thatch" Scarify with tractor-drawn or self-propelled equipment to a depth of 50mm to relieve thatch conditions and remove dead grass and other organic matter	As required following Inspection
Spiking Spike with tractor-drawn or self-propelled spiker to aerate the soil to a depth of 100mm, at 100mm centres	As required following Inspection

Swales and Filter Strips	
Activity	**Frequency**
Hollow Tining Hollow tine with tractor-drawn or self-propelled equipment to a depth of 100mm, at 100mm centres, removing the cores from the surface	As required following Inspection
Monitoring Inspect infiltration areas following heavy rain and record areas that are "ponding" and where water is lying for more than 48 hours. Report to Client.	As required, Monthly and in response to advice from site personnel
Remedial Work to Grass Areas Subject to Silt Accumulation Remove damaged or silt-covered turf to a depth 50mm below original design level and cultivate to a fine tilth. *Either* Re-turf using turf of a quality and appearance to match existing using addition fine sieved topsoil to BS3882 to achieve final design levels; *Or* Reseed to BS7370: Part 3, Clause 12.6 using seed to match existing turf in appearance or quality. Supply and fix fully biodegradable coir blanket as suppliers' instructions to protect seeded soil. Top-dress with fine sieved topsoil to BS3882 to achieve final design levels. Provide protection and watering to promote successful germination and/or establishment. When there is a build up of silt in the channel bottom, i.e. 50mm above the general area, then this should be removed in autumn or early spring when the ground is damp, and grass turves transplanted to original levels Lift turf for no more than 20% of length or area of base to ensure filter function continues and remove depth of accumulated sediment. Replace or renew turves. Spread excavated material on site or to make up levels where required (providing the silt is not considered contaminated. This should be checked with Environment Agency)	As required, Monthly and in response to advice from site personnel

Filter Drains & Infiltration Trenches	
Activity	**Frequency (per annum)**
Litter Collect and remove from site all extraneous, including paper, Packaging materials, bottles, cans and similar debris	Monthly
Grass Mowing Generally, to surroundings of filter drain, keep grass at 35mm – 50mm minimum and 75mm maximum. Ensure that the grass cuttings are collected and disposed of well away from the system, to ensure they do not contribute to future surface clogging Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	As required
Weed Control Hand pull or spot treat weed growth in filter drains/infiltration trenches using an approved herbicide.	As required
Monitoring Monitor accumulation of silt at inlet/outlet infrastructure. Advise client if silt build up is significant and take action to prevent blocking of drain. Monitor effectiveness of filter drain/infiltration trench surface, and when water does not infiltrate immediately, advise client of possible need to rehabilitate surface layers	Monthly
Rehabilitation Works Remove 150 – 300mm of the 20mm – 40mm single size clean round stone and set aside on a clean, hard surface or polythene sheet. Jet wash to remove any silt for reuse Fold in vertical geotextile sides and roll up horizontal geotextile including accumulated silt, taking care not to contaminate clean stone layer beneath Remove silted geotextile and dispose of safely to tip Supply and install replacement geotextile to match previous installation, fixing to edge boards as detail Replace clean 20mm – 40mm round stone making up volume with stone to match to surrounding ground level	As required

Ponds and Wetlands	
Activity	**Frequency (per annum)**
Litter	
Collect and remove from site all extraneous rubbish, including paper, packaging materials, bottles, cans and similar debris	Monthly
Grass Mowing	
Generally, to surroundings of ponds/wetlands, keep grass at 35mm – 50mm minimum and 75mm maximum for access. Ensure that grass cuttings are collected and disposed of well away from the system, to ensure they do not contribute to pond quality deterioration and/or inlet/outlet infrastructure blockages.	As Required
Meadow Management	1 or 2 cuts annually
Areas not required for access may be managed for wildlife interest only	
Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	
Manage Aquatic Planting	
Inspect vegetation to pond edge and remove nuisance plants during first one to three years	Monthly initially and then as required
Hand cut submerged and emergent aquatic plants a minimum of 100mm above wetland base, to include no more than 25% of pond/wetland surface. (machine cutting to be a method approved by the client or supervising agent)	Monitor monthly and manage annually or every 3 years.
Determine whether a pond liner has been used to waterproof the pond/wetland and protect accordingly. Damage to any pond liner will be made good at the contractor's expense	Between September and November inclusive
Remove all arisings including floating weed and spread on bank to de water for 48 hours	
Undertake an end of season clearance of up to 25% of all pond and wetland growth during September, minimising damage to wildlife and on instruction from the client representative /LA	Annually
Retain seed heads which contribute to winter appearance, keeping the maximum diversity of existing plants	
Undertake a spring tidy of all dead growth surviving the winter in February or March using shears and not a strimmer, enduring that all new growth is retained.	
Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	
Bank Clearance	
Remove bank vegetation by cutting to ground level, using an approved technique and as directed on site, up to 25% of all vegetation from waters edge to a minimum of 1m above water level taking care not to damage banks and potential	Annually, if required, or every 3 years. Undertake during mid-summer

Ponds and Wetlands	
Activity	**Frequency (per annum)**
animal habitat. The work to be undertaken between September and November inclusive in any one year. Disposal of arisings on wildlife piles, composting areas, or off-site as required by Schedule of Works	
Monitoring When silt accumulates to within 150mm of inlet or outlet inform and recommend remedial work to client	Monthly
Management of silt accumulation Following a site inspection by client representative/LA programme a phased removal of silt should be agreed, depending on the rate of build-up and risk assessment Confirm that silt is not considered toxic by suitable environmental testing. Remove silt as instructed – not more than 300mm depth and not more than 25% of pond or wetland area at any one time Spread excavated material adjacent to wetland to allow de-watering of silt and then on site to make up levels or off site if the silt is considered special waste Retain as much of existing vegetation as possible to ensure rapid re-colonisation of open areas Remove up to 25% of accumulated inorganic and organic silt using suitable tracked machinery and buckets without teeth (to prevent damage to liners), to the following guidelines: • Operate at a minimum distance of 1m from the bank • Undertake work between September and November inclusive to protect breeding or hibernating wildlife • Stack silt within 1m of bank edge for 48 hours to drain • Spread silt maximum 300mm deep as directed on site and outside line of drainage to de-water and oxidise (subject to consultation and agreement from Environmental Consultant) • Relocate after 1 month to make up design levels or top enclosing banks and berms or dispose of safely to authorised tip • Remove vegetation to wildlife piles, compost, or dispose off site after 48 hours	Annually if required or every 3 years. Undertake during mid-summer
Inlets and Outlet Infrastructure Maintenance Remove all litter and debris from inlet and outlet structure surroundings Strim 1m radius to all inlets and outlets, collecting all arisings and remove to wildlife piles, compost facility or dispose from site Remove all accumulated silt from inlet and outlet aprons and use to make up design levels or top enclosing banks or berms on site, or dispose of to an approved tip Ensure free movement of any moving parts, and grease if required	Monthly

Ponds and Wetlands	
Activity	**Frequency (per annum)**
Spillage In the event of a serious spillage close/block off inlet and or outlet infrastructure and contact the Environmental Protection Agency.	If Required
Overflow Weirs *Grass* Check for erosion of grass surface and make good as necessary Replacement turves will require pegging using wood or mild steel pegs, and monitoring monthly *Rip-Rap / Stone / Wire Gabions & Mattresses* Check that stone remains in position and that erosion does not occur Replace stones if required to ensure integrity of overflow surface Check wire mesh for integrity, repair damage and breakage in accordance with manufacturers recommendations	Monthly

Stilling Chamber No. 1 and Outlet No. 1 to Glashaboy River	
Activity	**Frequency**
Stilling Chamber Visual inspection of chamber from chamber cover level via opening cover (safety grating below cover to remain closed) to check for internal blockages/obstruction; Commission / instigate subsequent remedial actions as required.	Monthly
Outlet at Glashaboy River (exposed only at low tides) Visual inspection of outlet to river for obstruction/blockage; Commission / instigate suitable remedial measures as required.	Monthly

Rip-Rap basin and Outlet No. 2 to Glashaboy River	
Activity	**Frequency**
Rip Rap Basin General Visual Inspection; Remove vegetation, debris, jetsam etc. from basin and dispose accordingly to material type; Visual inspection of basin rock armouring at invert and sides – for evidence of stone movement/dislodgement/damage to gabion; Commission / instigate repairs to rock armouring and gabion system as necessary to restore integrity	Monthly
Outlet at Glashaboy River General Visual Inspection Remove debris, and jetsam from outlet and immediate surrounds and dispose accordingly to material type Inspect outlet to river and adjacent shoreline for damage/erosion. Commission / instigate repairs to outlet and adjacent shoreline as necessary to restore integrity	Monthly

Hydrocarbon & Silt Separators	
Activity	**Frequency**
Note: Note: Hydrocarbon and silt separators are proprietary devices with maintenance requirements specific to each type and size of model. It is strongly recommended that separators are maintained by contract agreement with suitably qualified maintenance companies in accordance with EN858 – 2 Separator systems for light liquids part 2 – selection of normal size installation, operation and maintenance. The following is an outline maintenance plan provided only as an indicator in advance of installation of specific devices.	
Open downstream catchpit chamber, inspect for hydrocarbons Check closure device for functionality	Every 6 months
Check closure device for functionality	Every 6 months
Internal visual inspection for damage	Every 6 months
Clean and test oil probe for functionality, replace as required	Every 6 months
Routine servicing of mechanical and electrical components	Every 6 months
Routine empty/desludge	Every 6 months

Hydrocarbon & Silt Separators	
Activity	**Frequency**
Test separator in integrity	Once per 5 years

Concrete Attenuation Tank & Flow Control Valve	
Item	**Frequency**
Concrete Attenuation Tank: Open covers at inlet and outlet to tank, from ground level inspect inverts for cleanliness and blockages Non routine cleaning of tank when tank does not drain down within 24 hours of the end of a rainfall event *Note: tank is an enclosed space and may contain standing water to a depth of up to 2m. All inspections shall be performed by suitably qualified personnel with appropriate safety training, equipment and briefing*	Every 6 months, during periods of low rainfall when tank is empty As required
Flow control device in chamber *Flow control devices are proprietary devices with maintenance requirements specific to each type and size of model.* *The following is an outline maintenance plan provided only as an indicator – for definitive guidance please refer to the manufacturer's requirements for the specific model* Open chamber and inspect for debris & debris build up; remove and dispose as necessary Open chamber and pull emergency release device Flow control device to be subsequently inpected by a specialist and repaired as required	Monthly In the case of overflowing & blockage

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CHAPTER 9 Land & Soils

Appendix 9.1	Old OSI Maps & Aerial Photograph
Appendix 9.1	Old OSI Maps & Aerial Photograph
Appendix 9.2	OSI Contour Mapping
Appendix 9.3	VCL Site Walkover Photographs
Appendix 9.4	Soil & Subsoil Mapping
Appendix 9.4A	Clonroche Soil Description
Appendix 9.5	Geotechnical Investigation Report
Appendix 9.6	Geological Survey of Ireland (GIS) Mapping
Appendix 9.7	EPA Licensed Facilities
Appendix 9.8	Engineering Cut & Fill Assessment and Access Detail Drawing
Appendix 9.9A	IGI Guidelines - Activities Environments Matrix
Appendix 9.9B	IGI Guidelines - Flow Chart

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Appendix 9.1 Old OSI Maps & Aerial Photograph

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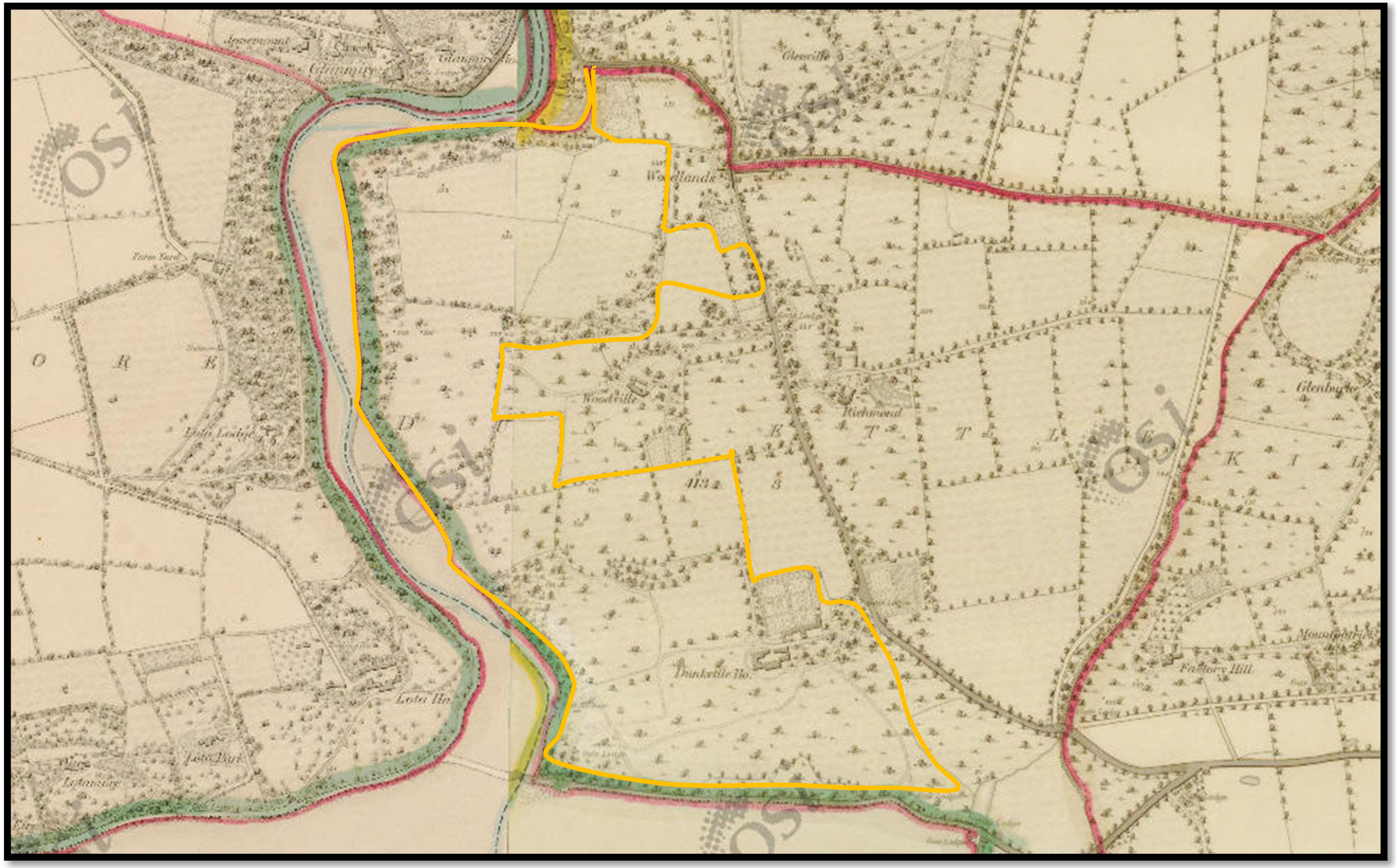

Image 9.1 Old OSI 1840's 6" Map of the Dunkettle area. Local area made up of large open fields with woodland & mature trees. (Approximate study area shown by orange line).

(Sourced from GSI Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

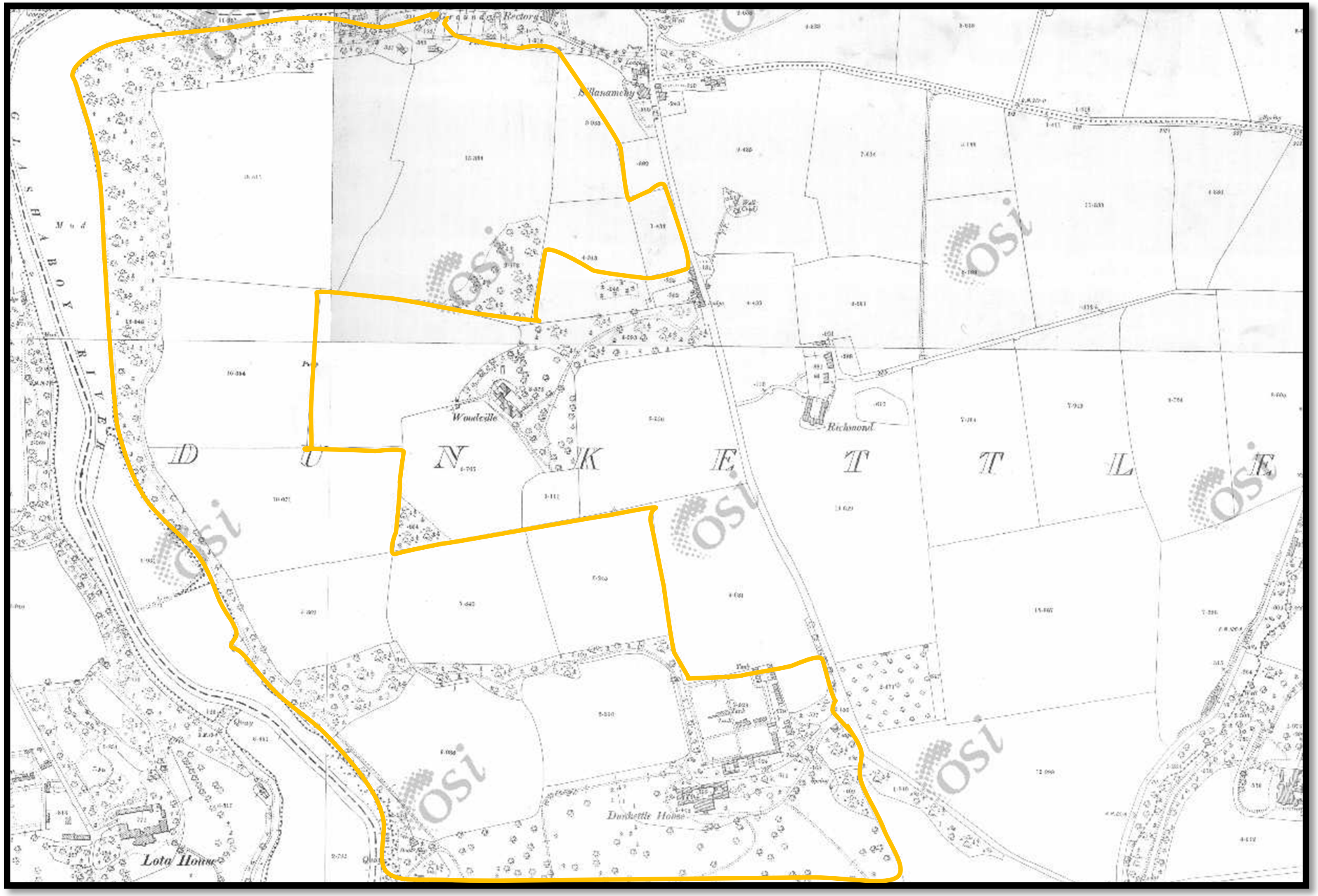

Image 9.2 OSI early 1900's 25" Map of the Dunkettle area. Site area made up of large open fields with mature woodland.

(Sourced from GSI Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

Image 9.3 OSI Aerial Photograph of study area from 1996.

(Sourced from GSI Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

Appendix 9.2 OSI Contour Mapping

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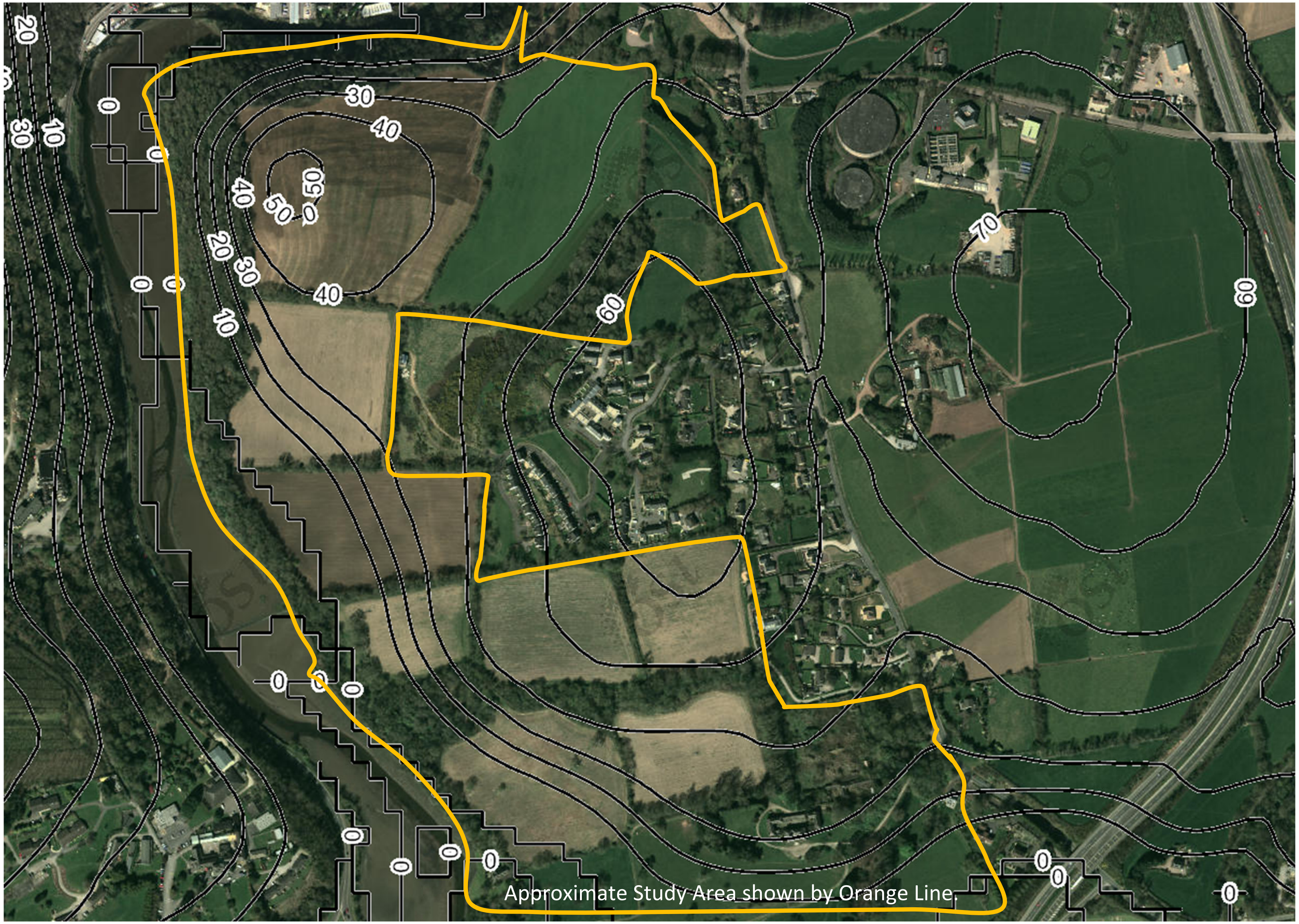
Appendix 9.2 – OSI Contour Mapping



Approximate Study Area shown by Orange Line.

(Sourced from GSI Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eireann – Surveying)

Appendix 9.3 VCL Site Walkover Photographs

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Photo 9.3.1 – Old access track from local road (L2998) at North end of study area.

Photo 9.3.2 – View East back towards access track from open western field at North end of study area. (Corner of field is being used as a temporary laydown for building materials.)


Photo 9.3.3 – View South across open field on east side of access in Phase 1 area.


Photo 9.3.4 – View back NW towards access track from open field on east side of access.


Photo 9.3.5 – View SW across open field on east side of Phase 1 development area.

Photo 9.3.6 – View South of small sloping field on east side of Phase 1 development area.

Photo 9.3.7 – View East from east side of Phase 1 area of proposed new site access point.

Photo 9.3.8 – View North of eastern side of the Phase 1 development area with Ballinglanna and Glanmire residential areas in background. New access on east side of this field.

Photo 9.3.9 – View NE across the open field in the eastern part of the Phase 1 area. (This view is back towards the photo 9.3.5).

Photo 9.3.9 – View North across the open field in the western part of the Phase 1 area.

Photo 9.3.11 – View east from high ground across the middle part of the western field, the eastern field and wooded area of the Phase 1 area are in the background.

Photo 9.3.12 – View SW from edge of western field in the phase 1 area. Note manhole for the Main Sewer line which runs N-S through the site area.

Photo 9.3.13 – View back NE across the high ground on the west side of the western field located in the Phase 1 area.

Photo 9.3.14 – View of straw bale that rolled into the old boundary wall on the edge of the mature woodland area which forms the northern and western boundary of the site area.

Photo 9.3.15 – View East of hilly scrub and wooded area to the east (outside) of the site area.

Photo 9.3.16 – View SW of westward sloping field in the NW part of the Phase 2 area.

Photo 9.3.17 – View SW of westward sloping field in the northern part of the Phase 2 area.

Photo 9.3.18 – View NW of same field as above in the northern part of the Phase 2 area.

Photo 9.3.18 – View NW of westward sloping field in the SW part of the Phase 2 area.

Photo 9.3.18 – Sandstone bedrock outcropping on track to fields west of Dunkettle House.

Photo 9.3.19 – View North of field that forms the southern part of the Phase 2 area.

Photo 9.3.20 – View SW back across the field that forms the southern part of the Phase 2 area.

Photo 9.3.21 – View NE of the open field that forms the SE part of the Phase 2 area.

Photo 9.3.22 View West of field behind Dunkettle House this is outside the development area.

Photo 9.3.23 – View South sloping fields near Dunkettle House outside the development area.

Photo 9.3.24 View SW of Upper Cork Harbour. Out flow of Glashaboy Estuary on right (arrow). (These are open fields make up the southern section of the study area but are not part of the proposed residential development areas.)

Appendix 9.4 Soil & Subsoil Mapping

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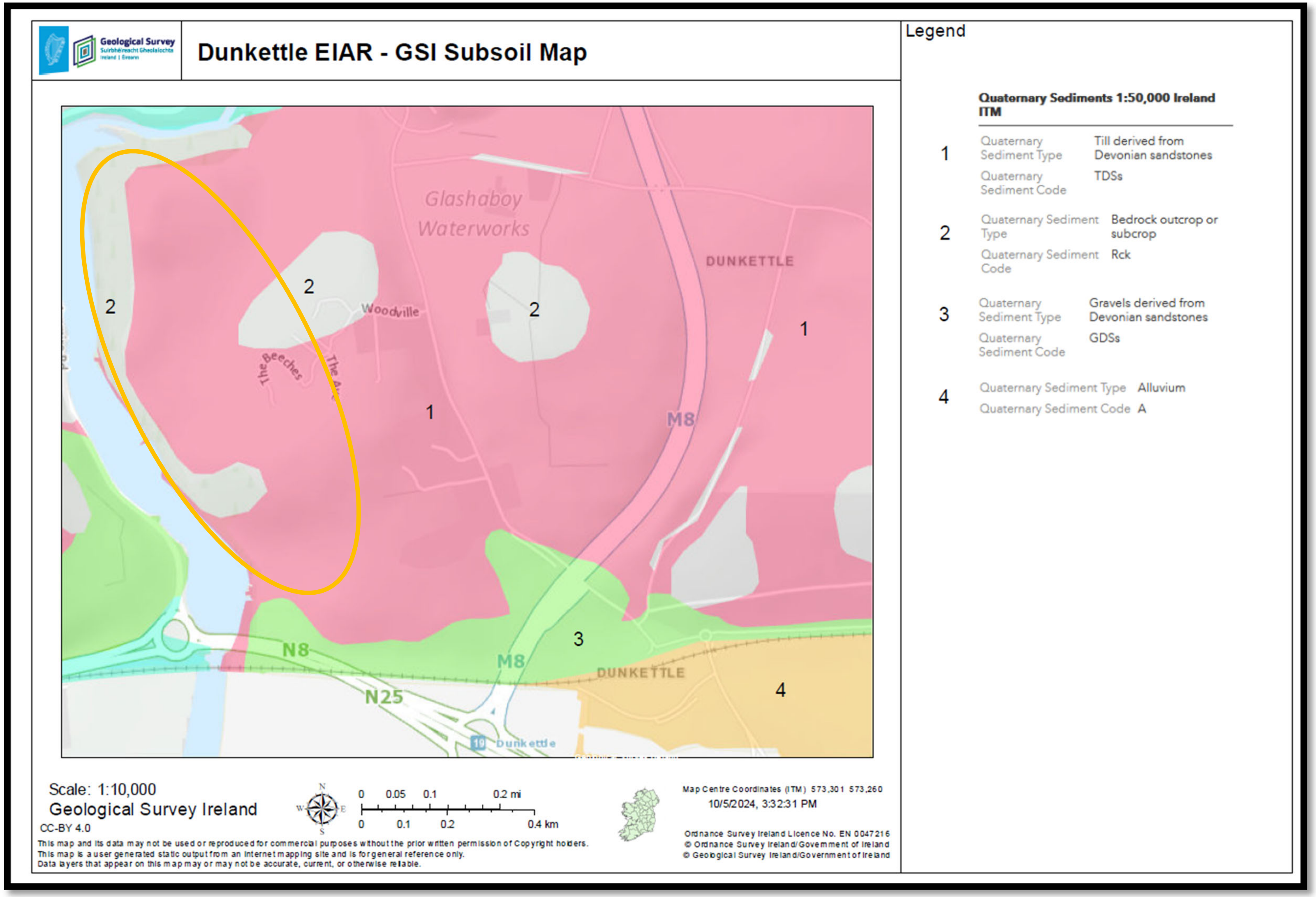
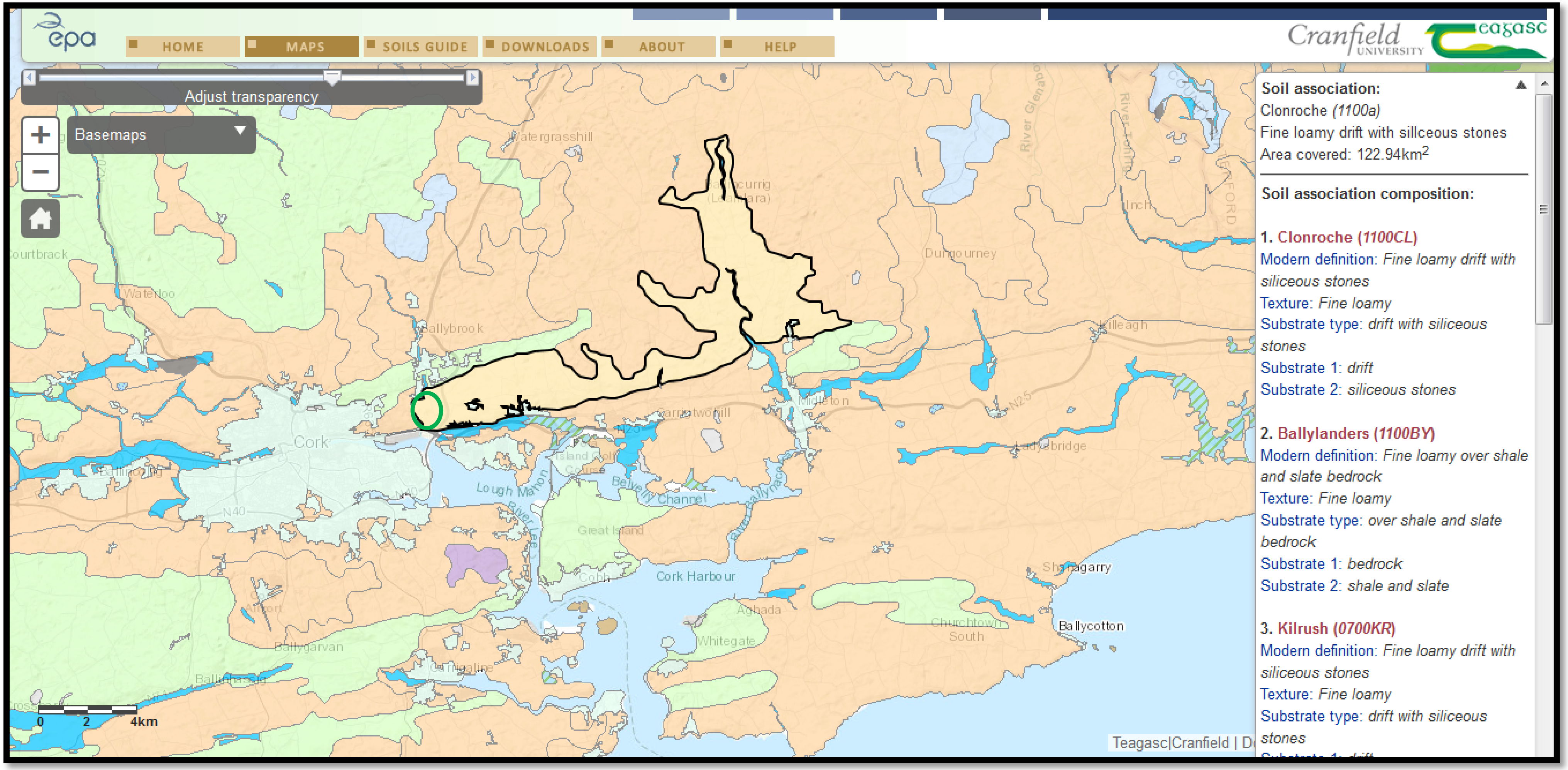


Image 9.4.1 - GSI Subsoil (Quaternary Sediments) Mapping, with approximate study area shown by orange oval shape.

Teagasc Soils:

Parent Material	TDSs
Parent Material Name	Till derived chiefly from Devonian sandstones
Parent Material Desciption	Sandstone till (Devonian)
Soil Group	Acid Brown Earths, Brown Podzolics
IFS Soil Code	AminDW
IFS Soil Description	Derived from mainly non-calcareous parent materials
County	CORK
Category	Deep well drained mineral (Mainly acidic)
Legend	AminDW - Deep well drained mineral (Mainly acidic)

Image 9.4.2 Screen Grab from GSI web site showing Teagasc Soil Mapping, with approximate study area shown by orange oval shape.



Soil association:
Clonroche *(1100a)*
Fine loamy drift with sillceous stones
Area covered: 122.94km^2

Soil association composition:

1. Clonroche *(1100CL)*
Modern definition: *Fine loamy drift with siliceous stones*
Texture: *Fine loamy*
Substrate type: *drift with siliceous stones*
Substrate 1: *drift*
Substrate 2: *siliceous stones*

2. Ballylanders *(1100BY)*
Modern definition: *Fine loamy over shale and slate bedrock*
Texture: *Fine loamy*
Substrate type: *over shale and slate bedrock*
Substrate 1: *bedrock*
Substrate 2: *shale and slate*

3. Kilrush *(0700KR)*
Modern definition: *Fine loamy drift with siliceous stones*
Texture: *Fine loamy*
Substrate type: *drift with siliceous stones*

Image 9.4.3 - Screen Grab of Clonroche Soil Association from EPA web site – approximate location of the Dunkettle study area location shown by green circle.

(Clonroche Soil Description from the EPA/Teagasc Soil Association web site is attached below.)

Appendix 9.4A Clonroche Soil Description

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SERIES: CLONROCHE

Reference profile:	RPS62RC04
County:	Kilkenny
Weather:	Overcast
Elevation:	256

TOPOGRAPHY

Position:	Lower slope
Slope degree:	1
Slope Form:	Straight
Aspect:	

PARENT MATERIAL

Substrate Type:	Drift
Substrate Subgroup:	Siliceous stones

TEXTURAL CRITERIA

Textural Class:	Fine loamy
Texturally contrasting:	

LAND USE

Land use:	Grassland Improved
Human technologies:	Fertilizer applications, Ploughing

WATER TABLE:	None
ROCK OUTCROPS	None
SURFACE STONE	None

IRISH CLASSIFICATION (2013)

Soil subgroup: 11.0.0 Typical Brown Earth

National Soil Series: Clonroche
Fine loamy drift with siliceous stones

DESCRIPTION

0 - 21 cm **Ap**

MATRIX COLOR: 10YR43. **STONES (%):** None. **TEXTURE:** Loam. **STRUCTURE:** Moderate, Sub-angular blocky, Medium. **COMPACTION:** Non-cemented and Non-compacted. **CONSISTENCY:** Friable. **PLASTICITY:** Plastic. **STICKINESS:** Slightly sticky. **ROOTS:** Common, Very fine. **PACKING DENSITY:** Low. **BOUNDARY:** Abrupt, Smooth.

21 - 48 cm **Bw1**

MATRIX COLOR: 10YR44. **STONES (% TOTAL):** Common, Angular, Siliceous stones. **TEXTURE:** Loam. **STRUCTURE:** Moderate, Sub-angular blocky, Fine. **COMPACTION:** Non-cemented and Non-compacted. **CONSISTENCY:** Friable. **PLASTICITY:** Plastic. **STICKINESS:** Sticky. **ROOTS:** Common, Very fine. **PACKING DENSITY:** Low. **BOUNDARY:** Clear, Smooth.

48 - 75 cm **Bw2**

MATRIX COLOR: 10YR44. **STONES (%):** Many, 2-6 cm, Angular, Siliceous stones; 6-20 cm, Sub angular, Shale. **TEXTURE:** Loam. **STRUCTURE:** Moderate, Sub-angular blocky, Fine. **COMPACTION:** Non-cemented and Non-compacted. **CONSISTENCY:** Friable. **PLASTICITY:** Plastic. **STICKINESS:** Sticky. **ROOTS:** Very few, Very fine. **PACKING DENSITY:** Low. **BOUNDARY:** Abrupt, Wavy.

75 - 100 cm **BC**

MATRIX COLOR: 25Y54. **MOTTLE:** 25Y66. **STONES (%):** Many, 6mm -2 cm, Flat/platy, Shale; 2-6 cm, Flat/platy, Shale. **TEXTURE:** Sandy loam. **STRUCTURE:** Weak, Angular blocky, Medium. **COMPACTION:** Cemented. **CONSISTENCY:** Firm. **PLASTICITY:** Plastic. **STICKINESS:** Sticky. **COATS:** Manganese. **PACKING DENSITY:** Medium.

LABORATORY ANALYSIS

Horizon	pH	Total (%)		Organic Carbon (%)	Loss-on-ignition (%)
		Nitrogen	Carbon		
1(Ap)	6.6	0.48	4.27	3.57	
2(Bw1)	6.5	0.29	2.42	1.40	
3(Bw2)	6.5	0.18	1.23	0.80	
4(BC)	6.5	0.06	0.32	0.18	

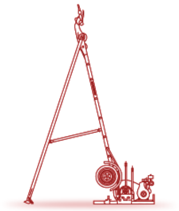
OXALATE EXTRACTABLE		EXCHANGEABLE COMPLEX					
Fe (g kg^{-1})	Al (g kg^{-1})	CEC (cmol kg^{-1})	Exchangeable Bases (cmol kg^{-1})				Base Saturation (%)
			Na$^+$	K$^+$	Mg^{2+}	Ca^{2+}	
8.69	2.94	15.30	0.13	0.59	1.67	12.35	96
9.78	3.18	9.63	0.14	0.63	1.26	6.29	86
11.82	5.26	8.05	0.10	0.42	1.14	4.19	73
2.02	1.07	4.35	0.08	0.23	0.65	1.82	64

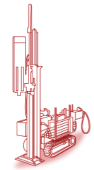
PARTICLE SIZE (%)			Textural Class USDA	Bulk Density g/cm^3	Standard Deviation
Sand 2000-50 µm	Silt 50-2 µm	Clay <2 µm			
43	34	23	Loam	0.92	0.11
40	35	25	Loam	0.96	0.02
35	41	24	Loam		
53	33	14	Sandy Loam		

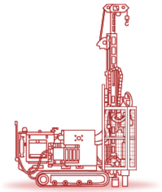
Appendix 9.5 Geotechnical Investigation Report

November 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS







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geotechnical

Our Ref: JMS/Rp/P21068

31st August, 2021.

O' Flynn Group
Beckett House,
Barrack Square,
Ballincollig,
Co. Cork.

Re: Dunkettle Development, Geotechnical investigation, Factual report

In March, 2021 Priority, were requested by O' Flynn Group, to undertake a site investigation to determine the ground conditions at a site located at Dunkettle, Cork. JODA were acting as consulting engineers for the project.

The Site generally consists of farmland with woodland. The land topography is generally sloping with steep slopes in parts of the site. There is a large depression in the ground close to the location of TP13. There is a known foul sewer traversing the site, consisting of 02Nr. asbestos cement rising mains at the north end of the site discharging to a concrete gravity pipe. There are live overhead electrical wires on the site. It is not known whether there are buried electrical services on the site.

It is proposed to construct a residential development on the site. The primary purpose of the site investigation is to determine the engineering soil characteristics of the ground, for the design of the road pavement, soil retaining structures and building foundations. Testing for contaminants in the soil is required to determine the suitability of the topsoil and subsoil for export from the site.

The scope of works as determined by JODA comprised of;

- 29Nr. trial pit excavations to 3.5m depth;
- All associated sampling;
- Associated geotechnical and environmental laboratory and
- Associated reporting.

Fieldworks

The intrusive works were carried out between the 31th March and 02nd April 2021 under the supervision of PGL, Engineering Geologist(s); in accordance with the contract specification: The site investigation was carried out in accordance with the specification for ground investigation, ground investigation and testing (BS EN 1997-2: 2007) and the relevant British Standards (BS 5930 (2015) Code of Practice for Site Investigation and BS 1377, Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests Parts 1 to 9). Details of the plant and equipment used are detailed on the relevant exploratory records.

Trial pit excavations

A total of twenty eight (28) trial pits were excavated to depths of 0.7m below existing ground level (bgl) to 3.5m bgl using an 8t tracked excavator. The exploratory records accompany this report.

Location	Final Depth (m bgl)	Date Start (dd/mm/yyyy)	Stability
TP01	1.7	31/03/2021	Good
TP02	2.0	31/03/2021	Good.
TP03	1.2	31/03/2021	Moderate.
TP04	1.4	01/04/2021	Moderate
TP05	1.4	31/03/2021	Good
TP06	3.0	31/03/2021	Good.
TP07	1.1	31/03/2021	Moderate.
TP08	3.5	31/03/2021	Moderate.
TP09	1.4	01/04/2021	Poor.
TP10	3.5	01/04/2021	Good.
TP11	3.5	31/03/2021	Good.
TP12	1.5	31/03/2021	Poor.
TP13	1.2	31/03/2021	Very Poor.
TP14	1.9	01/04/2021	Moderate.
TP15	1.9	01/04/2021	Moderate.

Location	Final Depth (m bgl)	Date Start (dd/mm/yyyy)	Stability
TP16	3.0	01/04/2021	Moderate.
TP17	3.5	02/04/2021	Moderate.
TP18	3.5	02/04/2021	Good.
TP19	1.3	02/04/2021	Poor.
TP20	2.0	02/04/2021	Moderate.
TP21	1.9	02/04/2021	Poor.
TP22	0.7	02/04/2021	Moderate.
TP23	1.5	02/04/2021	Moderate.
TP24	1.6	02/04/2021	Poor.
TP25	1.8	01/04/2021	Moderate.
TP27	1.6	01/04/2021	Good.
TP28	3.5	01/04/2021	Good.
TP29	1.7	01/04/2021	Good.

Sampling

A total of ninety four (94) bulk disturbed samples (B), sixty six (66) small disturbed samples (D) and eighteen (18) environmental samples (ENV) were recovered from the exploratory holes in accordance with Geotechnical Investigation and Sampling – Sampling Methods and Groundwater Measurements (EN ISO 22475-1:2006).

Location plan

The 'as built' exploration locations were surveyed to approximate location using a hand held Garmin GPS unit to the Ordinance Survey Irish Transverse Mercator system of co-ordinates (ITM) and shown on the relevant exploratory logs and the Exploratory Location Plan accompanying this report.

Location	Easting	Northing	Final Depth (m bgl)	Date Start (dd/mm/yyyy)
TP01	572746	573888	1.7	31/03/2021
TP02	572859	573876	2.0	31/03/2021
TP03	572993	573882	1.2	31/03/2021
TP04	572610	573759	1.4	01/04/2021
TP05	572689	573768	1.4	31/03/2021
TP06	572827	573723	3.0	31/03/2021
TP07	572990	573752	1.1	31/03/2021
TP08	573151	573683	3.5	31/03/2021
TP09	572533	573597	1.4	01/04/2021
TP10	572692	573598	3.5	01/04/2021
TP11	572855	573615	3.5	31/03/2021

Location	Easting	Northing	Final Depth (m bgl)	Date Start (dd/mm/yyyy)
TP12	573024	573638	1.5	31/03/2021
TP13	573066	573638	1.2	31/03/2021
TP14	572503	573441	1.9	01/04/2021
TP15	527553	573477	1.9	01/04/2021
TP16	572669	573440	3.0	01/04/2021
TP17	572596	573294	3.5	02/04/2021
TP18	572701	573299	3.5	02/04/2021
TP19	572780	573310	1.3	02/04/2021
TP20	573067	573297	2.0	02/04/2021
TP21	573110	573296	1.9	02/04/2021
TP22	572707	573162	0.7	02/04/2021
TP23	572845	573160	1.5	02/04/2021
TP24	572980	573156	1.6	02/04/2021
TP25	573108	573129	1.8	01/04/2021
TP27	572830	573006	1.6	01/04/2021
TP28	573000	573018	3.5	01/04/2021
TP29	573129	573040	1.7	01/04/2021

Laboratory testing

All samples were transported to Priority Geotechnical's laboratory in Midleton, Co. Cork and prepared for testing. The following tests were scheduled by JODA. Chemical analysis was undertaken by third party specialist laboratory: Eurofins (UK) Ltd. on behalf of PGL and was carried out in accordance with BS1377 (1990), Methods of test for soils for civil engineering purposes and the ISRM suggested methods for rock characterisation, testing and monitoring. A summary of tests undertaken were detailed as follows;

SUMMARY OF LABORATORY TESTING

Type	Nr.	Remarks
Environmental testing WAC	14	TP02 0.10m, TP02 0.3m, TP03 0.10m, TP03 0.30m, TP10 0.20m, TP10 0.50m, TP21 0.10m, TP21 0.50m, TP24 0.20m, TP24 0.60m, TP25 0.10m, TP25 0.50m, TP08 0.10m & TP08 0.30m. See attached results

Please note that all samples shall be retained for a period no longer than 28 days from the date of this report. Thereafter all remaining samples shall be appropriately disposed of unless a written instruction to the contrary is received by PGL prior to the date of this reporting and within the 28 day period outlined above. Laboratory testing will result in a reduction of sample quantity and in some cased the use of the full sample mass. Samples already tested may not be suitable or available for further testing.

Published Geology

A search of the Geological Survey data base and 1:100,000 mapping (Sheet 25) showed the area to be underlain by the Gyleen Formation (GY) and described as Sandstone with Mudstone and Siltstone. Teagasc subsoil mapping indicated the area is underlain by glaial till derived from Sandstones. Gravels are mapped to the south. Outcropping bedrock is shown throughout the area. The national Groundwater Vulnerability mapping showed the area to be of high to extreme vulnerability with the extreme rating likely associated with shallow depth to bedrock or bedrock at surface.

Ground and groundwater conditions

The full details of the ground conditions encountered are provided for on the exploratory records accompanying this report. The records provide descriptions, in accordance with BS 5930 (2015) and Eurocode 7, Geotechnical Investigation and Testing, Identification and classification of soils, Part 1, Identification and description (EN ISO 14688-1: 2002),– Identification and Classification of Soil, Part 2: Classification Principles (EN ISO 14688-2:2004) and Identification and Classification of Rock, Part 1: Identification & Description (EN ISO 14689-1:2004) of the materials encountered, *in situ* testing and details of the samples taken, together with any observations made during the site investigation.

No groundwater was encountered during the period of works. Groundwater levels may be subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions etc. The duration trial pit excavations remain open may not be sufficient to allow for low volume flow to present. The groundwater regime should be assessed from standpipe well installations, where available.

Should you have any queries in relation to the data collected and presented herein, please do not hesitate to contact our office.

Yours sincerely,
For **Priority Geotechnical,**

SMcSweeney

James McSweeney BSc
Engineering Geologist

No responsibility can be held by PGL for ground conditions between exploratory locations. The exploratory logs provide for ground profiles and configuration of strata relevant to the investigation depths achieved during the fieldworks. Caution shall be taken when extrapolating between such exploratory locations. No liability is accepted for ground conditions extraneous to the exploratory locations.

No account has been taken of potential subsidence or ground movement due to mineral extraction, mining works or karstification below or in proximity to the site, unless specifically addressed.

This report has been prepared for the Employer and their Representative as outline, herein. The information should not be used without their prior written permission. PGL accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

Project Id:	P21068	Title:	Site Plan
Project Title:	Dunkettle Development	Scale:	1:7000
Location:	Dunkettle, Co. Cork	Engineer:	JODA
Client:	O'Flynn Group	Contractor:	PGL

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Legend Key

○ Locations By Type - Empty

▣ Locations By Type - TP

Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

**	Drillers Description
Friable	Easily crumbled

SAMPLES

U( )	Undisturbed 102mm diameter sample, ( ) denotes number of blows to drive sampler
U( )F, U( )P	F- not recovered, P-partially recovered
U38	Undisturbed 38mm diameter sample
P(F), (P)	Piston sample - disturbed
B	Bulk sample - disturbed
D	Jar Sample - disturbed
W	Water Sample
CBR	California Bearing Ratio mould sample
ES	Chemical Sample for Contamination Analysis
SPTLS	Standard Penetration Test S lump sample from split sampler

CORE RECOVERY AND ROCK QUALITY

TCR	Total Core Recovery (% of Core Run)
SCR	Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD	Rock Quality Designation (length of solid core greater than 100mm as % of core run)

Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column

If	Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL	Assumed Zone of Core Loss
NI	Non intact

GROUNDWATER

▽	Groundwater strike
▼	Groundwater level after standing period
Date/Water	Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

S	Standard Penetration Test - split barrel sampler
C	Standard Penetration Test - solid 60° cone
SW	Self Weight Penetration
Ivp, HVp (R)	In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F), (C), (R), (P)	Permeability Test
HP	Hand Penetrometer Test

MEASURED PROPERTIES

N	Standard Penetration Test - blows required to drive 300mm after seating drive
x/y	Denotes x blows for y mm within the Standard Penetration Test
x*/y	Denotes x blows for y mm within the seating drive
c_u	Undrained Shear Strength (kN/m^2)
CBR	California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	**Nominal Diameter (mm)**	
	Borehole	**Core**
N	75	54
H	99	76
P	120	92
S	146	113

Key Sheet

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Trial Pit No
TP01
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 572746E - 573888N

Level:

Date 31/03/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 6.00 × 1.00

Depth: 1.70m BGL

Scale 1:25

Client: O'Flynn Group

Logged RD

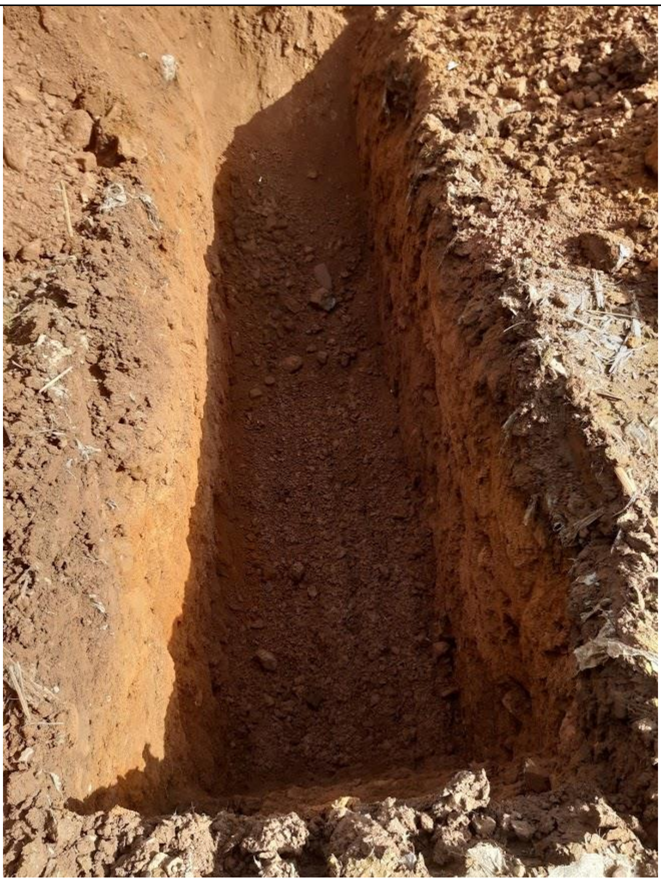
Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	Firm, brown, organic gravelly SILT with medium cobble content. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 110mm dia, angular to sub-angular.
▨	0.20	D					
▨	0.30 - 0.90	B		0.30		▨	Orange, slightly sandy gravelly SILT with high cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded. Cobbles are 63mm to 200mm dia, sub-angular to sub-rounded. Boulders are 200mm to 280mm dia, sub-angular to sub-rounded.
▨	0.60	D					
▨	0.90 - 1.60	B		0.90		▨	Beige, slightly sandy gravelly SILT with high cobble content. Gravel is fine to coarse, angular to rounded. Cobbles are 63mm to 200mm dia, sub-angular to sub-rounded. Boulders are 200mm to 350mm dia, sub-angular to sub-rounded.
▨	1.20	D					
▨	1.60 - 1.70	B		1.60		▨	Beige, very silty GRAVEL with a high cobble content. Gravel is fine to coarse and angular to sub-rounded. Cobbles range in dia from 63mm-200mm and are angular to sub-rounded.
				1.70			End of Pit at 1.700m

Stability: Good
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.70m due to suspected weathered bedrock.

Photographic Record



Number:	**TP01**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP01**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP02
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 572859E - 573876N

Level:

Date 31/03/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 5.00 1.00

Scale 1:25

Client: O'Flynn Group

Depth: 2.00m BGL

Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.20 0.10 0.10	B D ENV		0.20		▨	(TOPSOIL) brown, organic gravelly SILT. Gravel is fine to coarse and sub-angular to rounded. Strata contains plastic sheets.
▨	0.20 - 0.40 0.30 0.30	B D ENV		0.40		▨	Soft to firm, brown, slightly sandy gravelly SILT with medium cobble content. Gravel is fine to coarse and sub-angular to rounded. Cobbles range in dia from 63mm-140mm and are sub-angular to sub-rounded.
▨	0.40 - 1.20 0.80	B D		1.20		▨	Loose, orange beige, slightly sandy gravelly SILT with medium cobble content. Gravel is fine to coarse and are sub-angular to rounded. Cobbles range in dia from 63mm-180mm and are sub-angular to rounded.
▨	1.20 - 2.00	B		2.00		▨	Beige, very silty GRAVEL with high cobble content and medium boulder content. Gravel is fine to coarse and are angular to rounded. Cobbles range in dia from 63mm-200mm and are angular to sub-rounded. Boulders range in dia up to 500mm and are sub-angular to sub-rounded.
							End of Pit at 2.000m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

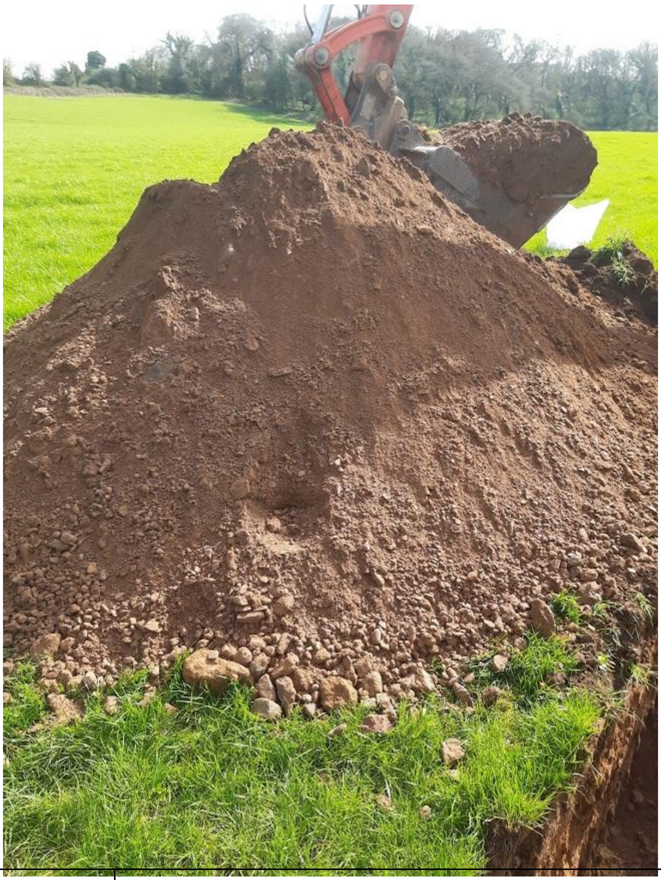
Groundwater: None encountered.

Remarks: Trial pit terminated at 2.00m bgl, due to boulder obstruction..

Photographic Record

Number:	**TP02**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record



Number:	**TP02**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP03
Sheet 1 of 1

Project Name:	Dunkettle Development	**Project No.** P21068	**Co-ords:** 572993E - 573882N	**Level:**	**Date** 31/03/2021
Location:	Dunkettle, Co. Cork	**Dimensions (m):** 4.30 × 1.00	**Depth:** 1.20m BGL		**Scale** 1:25
Client:	O'Flynn Group				**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.10	B		0.10		▨	(TOPSOIL) Very soft, brown, organic, slightly sandy gravelly CLAY. Gravel is fine to coarse and angular to sub-rounded.
▨	0.10	D					
▨	0.10	ENV					
▨	0.10 - 0.40	B		0.40		▨	(MADE GROUND) Brown, slightly sandy gravelly SILT with medium cobble content. Gravel is fine to coarse and are angular to sub-angular. Cobbles range in dia 63mm - 200mm and are angular and tabular. Strata contains ceramic.
▨	0.30	D					
▨	0.30	ENV					
▨	0.40 - 0.90	B		0.90		▨	Soft to firm, orange, slightly sandy gravelly SILT with high cobble content and medium boulder content. Gravel is fine to coarse and angular to sub-angular. Cobbles range in dia from 63mm-200mm and are angular to sub-angular. Boulders range in dia up to 450mm and are angular to sub-angular.
▨	0.70	D					
▨	0.90 - 1.20	B		1.20		▨	Purple brown, silty very gravelly COBBLES with a high boulder content. Gravel is fine to coarse and angular to sub-angular. Cobbles range in dia form 63mm - 200mm and are angular, sub-angular and tabular. Boulders range in dia up to 600mm and are angular, sub-angular and tabular.

End of Pit at 1.200m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.20m bgl due to boulder obstruction..

Photographic Record

Number:	**TP03**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP03**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Trial Pit No
TP04
Sheet 1 of 1

Project Name: Dunkettle Development
Project No. P21068
Co-ords: 572610E - 573759N
Level:
Date 01/04/2021
Location: Dunkettle, Co. Cork
Dimensions (m): 4.00 × 1.00
Depth: 1.40m BGL
Scale 1:25
Client: O'Flynn Group
Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30 0.10	B D				▨	Brown, organic gravelly SILT with medium cobble content. Gravel is fine to coarse, sub-angular to sub-rounded. Cobbles are 63mm to 120mm dia, sub-angular to sub-rounded.
	0.30 - 0.80	B		0.30		▨	Orange beige, slightly sandy gravelly SILT with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded.
	0.50	D					
	0.80 - 1.40	B		0.80			
							End of Pit at 1.400m

1
2
3
4
5

Stability: Moderate
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.
Remarks: Trial pit terminated at 1.40m bgl due to boulder obstruction..

Photographic Record

Number:	**TP04**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP04**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP05
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 572689E - 573768N

Level:

Date 31/03/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 6.00 1.00

Depth: 1.40m BGL

Scale 1:25

Client: O'Flynn Group

Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	Dark brown, slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub rounded. Cobbles are up to 120mm and sub rounded.
	0.20	D					
	0.30 - 0.60	B		0.30		▨	Orange, slightly sandy gravelly SILT with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse. Cobbles are up to 200mm and sub angular to rounded. Boulders are up to 500mm and sub angular.
	0.40	D					
	0.60 - 1.40	B		0.60		▨	Stiff, beige, slightly sandy gravelly SILT with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse. Cobbles are up to 200mm and sub angular to rounded. Boulders are up to 600mm and sub angular.
	1.00	D					
				1.40			End of Pit at 1.400m

Stability: Good
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.40m due to boulder obstruction..

Photographic Record

Number:	**TP05**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Number:	**TP05**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP06
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572827E - 573723N **Level:**	**Date** 31/03/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 5.30 × 1.00 **Depth:** 3.00m BGL	**Scale** 1:25
Client: O'Flynn Group			**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.20	B					(TOPSOIL) Brown, gravelly SILT. Gravel is fine to coarse.
	0.10	D					
	0.20 - 0.40	B		0.20			Brown, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse. Cobbles are up to 110mm and sub angular to sub rounded.
	0.30	D					
	0.40 - 1.00	B		0.40			Orange beige, slightly sandy gravelly SILT with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and sub angular to sub rounded. Boulders are up to 350mm and sub angular to sub rounded.
	0.70	D					
	1.00 - 1.90	B		1.00			Soft, beige, slightly sandy gravelly CLAY with high cobble content and high boulder content. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and sub angular to rounded. Boulders are up to 450mm and angular to sub rounded.
	1.50	D					
	1.90 - 2.90	B		1.90			Beige, very sandy GRAVEL with high cobble content and high boulder content. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and sub angular to rounded. Boulders are up to 700mm and sub angular to sub rounded.
				3.00			End of Pit at 3.000m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.00m bgl due to boulder obstruction..

Photographic Record

Number:	**TP06**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP06**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP07
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572990E - 573752N **Level:**	**Date** 31/03/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.10m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.20 0.10	B D				▨	(TOPSOIL) Soft, brown, gravelly CLAY. Gravel is fine to coarse and angular to rounded.
▨	0.20 - 0.30	B		0.20		▨	Soft to firm, brown, slightly sandy gravelly SILT with low cobble content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 90mm and angular.
▨	0.30 0.30 - 1.10 0.70	D B D		0.30		▨	Soft to firm, orange purple, slightly sandy gravelly SILT with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular. Boulders are up top 350mm and angular to sub rounded.
				1.10			End of Pit at 1.100m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.10m bgl due to large boulders/ possible weathered bedrock obstruction.

Photographic Record

Number:	**TP07**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP07**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

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Trial Pit No
TP08
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573151E - 573683N		**Date** 31/03/2021
		Level:		
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.30 × 1.00		**Scale** 1:25
Client: O'Flynn Group		**Depth:** 3.50m BGL		**Logged** RD

Samples & In Situ Testing

Depth (m)	Type	Results
0.00 - 0.20	B	
0.10	D	
0.10	ENV	
0.20 - 0.40	B	
0.30	D	
0.30	ENV	
0.40 - 0.80	B	
0.60	D	
1.50 - 2.50	B	

Depth (m)	Level (m OD)	Stratum Description
0.20		(TOPSOIL) Soft, brown, gravelly SILT with low cobble content.
0.40		Brown, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 120mm and angular to sub angular.
0.80		Orange, slightly sandy gravelly SILT with high cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 350mm and sub angular.
3.50		Light brown, slightly sandy gravelly SILT with high cobble content and medium boulder content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 450mm and sub angular.

End of Pit at 3.500m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.

Remarks: Trial pit terminated at 3.50m bgl.

Photographic Record

Number:	**TP08**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP08**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP09
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572533E - 573597N **Level:**	**Date** 01/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 3.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.40m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	(TOPSOIL) Soft, dark brown, gravelly CLAY with low cobble content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 90mm and angular to sub angular.
▨	0.30 0.30 - 1.30	D B		0.30		⁘	Orange, very gravelly SAND with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 600mm and sub angular.
				1.40			End of Pit at 1.400m

Stability: Poor.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.40m bgl due to weathered bedrock.

Photographic Record

Number:	**TP09**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP09**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

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Trial Pit No
TP10
Sheet 1 of 1

Project Name: Dunkettle Development
Project No. P21068
Co-ords: 572692E - 573598N
Level:
Date 01/04/2021

Location: Dunkettle, Co. Cork
Dimensions (m): 5.70 × 1.00
Depth: 3.50m BGL
Scale 1:25

Client: O'Flynn Group
Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	**Type**	**Results**				
	0.00 - 0.30 0.00 - 0.30 0.20	B D ENV					(TOPSOIL) Soft, dark brown, gravelly SILT. Gravel is fine to coarse and sub angular to rounded.
	0.30 - 1.00 0.30 - 1.00 0.50	B D ENV		0.30			Orange beige, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 150mm and angular to sub angular.
	1.00 - 2.00 1.00 - 2.00	B D		1.00			Soft, beige, slightly sandy gravelly CLAY with high cobble content and high boulder content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 450mm and sub angular.
	2.30 - 3.30	B		2.10			Loose, beige, gravelly SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 700mm and sub angular.
				3.50			End of Pit at 3.500m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.

Remarks: Trial pit terminated at 3.50m bgl.

Photographic Record

Number:	**TP10**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP10**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP11
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572855E - 573615N **Level:**	**Date** 31/03/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 5.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 3.50m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
▨	0.00 - 0.20	B				▨	(TOPSOIL) Soft, brown, gravelly CLAY with high cobble content. Gravel is fine to coarse. Cobbles are up to 130mm and sub angular to sub rounded.	
▨	0.10	D						
▨	0.20 - 0.40	B		0.20		▨	(MADE GROUND) Brown, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 140mm and angular to sub angular.	
▨	0.30	D						
▨	0.40 - 1.20	B		0.40		▨	Orange beige, slightly sandy gravelly SILT with high cobble content and low boulder content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 350mm and sub angular.	
▨	0.80	D						1
▨	1.20 - 2.20	B		1.20		▨	Purple brown, very sandy GRAVEL with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 600mm and sub angular.	2 3
				3.50			End of Pit at 3.500m	4 5

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.50m bgl

Photographic Record

Number:	**TP11**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP11**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP12
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573024E - 573638N **Level:**	**Date** 31/03/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 3.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.50m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
	0.00 - 0.10 0.10	B D		0.10			(TOPSOIL) Soft, dark brown, gravelly CLAY with low cobble content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 90mm and angular to sub angular.
	0.10 - 0.40 0.30	B D		0.40			(MADE GROUND) Dark brown, slightly sandy gravelly SILT with medium cobble content
	0.40 - 1.40	B		1.50			Orange brown, slightly sandy very gravelly COBBLES Sand is fine to coarse. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 500mm and sub angular. with high boulder content.
							End of Pit at 1.500m

Stability: Poor.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.50m bgl due to suspected weathered bedrock obstruction.

Photographic Record

Number:	**TP12**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP12**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

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Trial Pit No
TP13
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573066E - 573638N **Level:**	**Date** 31/03/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.20m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.20 0.10	B D		0.20		▨	(TOPSOIL) Soft, brown orange, gravelly SILT. Gravel is fine to coarse.
▨	0.20 - 1.20	B		1.20		⁘	Dark brown, sandy gravelly COBBLES with high boulder content. Gravel is fine to coarse and angular to sub angular. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 500mm and sub angular.
							End of Pit at 1.200m

Stability: Very Poor.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.20m bgl due to collapsing side walls in weathered bedrock.

Photographic Record

Number:	**TP13**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP13**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Trial Pit No
TP14
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572503E - 573441N **Level:**	**Date** 01/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.20 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.90m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
	0.00 - 0.30 0.20 0.20	B D ENV		0.30			(TOPSOIL) Very soft, dark brown, slightly sandy gravelly CLAY with medium cobble content. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 110mm and sub angular to sub rounded.
	0.30 - 1.30 0.60	B ENV		1.40			Orange beige, silty very gravelly SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 450mm and sub angular to sub rounded.
	1.40 - 1.90	B		1.90			Grey, silty sandy very gravelly COBBLES with high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 450mm and sub angular to sub rounded.
							End of Pit at 1.900m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.90m bgl due to suspected weathered bedrock obstruction.

Photographic Record

Number:	**TP14**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP14**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

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Trial Pit No
TP15
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 527553E - 573477N **Level:**	**Date** 01/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.50 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.90m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
▨	0.00 - 0.30	B				▨	(TOPSOIL) Very soft, dark brown orange, slightly sandy gravelly CLAY with low cobble content.
	0.20	D					
	0.30 - 0.60	B		0.30		⨯	Soft to firm, orange, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 140mm and angular to sub rounded.
	0.50	D					
	0.60 - 1.40	B		0.60		∘	Beige, very gravelly SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 550mm and sub angular to sub rounded.
	1.40 - 1.90	B		1.40		∘	Beige, clayey GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 500mm and sub angular to sub rounded.
				1.90			End of Pit at 1.900m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.90m bgl due to suspected bedrock obstruction.

Photographic Record

Number:	**TP15**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP15**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP16
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 572669E - 573440N

Level:

Date 01/04/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 5.00 × 1.00

Scale 1:25

Client: O'Flynn Group

Depth: 3.00m BGL

Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.30	B					(TOPSOIL) Soft, brown, gravelly CLAY with medium cobble content.
	0.20	D					
	0.30 - 0.70	B		0.30			Soft to firm, orange beige, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 150mm and angular to sub rounded.
	0.70 - 1.70	B		0.70			Beige, clayey sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are greater than 1000mm and sub angular to sub rounded.
	1.70 - 2.70	B					
				3.00			End of Pit at 3.000m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.00m bgl due to boulder obstruction.

Photographic Record

Number:	**TP16**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP16**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP17
Sheet 1 of 1

Project Name: Dunkettle Development
Project No. P21068
Co-ords: 572596E - 573294N
Level:
Date 02/04/2021

Location: Dunkettle, Co. Cork
Dimensions (m): 5.20 × 1.00
Scale 1:25

Client: O'Flynn Group
Depth: 3.50m BGL
Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.40	B					(TOPSOIL) Soft, dark brown orange, slightly sandy gravelly CLAY with low cobble content and plastic.
	0.20	D					
	0.20	ENV					
	0.40 - 0.80	B		0.40			Soft to firm, orange beige, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 150mm and angular to sub rounded.
	0.60	D					
	0.60	ENV					
	0.80 - 1.70	B		0.80			Soft, beige, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded.
	1.10	D					
				1.70			Soft, beige, sandy CLAY with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 500mm and sub angular to sub rounded.
	2.00 - 3.00	B					
	2.50	D					
				3.50			End of Pit at 3.500m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.
Remarks: Trial pit terminated at 3.50m bgl.

Photographic Record

Number:	**TP17**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Number:	**TP17**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP18
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572701E - 573299N **Level:**	**Date** 02/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 5.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 3.50m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.30	B					(TOPSOIL) Soft, dark brown orange, gravelly SILT with medium cobble content.
	0.20	D					
	0.30 - 1.10	B		0.30			Orange brown, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 120mm and angular to sub rounded.
	0.70	D					
				1.10			Grey, very gravelly silty SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and sub angular to sub rounded.
	2.00 - 3.00	B					
				3.50			End of Pit at 3.500m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.50m bgl.

Photographic Record

Number:	**TP18**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP18**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP19
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572780E - 573310N **Level:**	**Date** 02/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.30 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.30m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	(TOPSOIL) Orange brown, gravelly SILT with medium cobble content and plastic.
▨	0.20	D				▨	
▨	0.30 - 0.60	B		0.30		⁘	Soft to firm, orange brown, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 150mm and angular to sub rounded.
▨	0.40	D				⁘	
▨	0.60 - 1.60	B		0.60		○	Brown orange, silty sandy gravelly BOULDERS with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 900mm and sub angular to sub rounded.
				1.30			End of Pit at 1.300m

Stability: Poor.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.30m bgl due to boulder obstruction.

Photographic Record

Number:	**TP19**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP19**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

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Trial Pit No
TP20
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573067E - 573297N **Level:**	**Date** 02/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.20 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 2.00m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
▨	0.00 - 0.30 0.20	B D		0.30		▨	(TOPSOIL) Loose, orange, slightly gravelly SILT with medium cobble content and plastic. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded.
▨	0.30 - 0.60 0.40	B D		0.60		▨	Soft to firm, orange brown, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded.
▨	0.60 - 1.60	B		2.00		▨	Beige, clayey sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 1000mm and sub angular to sub rounded.
							End of Pit at 2.000m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 2.00m bgl due to weathered bedrock obstruction.

Photographic Record

Number:	**TP20**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP20**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP21
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 573110E - 573296N

Level:

Date 02/04/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 4.80 × 1.00

Depth: 1.90m BGL

Scale 1:25

Client: O'Flynn Group

Logged RD

Water Strike & Backfill	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
	0.00 - 0.30 0.10 0.20	B ENV D					(TOPSOIL) Soft, brown orange, gravelly SILT with medium cobble content and some plastic.
	0.30 - 0.80 0.50 0.50	B D ENV		0.30			Soft to firm, orange brown, slightly sandy gravelly SILT and high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded.
	0.80 - 1.80	B		0.80			Brown, silty sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 700mm and sub angular to sub rounded.
				1.90			End of Pit at 1.900m

Stability: Poor.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.90m bgl due to collapsing sidewalls.

Photographic Record

Number:	**TP21**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP21**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP22
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572707E - 573162N **Level:**	**Date** 02/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 0.70m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	(TOPSOIL) Soft, dark brown orange, gravelly SILT with low cobble content and some plastics.
▨	0.20	D					
▨	0.30 - 0.70	B		0.30		▨	Brown, slightly sandy gravelly SILT with high cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded.
▨	0.50	D					
				0.70			End of Pit at 0.700m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 0.70m due to bedrock obstruction.

Photographic Record

Number:	**TP22**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP22**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP23
Sheet 1 of 1

Project Name: Dunkettle Development
Project No. P21068
Co-ords: 572845E - 573160N
Level:
Date 02/04/2021

Location: Dunkettle, Co. Cork
Dimensions (m): 4.80 × 1.00
Scale 1:25

Client: O'Flynn Group
Depth: 1.50m BGL
Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.30	B					(TOPSOIL) Dark brown orange, gravelly SILT with low cobble content and some brick plastics.
	0.20	D					
	0.30 - 0.80	B		0.30			Orange beige, slightly sandy gravelly SILT with high cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 350mm and sub angular to sub rounded.
	0.50	D					
	0.80 - 1.50	B		0.80			Beige, gravelly CLAY with high cobble content and high boulder content. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 800mm and sub angular to sub rounded.
	1.10	D					
				1.50			End of Pit at 1.500m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.
Remarks: Trial pit terminated at 1.50m bgl due to bedrock obstruction.

Photographic Record

Number:	**TP23**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP23**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP24
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 572980E - 573156N **Level:**	**Date** 02/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.60m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	**Type**	**Results**				
	0.00 - 0.30	B					(TOPSOIL) Soft, dark brown orange, gravelly SILT with medium cobble content.
	0.20	D					
	0.20	ENV					
	0.30 - 1.20	B		0.30			Orange, slightly sandy gravelly SILT with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 500mm and sub angular to sub rounded.
	0.60	ENV					
	0.70	D					
	1.20 - 1.60	B		1.20			Beige, clayey, sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 600mm and sub angular to sub rounded.
				1.60			End of Pit at 1.600m

Stability: Poor.
Plant: 8t tracked excavator.
Backfill: Arisings

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.60m bgl due to bedrock obstruction.

Photographic Record

Number:	**TP24**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP24**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No	**TP25**	Sheet 1 of 1	
Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573108E - 573129N **Level:**	**Date** 01/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 4.50 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 1.80m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
▨	0.00 - 0.30	B				▨	(TOPSOIL) Soft, dark brown orange, gravelly CLAY with medium cobble content.
▨	0.10	ENV				▨	
▨	0.20	D				▨	
▨	0.30 - 0.80	B		0.30		▨	Orange beige, slightly sandy gravelly SILT with high cobble content and medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 500mm and sub angular to sub rounded.
▨	0.50	D				▨	
▨	0.50	ENV				▨	
▨	0.80 - 1.80	B		0.80		▨	Beige, very silty sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 2000mm and sub angular to sub rounded.
				1.80			End of Pit at 1.800m

Stability: Moderate.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.80m bgl due to suspected bedrock obstruction.

Photographic Record

Number:	**TP25**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP25**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Trial Pit No
TP27
Sheet 1 of 1

Project Name: Dunkettle Development

Project No. P21068

Co-ords: 572830E - 573006N

Level:

Date 01/04/2021

Location: Dunkettle, Co. Cork

Dimensions (m): 5.20 × 1.00

Scale 1:25

Client: O'Flynn Group

Depth: 1.60m BGL

Logged RD

Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
0.00 - 0.40	B					(TOPSOIL) Soft, slightly sandy gravelly CLAY
0.20	D					
0.40 - 1.00	B		0.40			Orange beige, slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 150mm and angular to sub rounded.
0.70	D					
1.00 - 1.40	B		1.00			Beige, very gravelly SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and sub angular to sub rounded.
1.40 - 1.60	B		1.40			Beige, sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 500mm and sub angular to sub rounded.
			1.60			End of Pit at 1.600m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 1.60m bgl due to weathered bedrock obstruction.

Photographic Record

Number:	**TP27**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP27**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP28
Sheet 1 of 1

Project Name: Dunkettle Development	**Project No.** P21068	**Co-ords:** 573000E - 573018N **Level:**	**Date** 01/04/2021
Location: Dunkettle, Co. Cork		**Dimensions (m):** 5.00 × 1.00	**Scale** 1:25
Client: O'Flynn Group		**Depth:** 3.50m BGL	**Logged** RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.20 0.10	B D					(TOPSOIL) Soft, dark brown orange, gravelly SILT.
	0.20 - 1.20 0.70	B D		0.20			Orange with cream mottling, slightly sandy gravelly SILT with high cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 300mm and sub angular to sub rounded.
	1.20 - 2.20	B		1.20			Grey, silty very gravelly SAND with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 450mm and sub angular to sub rounded.
	2.30 - 3.30	B		2.30			Grey, silty sandy GRAVEL with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 450mm and sub angular to sub rounded.
				3.50			End of Pit at 3.500m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.50m bgl.

Photographic Record

Number:	**TP28**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA

Photographic Record

Number:	**TP28**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

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Trial Pit No
TP29
Sheet 1 of 1

Project Name: Dunkettle Development
Project No. P21068
Co-ords: 573129E - 573040N
Level:
Date 01/04/2021
Location: Dunkettle, Co. Cork
Dimensions (m): 5.00 1.00
Scale 1:25
Client: O'Flynn Group
Depth: 1.70m BGL
Logged RD

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.00 - 0.30	B					(TOPSOIL) Soft, dark brown, gravelly SILT with high cobble content.
	0.20	D					
	0.30 - 0.70	B		0.30			Soft to firm, orange beige, slightly sandy gravelly SILT with high cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 280mm and sub angular to sub rounded.
	0.50	D					
	0.70 - 1.70	B		0.70			Soft, beige, slightly sandy gravelly CLAY with high cobble content and high boulder content. Sand is fine to coarse. Gravel is fine to coarse and sub angular to rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 1000mm and sub angular to sub rounded.
	1.20	D					
				1.70			End of Pit at 1.700m

Stability: Good.
Plant: 8t tracked excavator.
Backfill: Arisings.
Groundwater: None encountered.
Remarks: Trial pit terminated at 1.70m bgl due to weathered bedrock obstruction.

Photographic Record

Number:	**TP29**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

Photographic Record

Number:	**TP29**	**Project** **Project No** **Engineer**	Dunkettle Development- O`Flynns P21068 JODA	

KEY TO SYMBOLS - LABORATORY TEST RESULT

U	Undisturbed Sample	
P	Piston Sample	
TWS	Thin Wall Sample	
B	Bulk Sample - Disturbed	
D	Jar Sample - Disturbed	
W	Water Sample	
pH	Acidity/Alkalinity Index	
SO_3	% - Total Sulphate Content (acid soluble)	
SO_3	g/ltr - Water Soluble Sulphate (Water or 2:1 Aqueous Soil Extract)	
+	Calcareous Reaction	
Cl	Chloride Content	
PI	Plasticity Index	
<425	% of material in sample passing 425 micron sieve	
LL	Liquid Limit	
PL	Plastic Limit	
MC	Water Content	
NP	Non Plastic	
Yb	Bulk Density	
Yd	Dry Density	
Ps	Particle Density	
U/D	Undrained/Drained Triaxial	
U/C	Unconsolidated/Consolidated Triaxial	
T/M	Single Stage/Multistage Triaxial	
100/38	Sample Diameter (mm)	
REM	Remoulded Triaxial Test Specimen	
TST	Triaxial Suction Test	
V	Vane Test	
DSB	Drained Shear Box	
RSB	Residual Shear Box	
RS	Ring Shear	
σ_3	Cell Pressure	
σ_1-σ_3	Deviator Stress	
c	Cohesion	
c_	Effective Cohesion Intercept	
ϕ	Angle of Shearing Resistance - Degrees	
ϕ_	Effective Angle of Shearing Resistance	
εf	Strain at Failure	
*	Failed under 1st Load	
**	Failed under 2nd Load	
#	Untestable	
##	Excessive Strain	
p_o	Effective Overburden Pressure	
m_v	Coefficient of Volume Decrease	
c_v	Coefficient of Consolidation	
Opt	Optimum	
Nat	Natural	
Std	Standard Compaction - 2.5kg Rammer	(¶ CBR)
Hvy	Heavy Compaction - 4.5kg Rammer	(§ CBR)
Vib	Vibratory Compaction	
CBR	California Bearing Ratio	
Sat m.c.	Saturation Moisture Content	
MCV	Moisture Condition Value	

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-11368-1		
Initial Date of Issue:	20-Apr-2021		
Client	Priority Geotechnical Ltd		
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland		
Contact(s):	Colette Kelly		
Project	P21068 Dunkettle		
Quotation No.:		**Date Received:**	10-Apr-2021
Order No.:	13637	**Date Instructed:**	10-Apr-2021
No. of Samples:	14		
Turnaround (Wkdays):	7	**Results Due:**	19-Apr-2021
Date Approved:	20-Apr-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No:	21-11368						**Landfill Waste Acceptance Criteria Limits**		
Chemtest Sample ID:	1176267								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP02								
Top Depth(m):	0.10								
Bottom Depth(m):									
Sampling Date:	31-Mar-2021								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.6	3	5	6
Loss On Ignition	2610	M	%			6.7	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.012	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0034	0.0078	0.0067	0.076	0.5	2	25
Barium	1455	U	0.011	0.023	0.022	0.22	20	100	300
Cadmium	1455	U	< 0.00012	0.00025	< 0.0012	0.0023	0.04	1	5
Chromium	1455	U	0.0011	0.0057	0.0021	0.054	0.5	10	70
Copper	1455	U	0.0070	0.017	0.014	0.0052	2	50	100
Mercury	1455	U	< 0.00005	0.00012	< 0.00005	0.0012	0.01	0.2	2
Molybdenum	1455	U	0.0010	0.0019	0.0020	0.019	0.5	10	30
Nickel	1455	U	0.0012	0.0031	0.0023	0.030	0.4	10	40
Lead	1455	U	0.010	0.036	0.020	0.34	0.5	10	50
Antimony	1455	U	0.0012	0.0017	0.0023	0.016	0.06	0.7	5
Selenium	1455	U	0.0008	0.0024	0.0015	0.023	0.1	0.5	7
Zinc	1455	U	0.009	0.017	0.017	0.16	4	50	200
Chloride	1220	U	4.4	4.3	< 10	43	800	15000	25000
Fluoride	1220	U	0.45	0.53	< 1.0	5.2	10	150	500
Sulphate	1220	U	7.0	2.1	14	24	1000	20000	50000
Total Dissolved Solids	1020	N	98	49	190	520	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	11	7.6	< 50	78	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	18

Leachate Test Information	
Leachant volume 1st extract/l	0.311
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.101

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No: 21-11368
Chemtest Sample ID: 1176268
Sample Ref:
Sample ID:
Sample Location: TP02
Top Depth(m): 0.30
Bottom Depth(m):
Sampling Date: 31-Mar-2021

							Landfill Waste Acceptance Criteria Limits		
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			0.68	3	5	6
Loss On Ignition	2610	M	%			5.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0066	0.0066	0.013	0.066	0.5	2	25
Barium	1455	U	0.006	< 0.005	0.012	0.0029	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0031	0.0014	0.0062	0.015	0.5	10	70
Copper	1455	U	0.010	0.0030	0.020	0.0049	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0004	0.0013	0.0043	0.5	10	30
Nickel	1455	U	0.0014	0.0011	0.0027	0.011	0.4	10	40
Lead	1455	U	0.0077	0.0040	0.015	0.041	0.5	10	50
Antimony	1455	U	0.0010	< 0.0005	0.0019	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.011	0.004	0.021	0.047	4	50	200
Chloride	1220	U	3.5	2.5	< 10	25	800	15000	25000
Fluoride	1220	U	0.15	0.16	< 1.0	1.6	10	150	500
Sulphate	1220	U	7.1	< 1.0	14	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	44	18	86	190	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	14	8.9	< 50	91	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.314
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.085

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176269								
Sample Ref:									
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	0.10								
Bottom Depth(m):									
Sampling Date:	31-Mar-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.3	3	5	6
Loss On Ignition	2610	M	%			7.4	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0024	0.0030	0.0047	0.029	0.5	2	25
Barium	1455	U	0.009	0.018	0.017	0.17	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0017	0.0033	0.0034	0.032	0.5	10	70
Copper	1455	U	0.0042	0.0041	0.0082	0.0033	2	50	100
Mercury	1455	U	< 0.00005	0.00008	< 0.00005	0.00075	0.01	0.2	2
Molybdenum	1455	U	0.0003	0.0009	0.0006	0.0083	0.5	10	30
Nickel	1455	U	0.0014	0.0013	0.0028	0.013	0.4	10	40
Lead	1455	U	0.011	0.014	0.021	0.14	0.5	10	50
Antimony	1455	U	0.0007	0.0009	0.0013	0.0089	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.004	0.004	0.008	0.042	4	50	200
Chloride	1220	U	3.0	4.1	< 10	40	800	15000	25000
Fluoride	1220	U	0.28	0.33	< 1.0	3.3	10	150	500
Sulphate	1220	U	1.2	3.1	< 10	30	1000	20000	50000
Total Dissolved Solids	1020	N	48	25	94	260	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	8.6	4.7	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.308
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.105

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176270								
Sample Ref:									
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	0.30								
Bottom Depth(m):									
Sampling Date:	31-Mar-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.9	3	5	6
Loss On Ignition	2610	M	%			5.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0032	0.0011	0.0064	0.013	0.5	2	25
Barium	1455	U	0.011	< 0.005	0.021	0.0070	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0028	0.0010	0.0056	0.011	0.5	10	70
Copper	1455	U	0.0067	0.0019	0.013	0.0049	2	50	100
Mercury	1455	U	0.00006	0.00006	0.00012	0.00056	0.01	0.2	2
Molybdenum	1455	U	0.0005	0.0008	0.0009	0.0074	0.5	10	30
Nickel	1455	U	0.0018	0.0027	0.0036	0.027	0.4	10	40
Lead	1455	U	0.017	0.0021	0.033	0.030	0.5	10	50
Antimony	1455	U	0.0009	0.0006	0.0017	0.0064	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.007	< 0.003	0.014	0.005	4	50	200
Chloride	1220	U	3.2	2.5	< 10	25	800	15000	25000
Fluoride	1220	U	0.33	0.34	< 1.0	3.4	10	150	500
Sulphate	1220	U	1.6	< 1.0	< 10	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	48	30	93	310	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	8.8	5.1	< 50	53	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.314
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.115

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No: 21-11368
Chemtest Sample ID: 1176271
Sample Ref:
Sample ID:
Sample Location: TP10
Top Depth(m): 0.20
Bottom Depth(m):
Sampling Date: 01-Apr-2021

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			1.6	3	5	6
Loss On Ignition	2610	M	%			4.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0068	0.0049	0.014	0.050	0.5	2	25
Barium	1455	U	0.007	0.008	0.013	0.080	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0025	0.0027	0.0049	0.027	0.5	10	70
Copper	1455	U	0.0047	0.0043	0.0093	0.0029	2	50	100
Mercury	1455	U	0.00005	0.00007	0.00010	0.00070	0.01	0.2	2
Molybdenum	1455	U	0.0005	0.0008	0.0010	0.0077	0.5	10	30
Nickel	1455	U	0.0016	0.0007	0.0033	0.0076	0.4	10	40
Lead	1455	U	0.020	0.012	0.040	0.12	0.5	10	50
Antimony	1455	U	0.0010	0.0005	0.0019	0.0056	0.06	0.7	5
Selenium	1455	U	0.0011	< 0.0005	0.0021	0.0005	0.1	0.5	7
Zinc	1455	U	0.006	0.007	0.013	0.069	4	50	200
Chloride	1220	U	4.4	3.1	< 10	32	800	15000	25000
Fluoride	1220	U	0.37	0.40	< 1.0	4.0	10	150	500
Sulphate	1220	U	6.1	2.3	12	25	1000	20000	50000
Total Dissolved Solids	1020	N	40	22	78	220	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	10	5.8	< 50	60	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.085

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No: 21-11368
Chemtest Sample ID: 1176272
Sample Ref:
Sample ID:
Sample Location: TP10
Top Depth(m): 0.50
Bottom Depth(m):
Sampling Date: 01-Apr-2021

							Landfill Waste Acceptance Criteria Limits		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.42	3	5	6
Loss On Ignition	2610	M	%			3.0	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0033	0.0019	0.0065	0.020	0.5	2	25
Barium	1455	U	< 0.005	< 0.005	< 0.0005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0029	0.0019	0.0058	0.020	0.5	10	70
Copper	1455	U	0.0051	0.0023	0.010	0.0024	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0002	0.0002	0.0004	0.0023	0.5	10	30
Nickel	1455	U	0.0010	0.0019	0.0020	0.019	0.4	10	40
Lead	1455	U	0.0061	0.0065	0.012	0.064	0.5	10	50
Antimony	1455	U	0.0008	< 0.0005	0.0015	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	< 0.003	< 0.003	4	50	200
Chloride	1220	U	3.0	1.7	< 10	18	800	15000	25000
Fluoride	1220	U	0.099	0.11	< 1.0	1.1	10	150	500
Sulphate	1220	U	7.0	1.6	14	19	1000	20000	50000
Total Dissolved Solids	1020	N	27	13	53	140	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	14	8.1	< 50	84	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	12

Leachate Test Information	
Leachant volume 1st extract/l	0.326
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.085

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfilll Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176273								
Sample Ref:									
Sample ID:									
Sample Location:	TP21								
Top Depth(m):	0.10								
Bottom Depth(m):									
Sampling Date:	02-Apr-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.2	3	5	6
Loss On Ignition	2610	M	%			6.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0007	0.0017	0.0014	0.016	0.5	2	25
Barium	1455	U	0.009	0.007	0.018	0.070	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0007	0.0011	0.0014	0.011	0.5	10	70
Copper	1455	U	0.0029	0.0022	0.0056	0.0033	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0009	0.0007	0.0018	0.0071	0.5	10	30
Nickel	1455	U	< 0.0005	0.0006	< 0.0005	0.0054	0.4	10	40
Lead	1455	U	0.0006	0.0037	0.0013	0.034	0.5	10	50
Antimony	1455	U	0.0006	0.0006	0.0012	0.0061	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	< 0.003	< 0.003	4	50	200
Chloride	1220	U	4.8	4.4	< 10	44	800	15000	25000
Fluoride	1220	U	0.54	0.57	1.1	5.7	10	150	500
Sulphate	1220	U	< 1.0	2.3	< 10	20	1000	20000	50000
Total Dissolved Solids	1020	N	160	85	320	930	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	35	17	69	190	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.202

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176274								
Sample Ref:									
Sample ID:									
Sample Location:	TP21								
Top Depth(m):	0.50								
Bottom Depth(m):									
Sampling Date:	02-Apr-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.1	3	5	6
Loss On Ignition	2610	M	%			5.1	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0014	0.0008	0.0029	0.0080	0.5	2	25
Barium	1455	U	0.006	< 0.005	0.012	0.0045	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0012	< 0.0005	0.0024	0.0009	0.5	10	70
Copper	1455	U	0.0029	0.0009	0.0058	0.0026	2	50	100
Mercury	1455	U	< 0.00005	0.00005	< 0.00005	0.00049	0.01	0.2	2
Molybdenum	1455	U	0.0005	0.0006	0.0010	0.0063	0.5	10	30
Nickel	1455	U	0.0009	< 0.0005	0.0018	0.0006	0.4	10	40
Lead	1455	U	0.0027	0.0008	0.0053	0.0090	0.5	10	50
Antimony	1455	U	0.0009	< 0.0005	0.0018	0.0006	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	0.003	< 0.003	0.032	4	50	200
Chloride	1220	U	2.2	1.7	< 10	17	800	15000	25000
Fluoride	1220	U	0.60	0.58	1.2	5.8	10	150	500
Sulphate	1220	U	< 1.0	< 1.0	< 10	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	33	130	350	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	7.7	4.7	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	13

Leachate Test Information	
Leachant volume 1st extract/l	0.324
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.126

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176275								
Sample Ref:									
Sample ID:									
Sample Location:	TP24								
Top Depth(m):	0.20								
Bottom Depth(m):									
Sampling Date:	01-Apr-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			2.5	3	5	6
Loss On Ignition	2610	M	%			7.8	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.017	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0038	0.0028	0.0075	0.029	0.5	2	25
Barium	1455	U	0.009	0.010	0.018	0.096	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0019	0.0022	0.0037	0.022	0.5	10	70
Copper	1455	U	0.0072	0.012	0.014	0.0040	2	50	100
Mercury	1455	U	0.00010	< 0.00005	0.00020	0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0005	0.0006	0.0010	0.0056	0.5	10	30
Nickel	1455	U	0.0009	0.0092	0.0017	0.087	0.4	10	40
Lead	1455	U	0.024	0.019	0.046	0.20	0.5	10	50
Antimony	1455	U	0.0009	< 0.0005	0.0018	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.009	0.007	0.018	0.070	4	50	200
Chloride	1220	U	3.6	3.3	< 10	33	800	15000	25000
Fluoride	1220	U	0.34	0.41	< 1.0	4.0	10	150	500
Sulphate	1220	U	2.9	3.0	< 10	30	1000	20000	50000
Total Dissolved Solids	1020	N	53	32	100	330	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	9.2	5.3	< 50	55	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.315
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.096

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176276								
Sample Ref:									
Sample ID:									
Sample Location:	TP24								
Top Depth(m):	0.60								
Bottom Depth(m):									
Sampling Date:	01-Apr-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			0.69	3	5	6
Loss On Ignition	2610	M	%			3.7	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0015	0.0030	0.0030	0.029	0.5	2	25
Barium	1455	U	< 0.005	0.010	< 0.0005	0.092	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0012	0.0037	0.0025	0.036	0.5	10	70
Copper	1455	U	0.0030	0.0045	0.0059	0.0013	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0003	0.0004	0.0005	0.0040	0.5	10	30
Nickel	1455	U	0.0008	0.0019	0.0017	0.018	0.4	10	40
Lead	1455	U	0.0028	0.0074	0.0056	0.072	0.5	10	50
Antimony	1455	U	0.0009	0.0007	0.0018	0.0070	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	0.005	< 0.003	0.044	4	50	200
Chloride	1220	U	9.5	4.1	19	43	800	15000	25000
Fluoride	1220	U	0.093	0.15	< 1.0	1.5	10	150	500
Sulphate	1220	U	5.4	4.3	11	43	1000	20000	50000
Total Dissolved Solids	1020	N	41	23	81	240	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	21	12	< 50	120	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	12

Leachate Test Information	
Leachant volume 1st extract/l	0.327
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.075

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No: 21-11368
Chemtest Sample ID: 1176277
Sample Ref:
Sample ID:
Sample Location: TP25
Top Depth(m): 0.10
Bottom Depth(m):
Sampling Date: 01-Apr-2021

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			2.7	3	5	6
Loss On Ignition	2610	M	%			6.9	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				6.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0041	0.0043	0.0081	0.043	0.5	2	25
Barium	1455	U	0.009	0.019	0.018	0.18	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0028	0.0055	0.0055	0.054	0.5	10	70
Copper	1455	U	0.0083	0.013	0.016	0.0046	2	50	100
Mercury	1455	U	0.00007	0.00007	0.00014	0.00069	0.01	0.2	2
Molybdenum	1455	U	0.0006	0.0010	0.0011	0.010	0.5	10	30
Nickel	1455	U	0.0020	0.014	0.0040	0.13	0.4	10	40
Lead	1455	U	0.027	0.023	0.052	0.23	0.5	10	50
Antimony	1455	U	0.0011	0.0010	0.0021	0.0097	0.06	0.7	5
Selenium	1455	U	< 0.0005	0.0006	< 0.0005	0.0061	0.1	0.5	7
Zinc	1455	U	0.008	0.012	0.016	0.11	4	50	200
Chloride	1220	U	3.2	3.1	< 10	31	800	15000	25000
Fluoride	1220	U	0.34	0.36	< 1.0	3.6	10	150	500
Sulphate	1220	U	4.5	2.9	< 10	30	1000	20000	50000
Total Dissolved Solids	1020	N	40	25	79	260	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	10	5.6	< 50	58	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.310
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.084

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No: 21-11368
Chemtest Sample ID: 1176278
Sample Ref:
Sample ID:
Sample Location: TP25
Top Depth(m): 0.50
Bottom Depth(m):
Sampling Date: 01-Apr-2021

Determinand	**SOP**	**Accred.**	**Units**				**Landfill Waste Acceptance Criteria Limits**		
							Inert Waste Landfill	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%			1.9	3	5	6
Loss On Ignition	2610	M	%			6.3	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0047	0.0014	0.0093	0.016	0.5	2	25
Barium	1455	U	0.008	< 0.005	0.015	0.0037	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0063	0.0017	0.012	0.019	0.5	10	70
Copper	1455	U	0.012	0.0039	0.024	0.0059	2	50	100
Mercury	1455	U	0.00009	< 0.00005	0.00018	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0005	0.0003	0.0009	0.0033	0.5	10	30
Nickel	1455	U	0.0033	0.0017	0.0065	0.018	0.4	10	40
Lead	1455	U	0.013	0.0033	0.026	0.038	0.5	10	50
Antimony	1455	U	0.0011	< 0.0005	0.0022	0.0006	0.06	0.7	5
Selenium	1455	U	0.0008	< 0.0005	0.0017	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.008	< 0.003	0.015	0.004	4	50	200
Chloride	1220	U	2.9	1.5	< 10	16	800	15000	25000
Fluoride	1220	U	0.17	0.20	< 1.0	2.0	10	150	500
Sulphate	1220	U	5.9	2.3	12	25	1000	20000	50000
Total Dissolved Solids	1020	N	26	12	51	120	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	15	11	< 50	110	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.315
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.086

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-11368								
Chemtest Sample ID:	1176279								
Sample Ref:									
Sample ID:									
Sample Location:	TP08								
Top Depth(m):	0.10								
Bottom Depth(m):									
Sampling Date:	31-Mar-2021						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			3.4	3	5	6
Loss On Ignition	2610	M	%			9.4	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0020	0.0020	0.0040	0.020	0.5	2	25
Barium	1455	U	0.007	0.008	0.014	0.080	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0012	0.0017	0.0023	0.017	0.5	10	70
Copper	1455	U	0.0057	0.0063	0.011	0.0046	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0003	0.0004	0.0006	0.0038	0.5	10	30
Nickel	1455	U	0.0009	0.0010	0.0018	0.0099	0.4	10	40
Lead	1455	U	0.0098	0.0090	0.019	0.090	0.5	10	50
Antimony	1455	U	0.0006	< 0.0005	0.0012	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.007	0.006	0.014	0.056	4	50	200
Chloride	1220	U	2.9	2.3	< 10	23	800	15000	25000
Fluoride	1220	U	0.12	0.14	< 1.0	1.4	10	150	500
Sulphate	1220	U	11	1.0	21	18	1000	20000	50000
Total Dissolved Solids	1020	N	78	40	150	430	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	8.8	6.2	< 50	64	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	21

Leachate Test Information	
Leachant volume 1st extract/l	0.305
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.142

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: P21068 Dunkettle

Chemtest Job No:	21-11368						**Landfill Waste Acceptance Criteria Limits**		
Chemtest Sample ID:	1176280								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP08								
Top Depth(m):	0.30								
Bottom Depth(m):									
Sampling Date:	31-Mar-2021								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.8	3	5	6
Loss On Ignition	2610	M	%			9.4	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	M				7.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0053	0.0034	0.011	0.035	0.5	2	25
Barium	1455	U	0.010	0.009	0.021	0.091	20	100	300
Cadmium	1455	U	< 0.00012	< 0.00012	< 0.0012	< 0.0012	0.04	1	5
Chromium	1455	U	0.0040	0.0030	0.0079	0.031	0.5	10	70
Copper	1455	U	0.015	0.0069	0.029	0.0096	2	50	100
Mercury	1455	U	0.00013	0.00006	0.00025	0.00061	0.01	0.2	2
Molybdenum	1455	U	0.0006	0.0006	0.0013	0.0059	0.5	10	30
Nickel	1455	U	0.0023	0.0020	0.0046	0.021	0.4	10	40
Lead	1455	U	0.031	0.021	0.061	0.21	0.5	10	50
Antimony	1455	U	0.0009	< 0.0005	0.0017	0.0005	0.06	0.7	5
Selenium	1455	U	0.0006	< 0.0005	0.0013	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.010	0.007	0.021	0.069	4	50	200
Chloride	1220	U	3.1	3.8	< 10	37	800	15000	25000
Fluoride	1220	U	0.25	0.26	< 1.0	2.6	10	150	500
Sulphate	1220	U	7.0	4.5	14	46	1000	20000	50000
Total Dissolved Solids	1020	N	42	30	83	310	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	8.7	5.5	< 50	57	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.106

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix 9.6 Geological Survey of Ireland (GIS) Mapping

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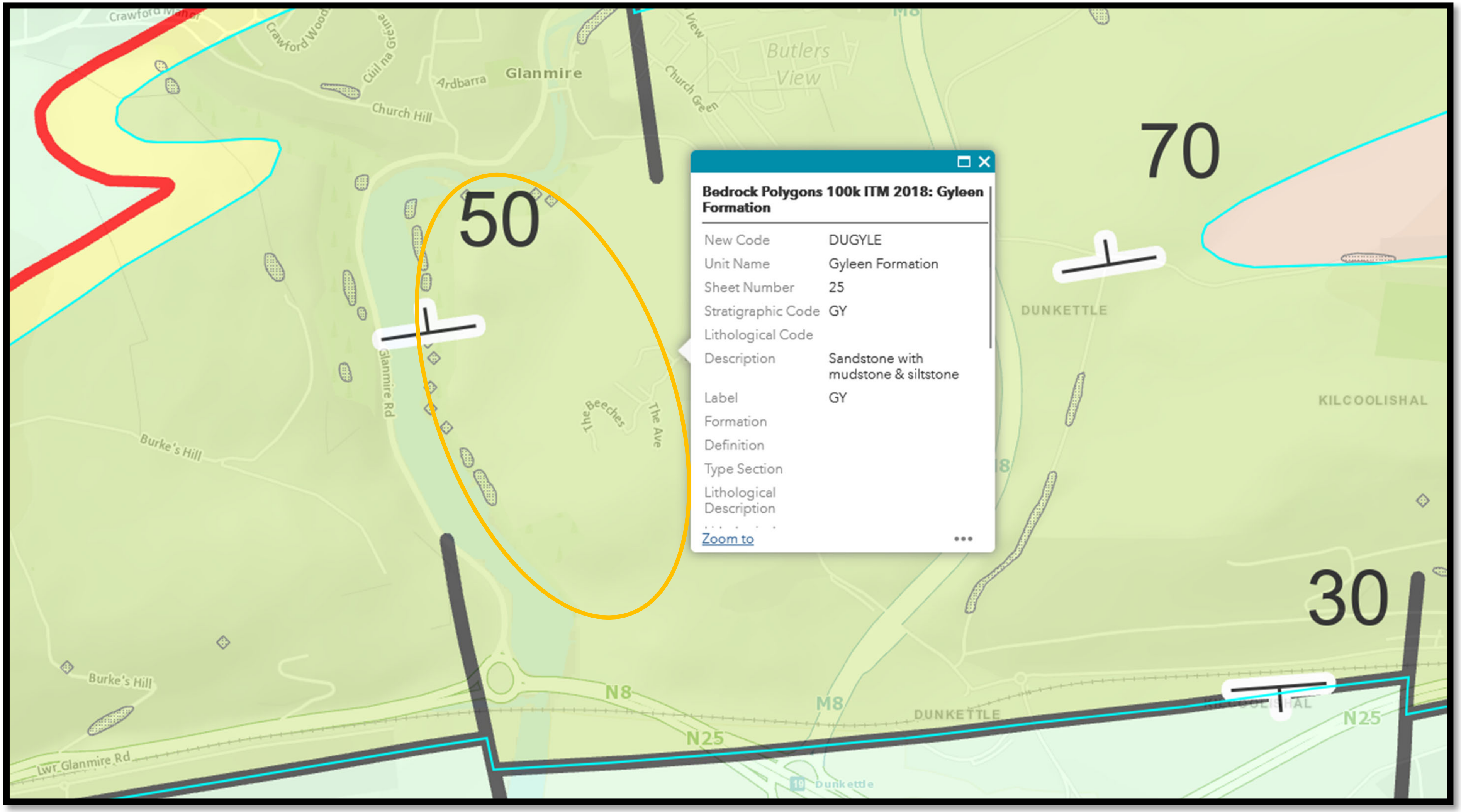
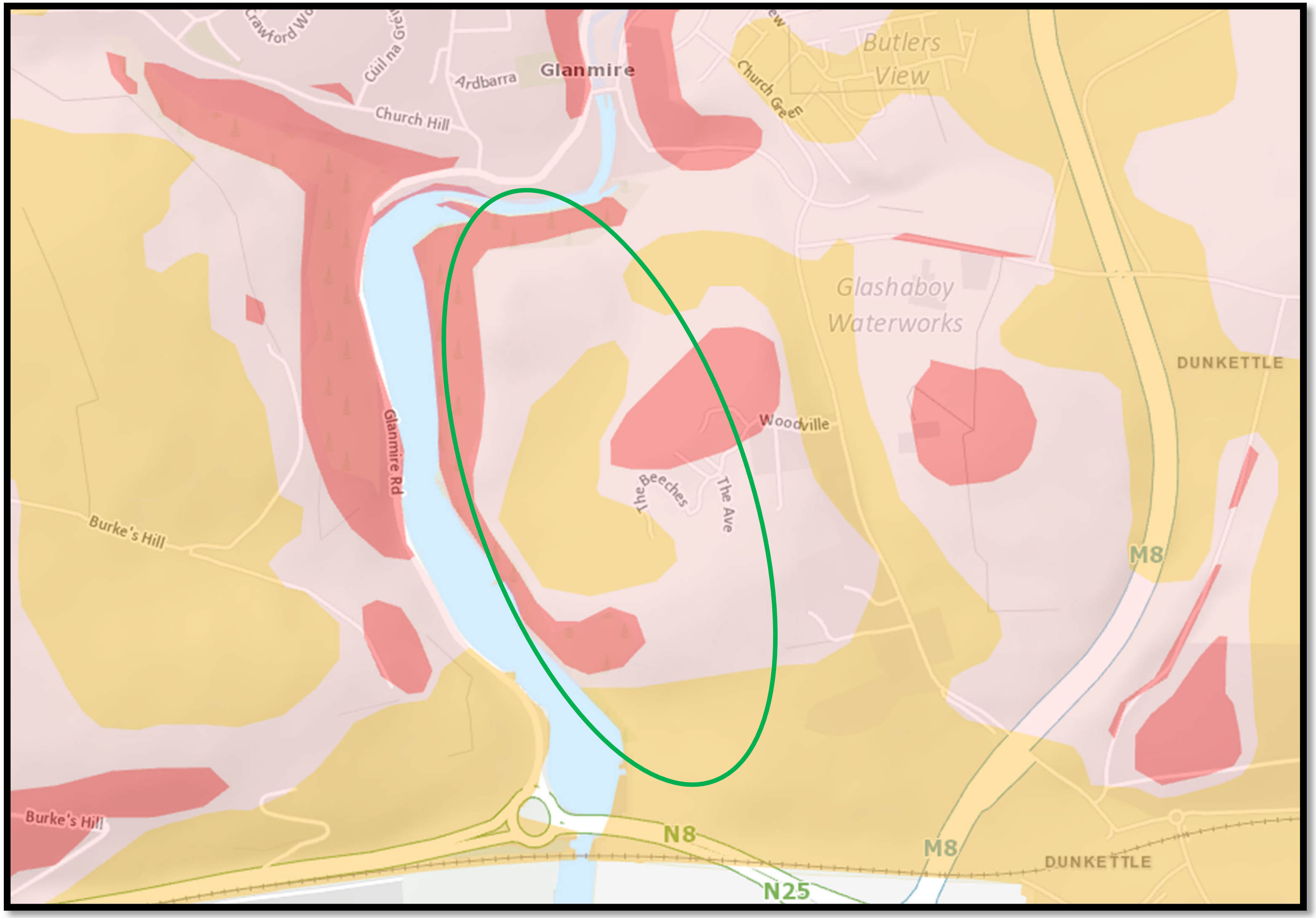


Bedrock Polygons 100k ITM 2018: Gyleen Formation

New Code	DUGYLE
Unit Name	Gyleen Formation
Sheet Number	25
Stratigraphic Code	GY
Lithological Code	
Description	Sandstone with mudstone & siltstone
Label	GY
Formation	
Definition	
Type Section	
Lithological Description	

Zoom to

Image 9.6.1 – GSI Bedrock Geology Mapping. Approximate study area shown by orange oval shape. Small hatched areas represent mapped rock outcrop.

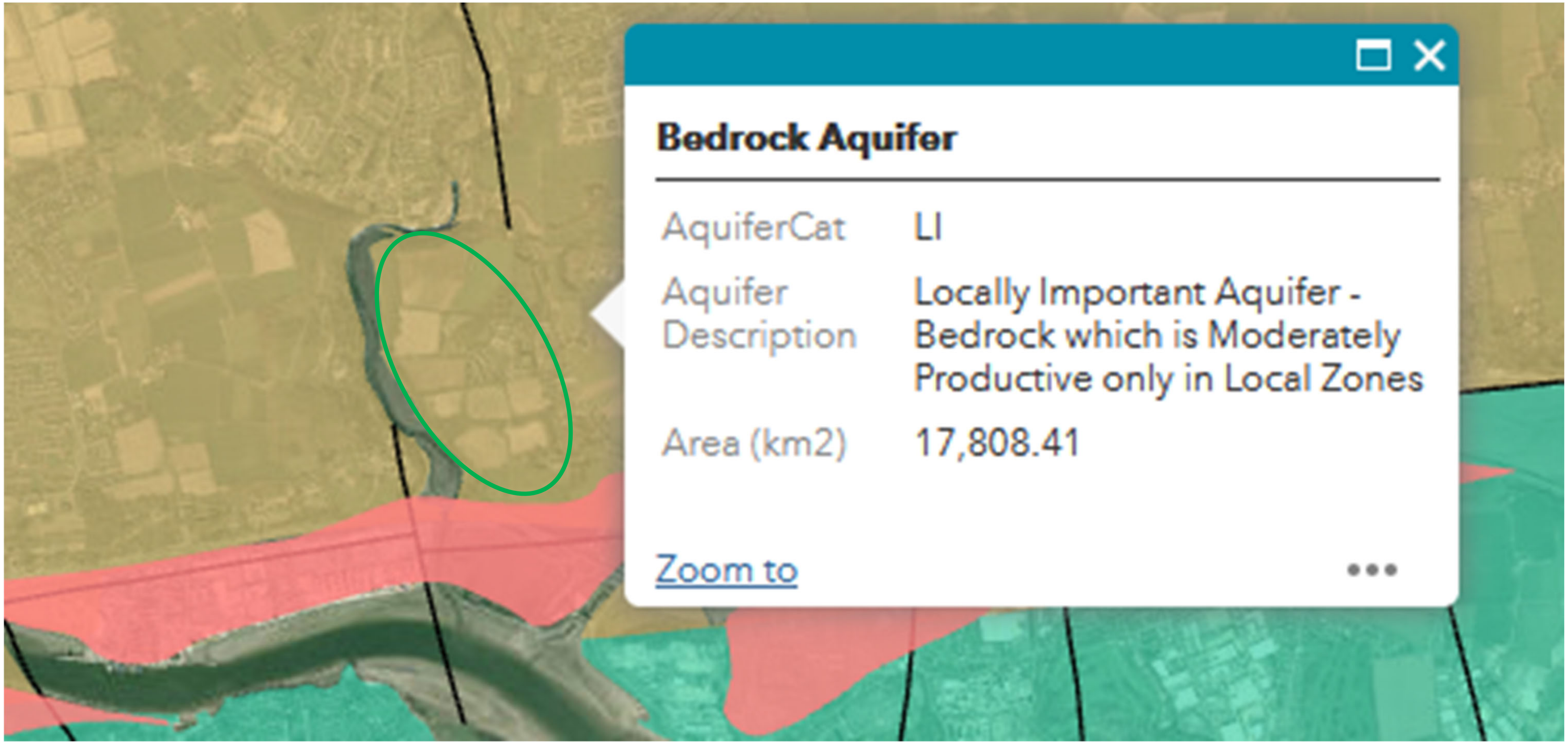


Extreme (Rock Close) = Red

Extreme (0 to 3m) = Pink

High (~3m to 5m) = Yellow

Image 9.6.2: GSI Vulnerability Mapping. Approximate study area shown by green oval shape.



Bedrock Aquifer

AquiferCat	LI
Aquifer Description	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
Area (km2)	17,808.41

Image 9.6.3: GSI Aquifer Mapping showing that the sandstone bedrock under the site is classified as a Locally Important Aquifer (LI)

Approximate study area shown by green oval shape.

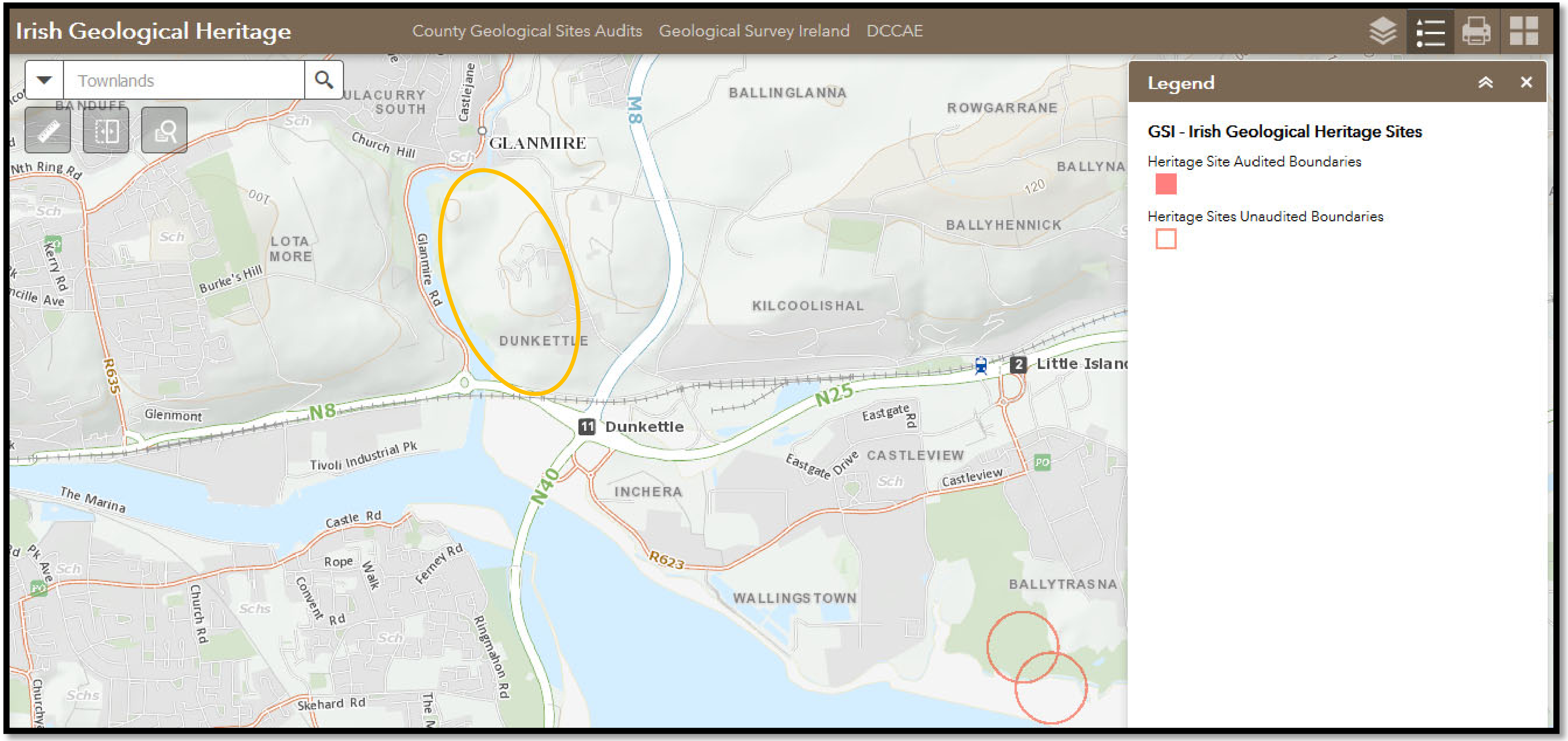


Image 9.6.4: GSI Heritage Mapping with no Geological Heritage Sites Located within or near site.

Approximate study area shown by orange oval shape.

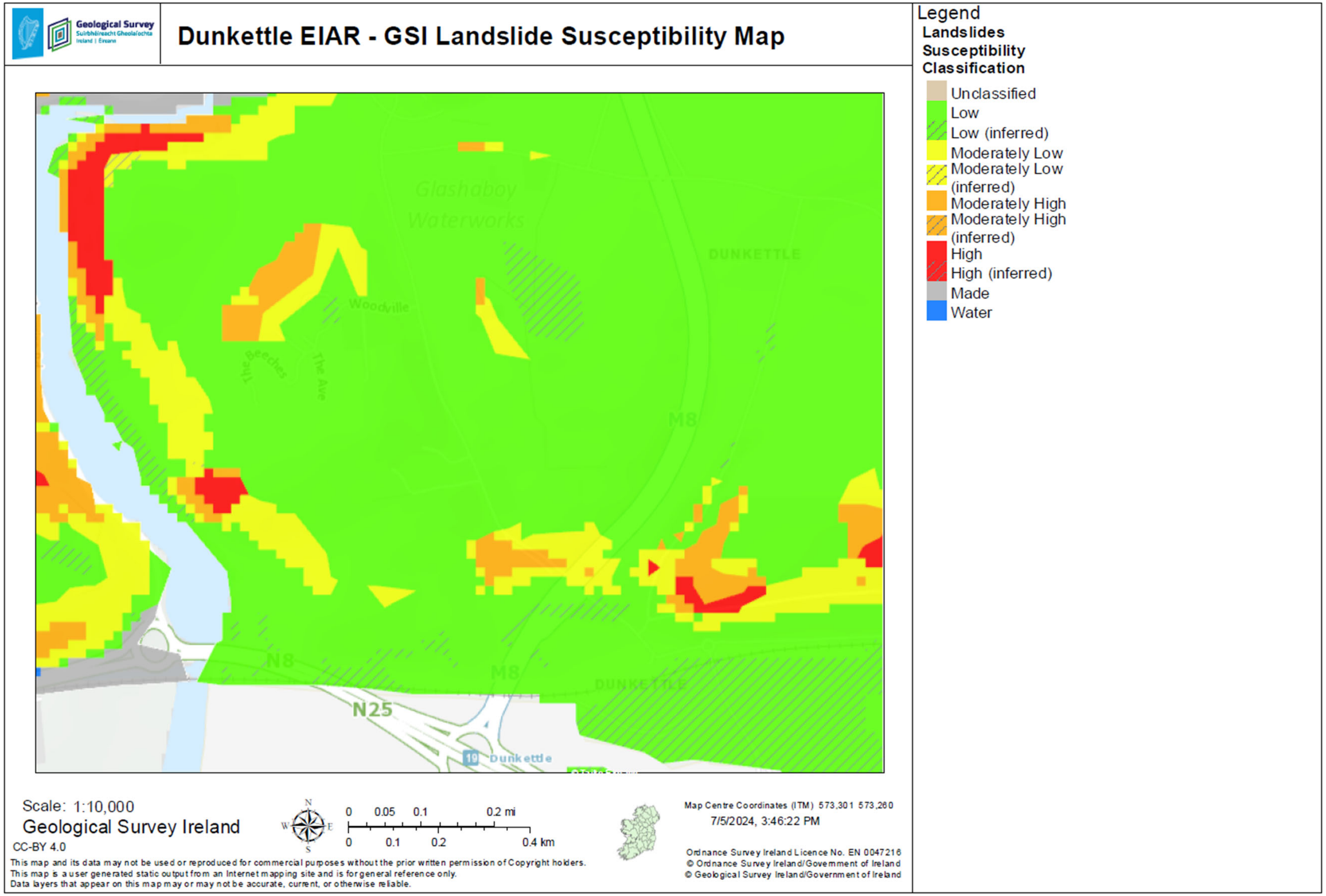


Image 9.6.5: GSI Slope Stability Hazard Mapping showing areas of High (red), Moderately High (brown) to Moderately Low (yellow) outside the development area.

Appendix 9.7 EPA Licensed Facilities

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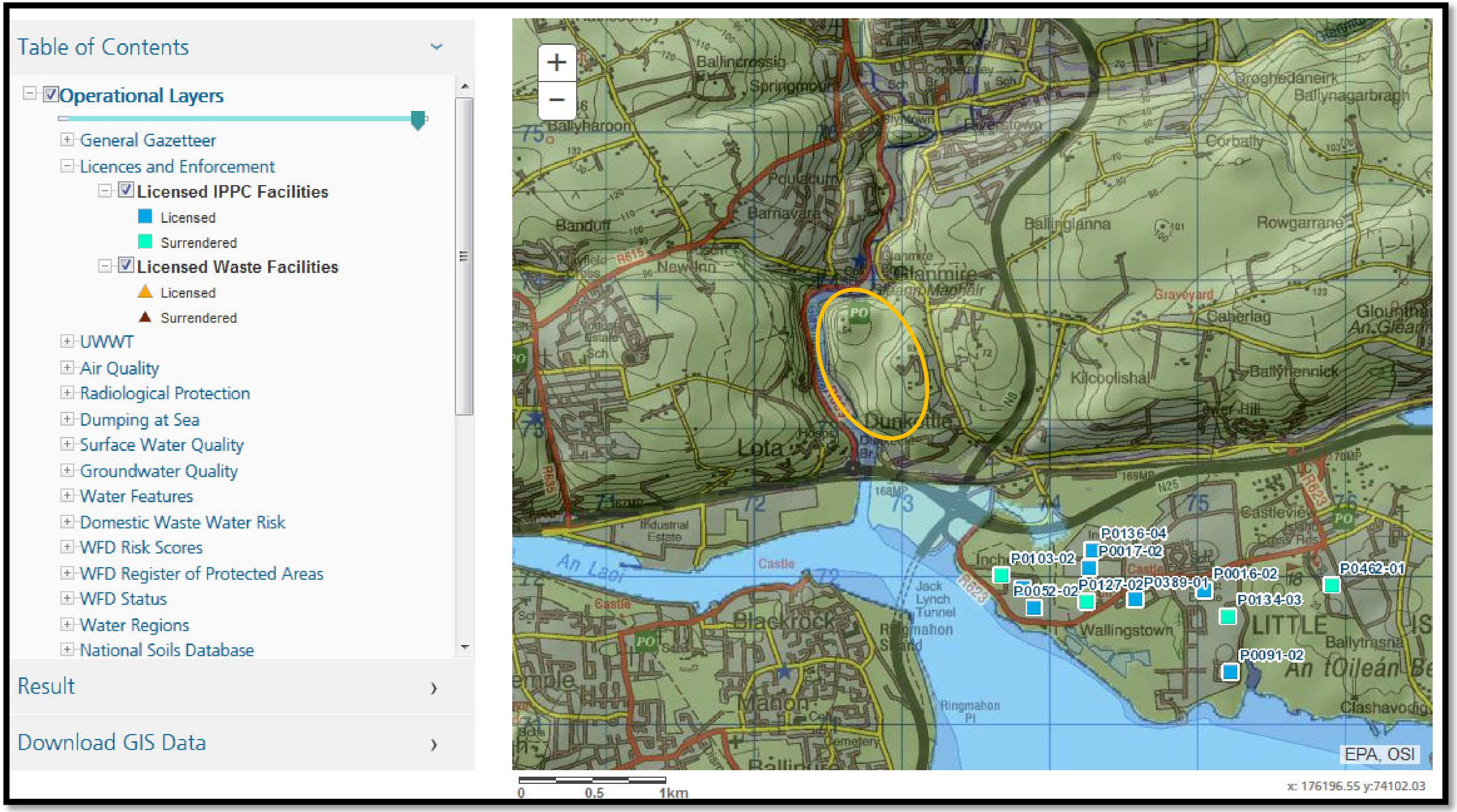

Image 6.7.1 EPA web site mapping of licensed facilities showing them on Little Island - approximate study area shown by orange circle.

Appendix 9.8 Engineering Cut & Fill Assessment and Access Detail Drawing

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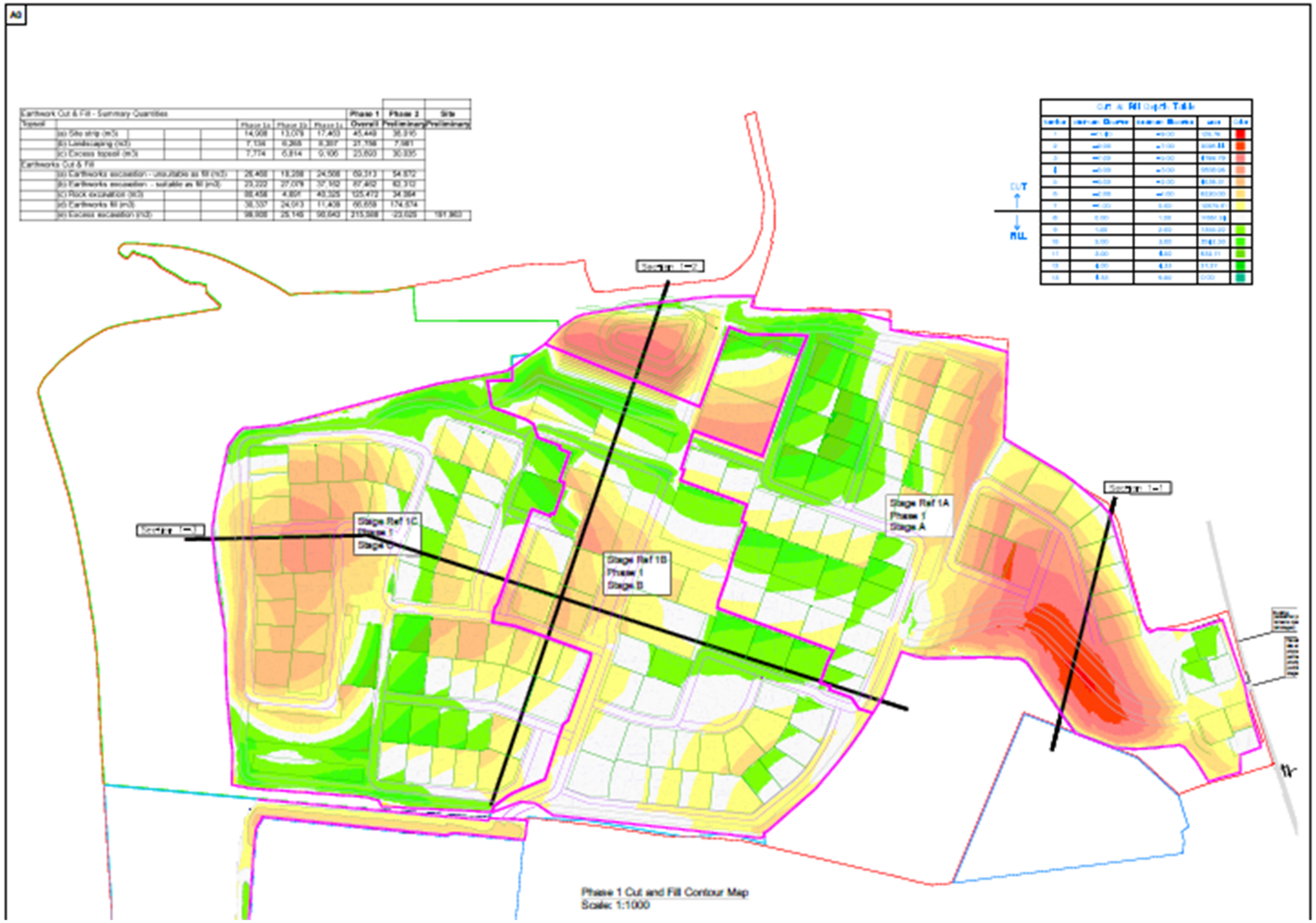


Image 9.8.1 – JODA Engineers Phase 1 Cut & Fill Assessment Mapping. Largest areas of cut are required in areas of higher ground and at the new site access.

(Part 1 of 3)

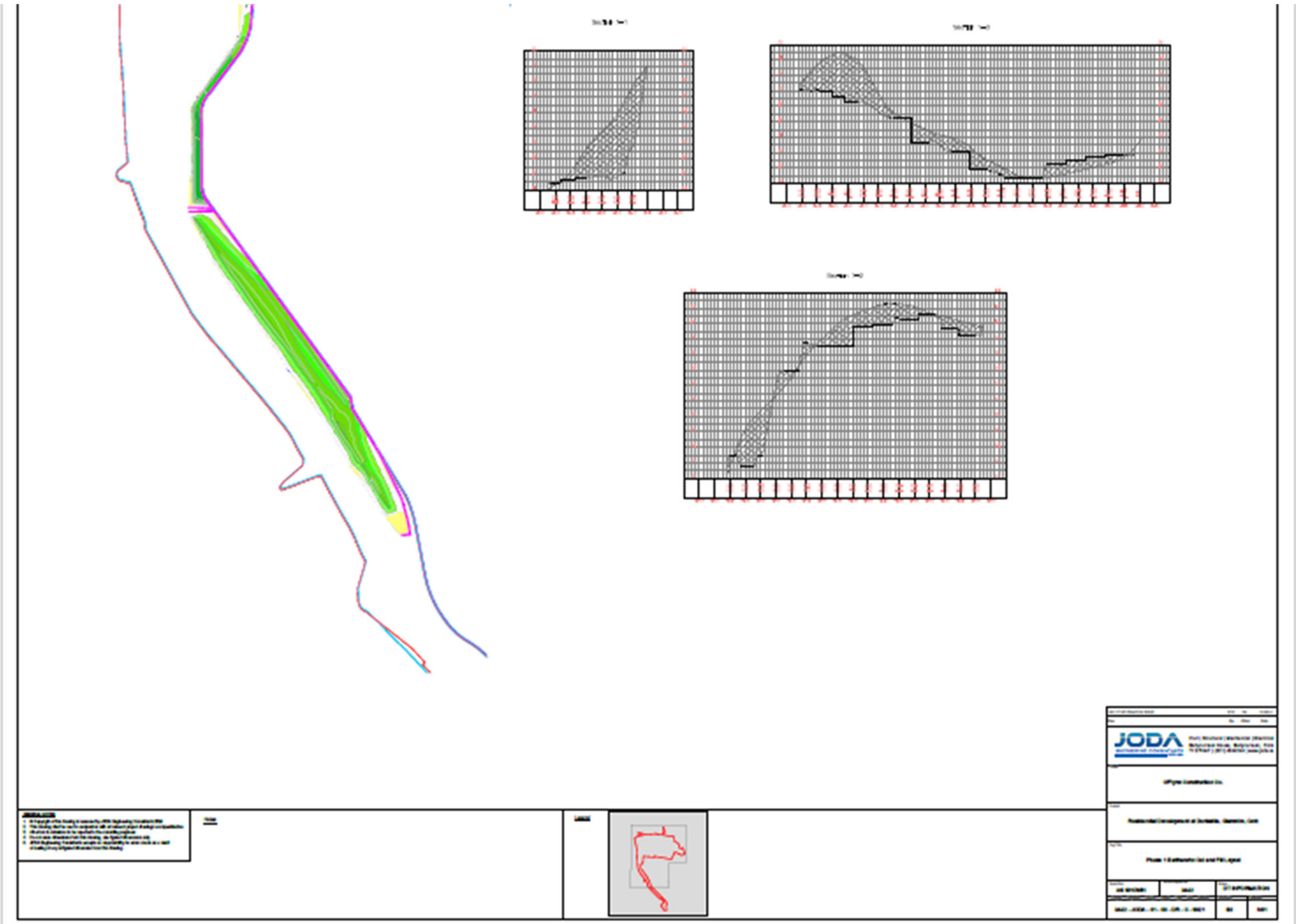
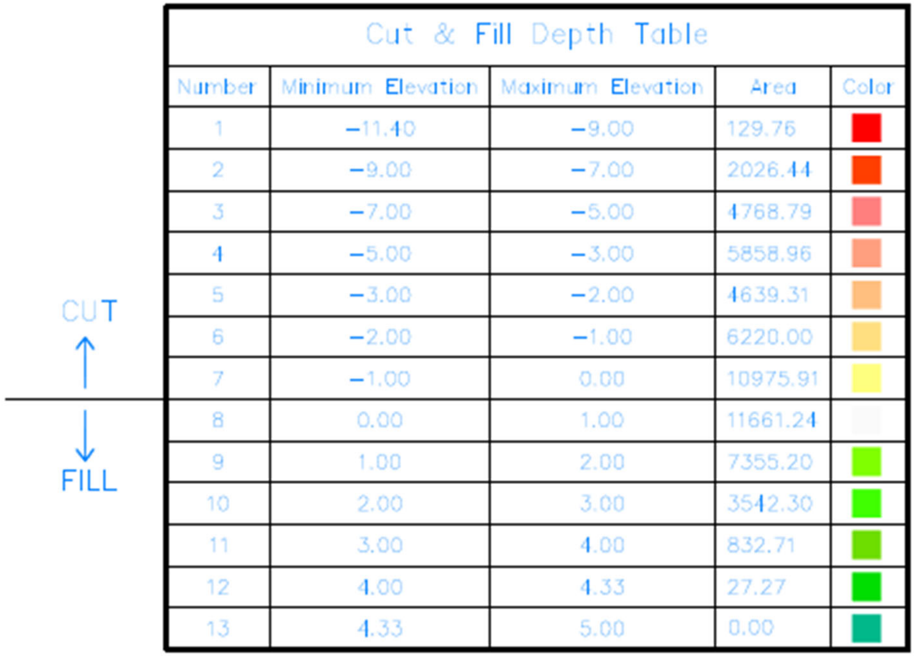


Image 9.8.2 – JODA Engineers Phase 1 Cut & Fill Assessment Mapping. Cross Sections have a large vertical exaggeration but show the future ground profile.

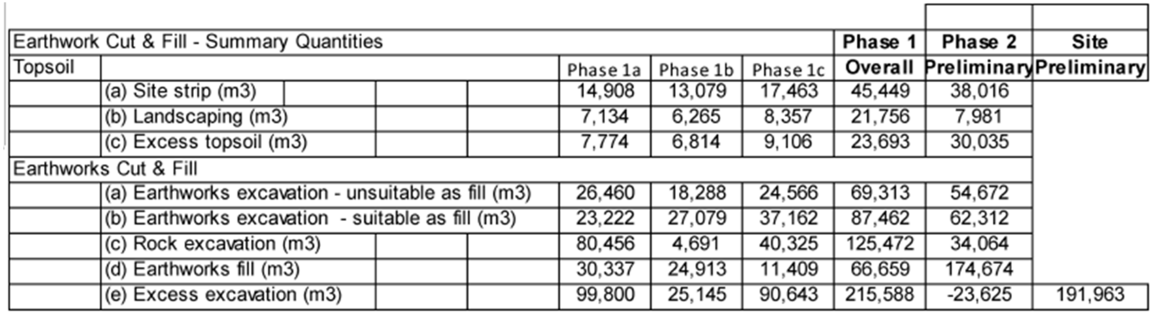
(Part 2 of 3)



Cut & Fill Depth Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	−11.40	−9.00	129.76	🟥
2	−9.00	−7.00	2026.44	🟥
3	−7.00	−5.00	4768.79	🟥
4	−5.00	−3.00	5858.96	🟧
5	−3.00	−2.00	4639.31	🟧
6	−2.00	−1.00	6220.00	🟨
7	−1.00	0.00	10975.91	🟨
8	0.00	1.00	11661.24	⬜
9	1.00	2.00	7355.20	🟩
10	2.00	3.00	3542.30	🟩
11	3.00	4.00	832.71	🟩
12	4.00	4.33	27.27	🟩
13	4.33	5.00	0.00	🟩

Image 9.8.3A - Detail from JODA Cut & Fill Assessment showing depths of proposed excavations (this is an enlarged screen grab from Image 9.8.1 above).



Earthwork Cut & Fill - Summary Quantities					Phase 1	Phase 2	Site
Topsoil		Phase 1a	Phase 1b	Phase 1c	Overall	Preliminary	Preliminary
	(a) Site strip (m3)	14,908	13,079	17,463	45,449	38,016	
	(b) Landscaping (m3)	7,134	6,265	8,357	21,756	7,981	
	(c) Excess topsoil (m3)	7,774	6,814	9,106	23,693	30,035	
Earthworks Cut & Fill							
	(a) Earthworks excavation - unsuitable as fill (m3)	26,460	18,288	24,566	69,313	54,672	
	(b) Earthworks excavation - suitable as fill (m3)	23,222	27,079	37,162	87,462	62,312	
	(c) Rock excavation (m3)	80,456	4,691	40,325	125,472	34,064	
	(d) Earthworks fill (m3)	30,337	24,913	11,409	66,659	174,674	
	(e) Excess excavation (m3)	99,800	25,145	90,643	215,588	-23,625	191,963

Image 9.83B – Detail from JODA Cut & Fill Assessment showing estimates of material volumes for both phases of the development.

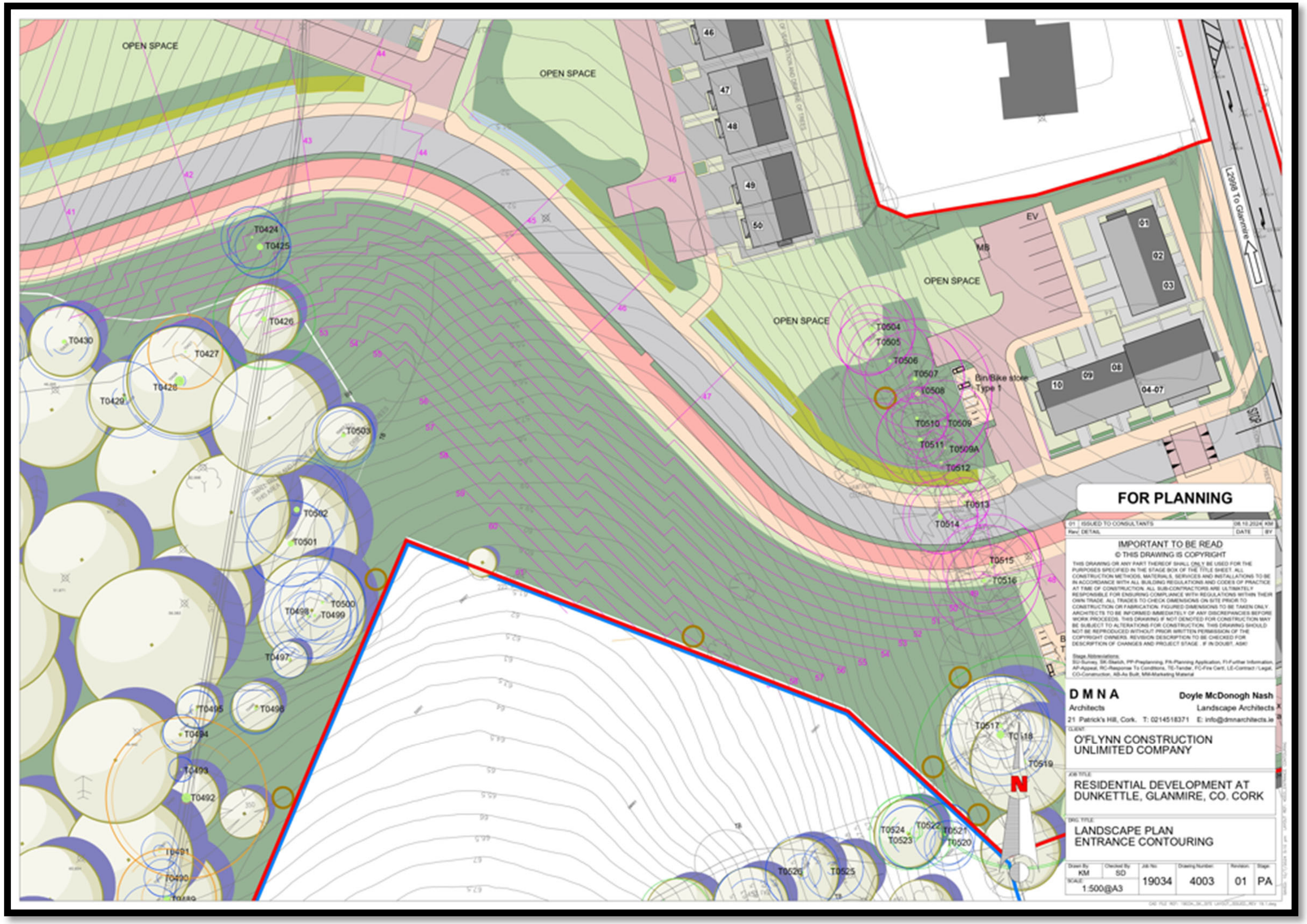


Image 9.8.4 – Contoured architect drawing of proposed new access road. A deep cut is needed in this area but it forms a broad valley and there is no slope risk.

Appendix 9.9A IGI Guidelines - Activities Environments Matrix

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Figure 2 Activities /Environments Matrix

	Activities							
Environments	**Earthworks**	**Storage / transmission of leachable and/or hazardous materials**	**Lowering of groundwater levels by pumping or drainage**	**Discharges to ground**	**Excavation of materials above the water table**	**Excavation of materials below the water table**	**Land-spreading**	**Abstraction / Discharge of energy (heat) from/to the ground**
Type A	Invasive site works to characterise nature[1] and thickness of soil and subsoil e.g. trial pits or augering.	Establish nature and quantity of leachable materials. Site works to characterise nature[1], thickness, permeability and stratification of soils, subsoils and bedrock geology e.g. trial pits, boreholes. Works to determine groundwater level, e.g.mapping, monitoring in stand pipes, piezometers, or boreholes.	Establish details of borehole /spring construction or drainage system structure details (as appropriate). Establish sustainable yield and proposed daily abstraction rate or drainage system invert levels (as appropriate). Works to determine summer level of the water table, annual actual recharge and proposed maximum drawdown. Measurement of effects of change in water level on nearby abstractions.	Complete a Risk Assessment as per EPA (2011) Guidance on the Authorisation of Discharges to Groundwater[2]; Apply Tier 1, 2 or 3 Assessment as appropriate	Site works to characterise nature[1], thickness, permeability and stratification of soils and subsoils e.g. trial pits, augering. Site works to fully characterise the bedrock geology and in order to to define the resource volume/weight according to The PERC Reporting Standard[3] e.g. trenching, drilling, geophysics. Works to determine groundwater level, flow direction and gradient; e.g.monitoring in stand pipes, piezometers, or boreholes.	Site works to characterise nature[1], thickness, permeability and stratification of soils and subsoils e.g. trial pits, augering. Site works to fully characterise the bedrock geology and in order to to define the resource volume/weight according to The PERC Reporting Standard[3] e.g. trenching, drilling, geophysics. Works to determine groundwater level, flow direction and gradient; e.g.monitoring in stand pipes, piezometers, or boreholes. Characterisation of groundwater chemistry and quality. If lowering of groundwater levels is required, then proceed also as for activity Lowering of water levels by pumping of drainage.	Establish the type of waste to be landspread. Undertake a walkover survey of the site. Review Groundwater Protection Responses for Landspreading[4], and apply Departmental[5] and Regularory[6] guidelines and best practice. Assign a response category.	Provide details of type of system (open/closed, shallow/deep). The site works required and described below will reflect the design parameters of the system being installed. Site works to characterise nature[1], thickness, permeability and stratification of soils, subsoils and bedrock geology. Design parameters for the system will be required to be collected, however these are out of the remit of this document - although any information gathered for design purposes should be used in the EIS.
Type B	*In addition to all the above;* Works to determine groundwater level, flow direction and gradient; e.g. monitoring in stand pipes, piezometers, or boreholes. Works to determine groundwater - surface water interactions.	*In addition to all the above;* Works to determine groundwater flow direction and gradient; e.g. monitoring in stand pipes, piezometers, or boreholes. Works to determine groundwater - surface water interactions.	*In addition to all the above;* Works to determine aquifer properties, seasonal variations in water levels, extent of cone of depression or drawdown of surrounding water levels (as appropriate) and alterations in groundwater flow pattern. Works to determine groundwater - surface water interactions and measure effects of drawdown in water levels on hydraulically connected surface waters and springs.	*As above;*	*As above;*	*As above;*	*In addition to all the above;* Site works to characterise subsoil/soil characteristics e.g. trial pits or augering.	*In addition to all the above;* Characterise baseline temperature of soil / groundwater and groundwater hydrochemistry and quality. Works to determine groundwater level e.g.monitoring in stand pipes, piezometers, or boreholes. If it is proposed to discharge to surface water, then characterisation surface water quality, baseline temperature and flow rates.
Type C	*In addition to all the above;* Identify location and abstraction rate of nearby groundwater abstractions.	*In addition to all the above;* Measure or determine rate of groundwater flow/travel time.	*In addition to all the above;* Installation of sufficient monitoring wells to provide groundwater flow direction, gradient, flow pattern and rate of flow/travel time. Identify nearby geothermal systems, and discharges to groundwater	*As above;*	*As above;*	*As above;*	*In addition to all the above;* Confirm subsoil permeability in laboratory. Delineate inner and outer source protection areas and source protection zones. Establish water quality of groundwater abstraction. Undertake risk assessment if appropriate.	*In addition to all the above;* Works to determine thermal and hydraulic conductivity of soil, subsoil and bedrock. Identify location and abstraction rate of nearby groundwater abstractions.
Type D	*In addition to all the above;* Regional study of karst in an area, including identified karst features (both mapped and identified during site walkovers). Map bedrock topography. Geotechnical assessment of risk of landslide or subsidence.	*In addition to all the above;* Full detailed hydrogeological assessment required in this situation. Geotechnical assessment of risk of landslide or subsidence.	*In addition to all the above;* Geotechnical assessment of risk of landslide or subsidence.	*In addition to all the above;* Geotechnical assessment of risk of landslide or subsidence.	*In addition to all the above;* Full detailed hydrogeological assessment required in this situation. Geotechnical assessment of risk of landslide or subsidence.	*In addition to all the above;* Geotechnical assessment of risk of landslide or subsidence.	*As for Type C above*	*In addition to all the above;* Geotechnical assessment of risk of landslide or subsidence.
Type E	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	Complete a Risk Assessment as per EPA (2011); Apply Tier 1, 2 or 3 Assessment as appropriate.	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	*As for Type C above*	Full thermogeological and/or hydrogeological assessment required in this situation.

Type A	Passive geological / hydrogeological environments
Type B	Natural dynamic hydrogeological environments
Type C	Man-made dynamic hydrogeological environments
Type D	Sensitive geological / hydrogeological environments
Type E	Groundwater dependent eco systems

Where works are required to characterise, establish, measure, determine or otherwise provide information, the level of activity and detail required will be informed by a combination of a) the potential impact of the proposed development , b) the scale of the proposed development and c) the professional judgement of the project geoscientist. In addition, the works are likely to be iterative, with new works required in reponse to information acquired during any phase of works.

1. Characterisation of soil and sub-soils to be carried out in accordance with a recognised standard or nomenclature system e.g. BS5930:1990 for subsoils or EPA Code of practice for Environmental Risk Assessment for Unregulated Waste Disposal sites where relevant
2. EPA, 2011. Guidance on the Authorisation of Discharges to Groundwater - Version 1 December 2011. www.epa.ie
3. The PERC Reporting Standard
4. Groundwater Protection Schemes (DoELG/EPA/GSI, 1999)
5. Control of Farm Pollution (DAFF, 1992) and the Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates (DoE and DAFF, 1996)
6. Landspreading of Organic Waste - Guidance on Groundwater Vulnerability Assessment of Land (EPA 2004)

Appendix 9.9B IGI Guidelines - Flow Chart

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Figure 1 Flow Chart

*Matrix: See Figure 2 in Guidelines for the Preparation of the Soils, Geology and Hydrogeological Chapters of Environmental Impact Statements - Issued by the Institute of Geologists of Ireland (2013)

Figure 2 Activities /Environments Matrix

Activities

Environments	Earthworks	Storage / transmission of leachable and/or hazardous materials	Lowering of groundwater levels by pumping or drainage	Discharges to ground	Excavation of materials above the water table	Excavation of materials below the water table	Land-spreading	Abstraction / Discharge of energy (heat) from/to the ground
Type A	Invasive site works to characterise nature[1] and thickness of soil and subsoil e.g. trial pits or augering.	Establish nature and quantity of leachable materials.	Establish details of borehole /spring construction or drainage system structure details (as appropriate).	Complete a Risk Assessment as per EPA (2011) Guidance on the Authorisation of Discharges to Groundwater[2]; Apply Tier 1, 2 or 3 Assessment as appropriate	Site works to characterise nature[1], thickness, permeability and stratification of soils and subsoils e.g. trial pits, augering.	Site works to characterise nature[1], thickness, permeability and stratification of soils and subsoils e.g. trial pits, augering.	Establish the type of waste to be landspread.	Provide details of type of system (open/closed, shallow/deep). The site works required and described below will reflect the design parameters of the system being installed.
		Site works to characterise nature[1], thickness, permeability and stratification of soils, subsoils and bedrock geology e.g. trial pits, boreholes.	Establish sustainable yield and proposed daily abstraction rate or drainage system invert levels (as appropriate).		Site works to fully characterise the bedrock geology and in order to to define the resource volume/weight according to The PERC Reporting Standard[3] e.g. trenching, drilling, geophysics.	Site works to fully characterise the bedrock geology and in order to to define the resource volume/weight according to The PERC Reporting Standard[3] e.g. trenching, drilling, geophysics.	Undertake a walkover survey of the site.	Site works to characterise nature[1], thickness, permeability and stratification of soils, subsoils and bedrock geology.
		Works to determine groundwater level, e.g.mapping, monitoring in stand pipes, piezometers, or boreholes.	Works to determine summer level of the water table, annual actual recharge and proposed maximum drawdown. Measurement of effects of change in water level on nearby abstractions.		Works to determine groundwater level, flow direction and gradient; e.g.monitoring in stand pipes, piezometers, or boreholes.	Works to determine groundwater level, flow direction and gradient; e.g.monitoring in stand pipes, piezometers, or boreholes. Characterisation of groundwater chemistry and quality. If lowering of groundwater levels is required, then proceed also as for activity Lowering of water levels by pumping of drainage.	Review Groundwater Protection Responses for Landspreading[4], and apply Departmental[5] and Regularory[6] guidelines and best practice. Assign a response category.	Design parameters for the system will be required to be collected, however these are out of the remit of this document - although any information gathered for design purposes should be used in the EIS.
Type B	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*As above;*	*As above;*	*As above;*	*In addition to all the above;*	*In addition to all the above;*
	Works to determine groundwater level, flow direction and gradient; e.g. monitoring in stand pipes, piezometers, or boreholes.	Works to determine groundwater flow direction and gradient; e.g. monitoring in stand pipes, piezometers, or boreholes.	Works to determine aquifer properties, seasonal variations in water levels, extent of cone of depression or drawdown of surrounding water levels (as appropriate) and alterations in groundwater flow pattern.				Site works to characterise subsoil/soil characteristics e.g. trial pits or augering.	Characterise baseline temperature of soil / groundwater and groundwater hydrochemistry and quality.
	Works to determine groundwater - surface water interactions.	Works to determine groundwater - surface water interactions.	Works to determine groundwater - surface water interactions and measure effects of drawdown in water levels on hydraulically connected surface waters and springs.					Works to determine groundwater level e.g.monitoring in stand pipes, piezometers, or boreholes. If it is proposed to discharge to surface water, then characterisation surface water quality, baseline temperature and flow rates.
Type C	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*As above;*	*As above;*	*As above;*	*In addition to all the above;*	*In addition to all the above;*
	Identify location and abstraction rate of nearby groundwater abstractions.	Measure or determine rate of groundwater flow/travel time.	Installation of sufficient monitoring wells to provide groundwater flow direction, gradient, flow pattern and rate of flow/travel time.				Confirm subsoil permeability in laboratory. Delineate inner and outer source protection areas and source protection zones.	Works to determine thermal and hydraulic conductivity of soil, subsoil and bedrock.
			Identify nearby geothermal systems, and discharges to groundwater				Establish water quality of groundwater abstraction. Undertake risk assessment if appropriate.	Identify location and abstraction rate of nearby groundwater abstractions.
Type D	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*In addition to all the above;*	*As for Type C above*	*In addition to all the above;*
	Regional study of karst in an area, including identified karst features (both mapped and identified during site walkovers).	Full detailed hydrogeological assessment required in this situation.	Geotechnical assessment of risk of landslide or subsidence.	Geotechnical assessment of risk of landslide or subsidence.	Full detailed hydrogeological assessment required in this situation.	Geotechnical assessment of risk of landslide or subsidence.		Geotechnical assessment of risk of landslide or subsidence.
	Map bedrock topography. Geotechnical assessment of risk of landslide or subsidence.	Geotechnical assessment of risk of landslide or subsidence.			Geotechnical assessment of risk of landslide or subsidence.			
Type E	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	Complete a Risk Assessment as per EPA (2011); Apply Tier 1, 2 or 3 Assessment as appropriate.	Full detailed hydrogeological assessment required in this situation.	Full detailed hydrogeological assessment required in this situation.	*As for Type C above*	Full thermogeological and/or hydrogeological assessment required in this situation.

Type A	Passive geological / hydrogeological environments
Type B	Natural dynamic hydrogeological environments
Type C	Man-made dynamic hydrogeological environments
Type D	Sensitive geological / hydrogeological environments
Type E	Groundwater dependent eco systems

Where works are required to characterise, establish, measure, determine or otherwise provide information, the level of activity and detail required will be informed by a combination of a) the potential impact of the proposed development , b) the scale of the proposed development and c) the professional judgement of the project geoscientist. In addition, the works are likely to be iterative, with new works required in reponse to information acquired during any phase of works.

1 Characterisation of soil and sub-soils to be carried out in accordance with a recognised standard or nomenclature system e.g. BS5930:1990 for subsoils or EPA Code of practice for Environmental Risk Assessment for Unregulated Waste Disposal sites where relevant
2 EPA, 2011. Guidance on the Authorisation of Discharges to Groundwater - Version 1 December 2011. www.epa.ie
3 The PERC Reporting Standard
4 Groundwater Protection Schemes (DoELG/EPA/GSI, 1999)
5 Control of Farm Pollution (DAFF, 1992) and the Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates (DoE and DAFF, 1996)
6 Landspreading of Organic Waste - Guidance on Groundwater Vulnerability Assessment of Land (EPA 2004)

Dunkettle EIAR

CHAPTER 10 Water & Hydrology

Appendix 10.1	EPA SW Catchment Maps & SWRBD Glashaboy WMU
Appendix 10.2	WFD Cycle 2
Appendix 10.3	EPA Groundwater Catchment Maps
Appendix 10.4	EPA & GSI Bedrock & Aquifer Mapping

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Appendix 10.1 EPA SW Catchment Maps & SWRBD Glashaboy WMU

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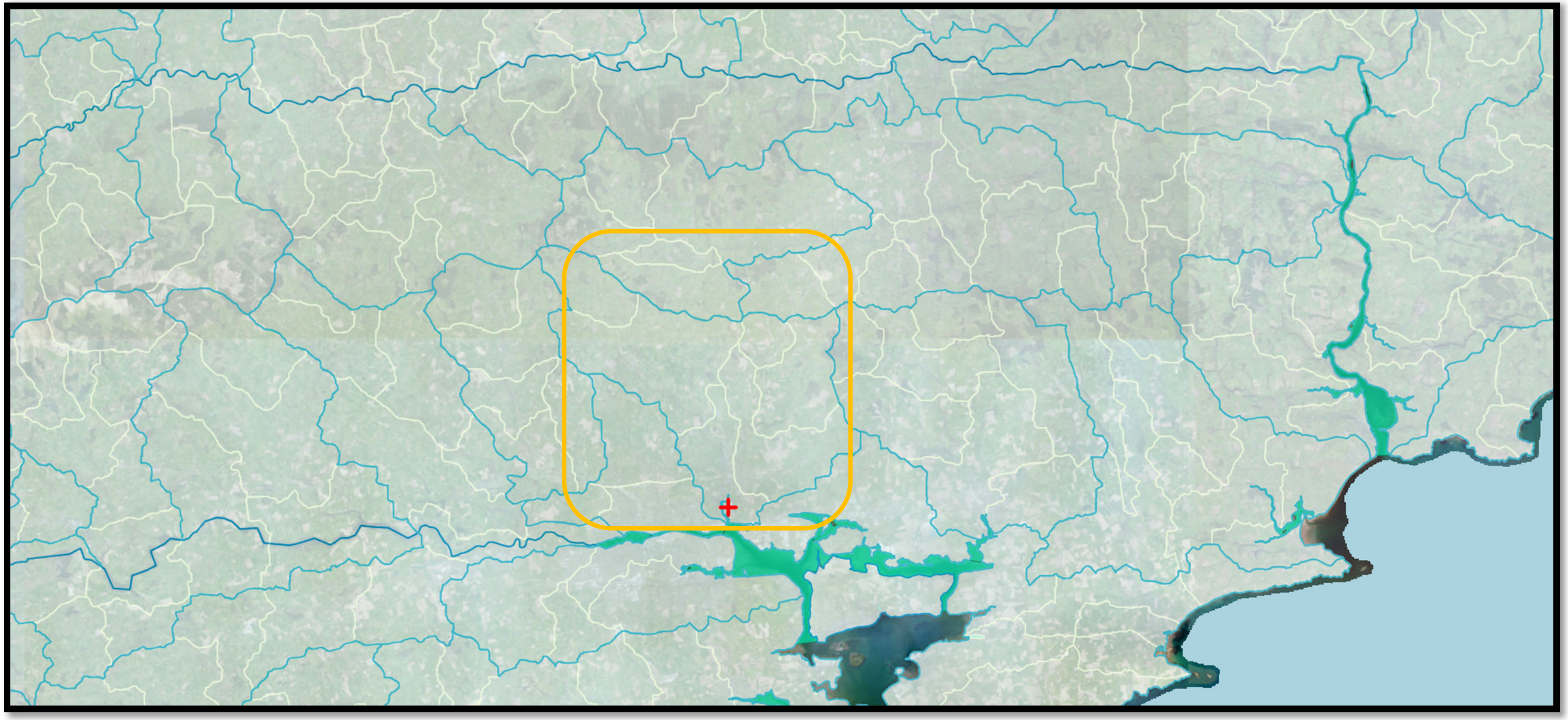
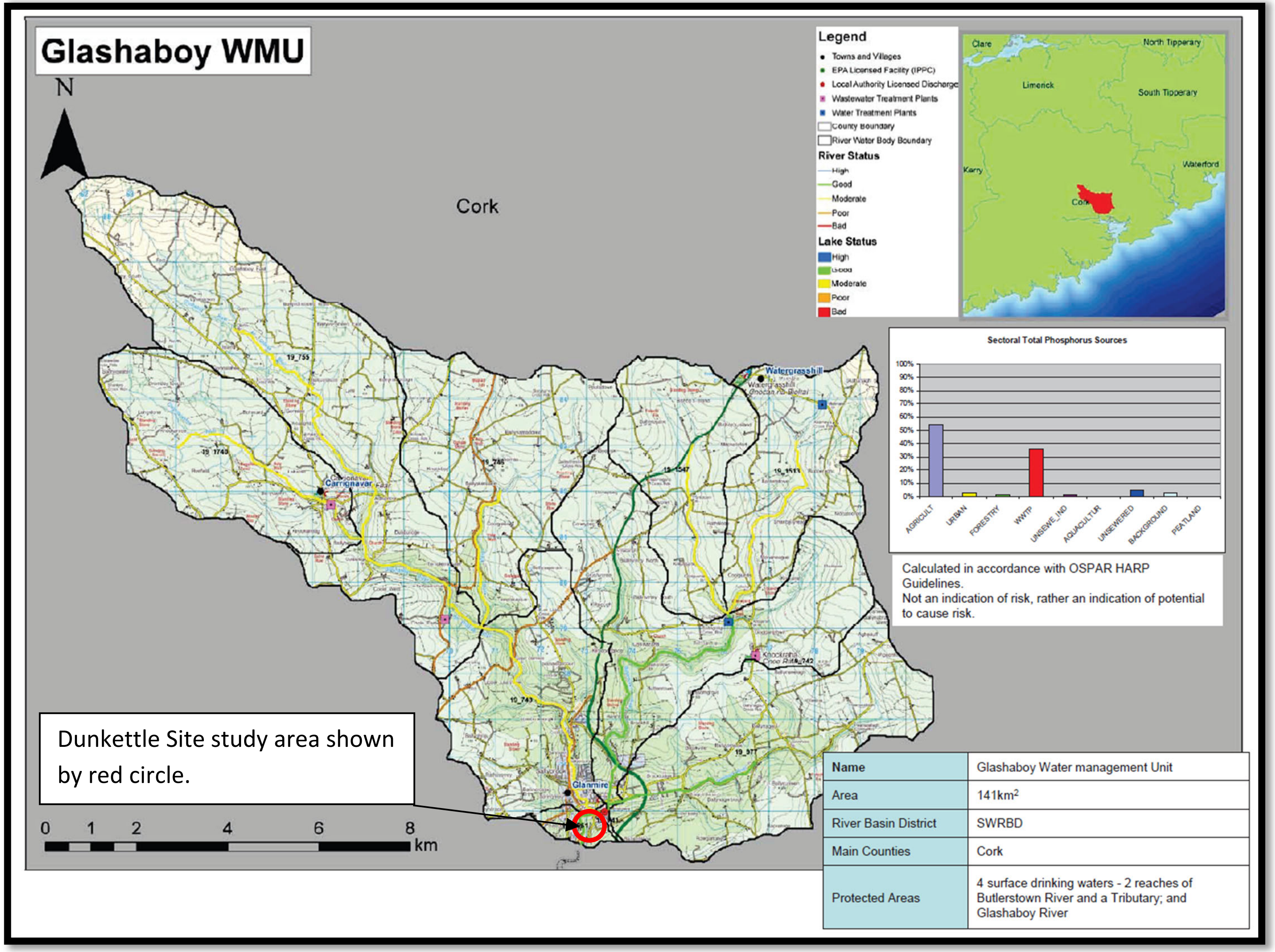


Image 10.1.1 EPA Map of the Lee, Cork Harbour and Youghal Bay Hydrometric Catchment Area 19, (Area of ~2,182km^2). (Glashaboy(L.Mahon) Sub-Catchment in orange box with approximate site location shown by red cross).

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)



Calculated in accordance with OSPAR HARP Guidelines.
Not an indication of risk, rather an indication of potential to cause risk.

Dunkettle Site study area shown by red circle.

Name	Glashaboy Water management Unit
Area	141km^2
River Basin District	SWRBD
Main Counties	Cork
Protected Areas	4 surface drinking waters - 2 reaches of Butlerstown River and a Tributary; and Glashaboy River

Image 10.1.2 SWRBD Map of the Glashaboy(L.Mahon)_SC_10 Sub-Catchment 19_11.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

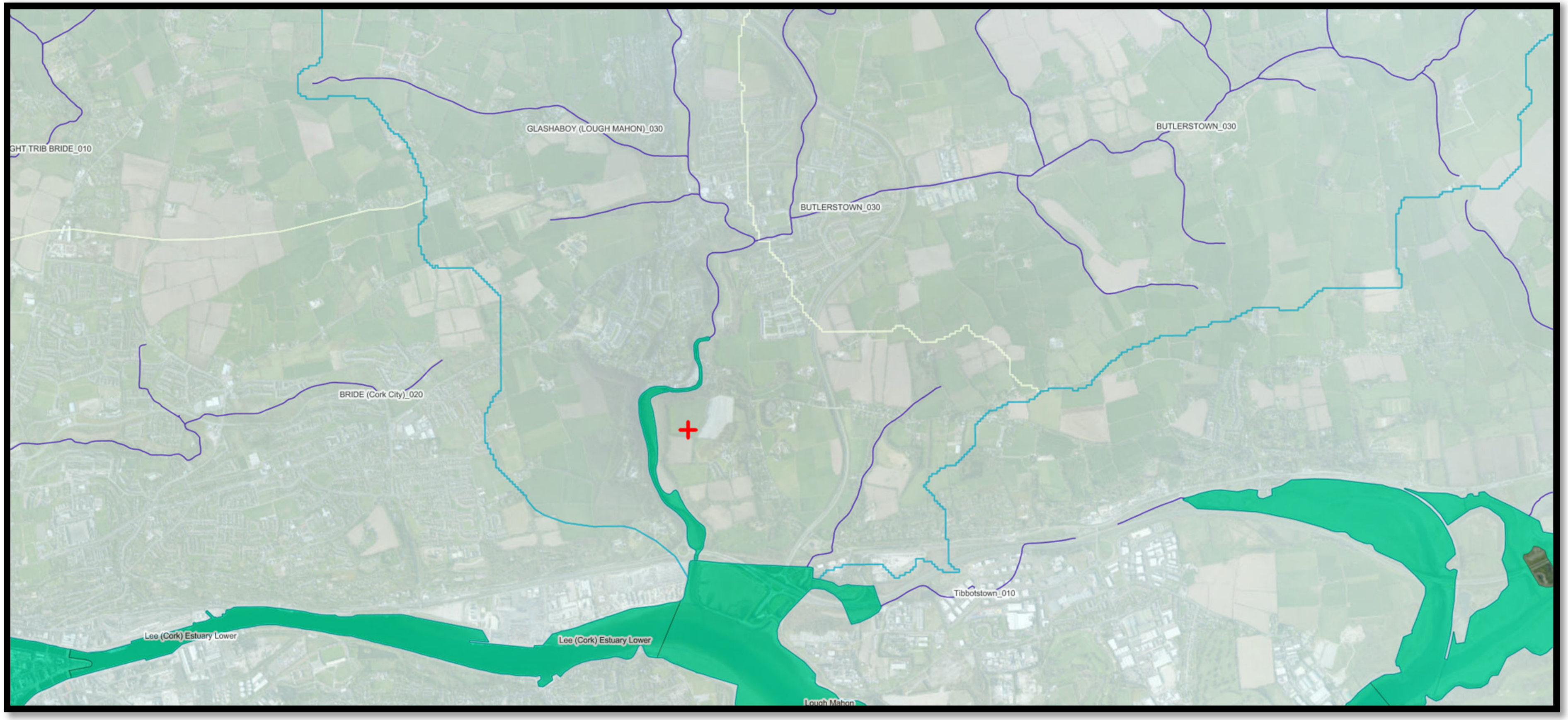


Image 10.1.3 EPA Map of Water Features near the Dunkettle Site (red cross).
The Glashaboy (Lough Mahon)_030 WFD River Sub-Basin ends in Glanmire Village north of the site.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

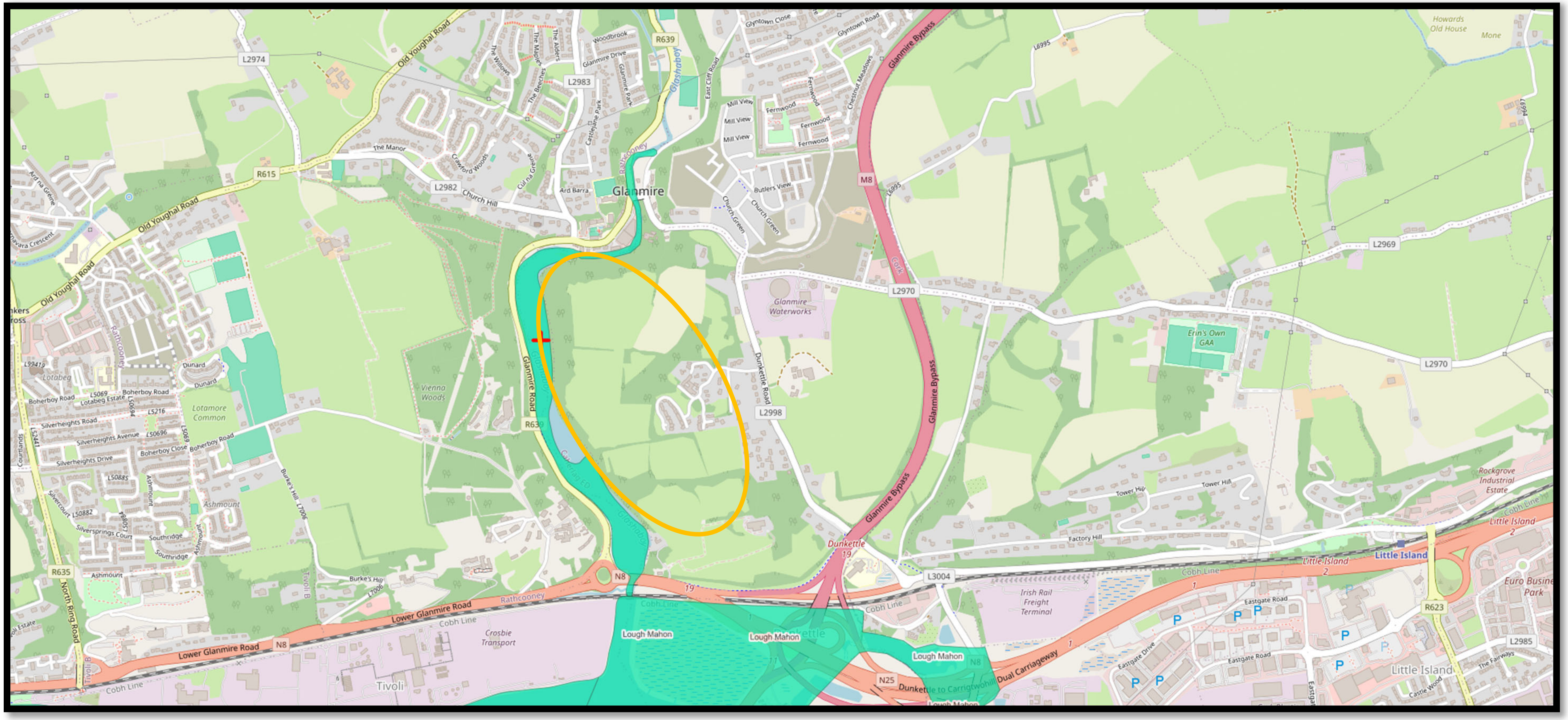


Image 10.1.4 – EPA Map of the Transitional Waters of the Glashaboy River Estuary (IE_SW_060_0800), (shown by red cross.) (Approximate study area shown by orange oval shape).

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

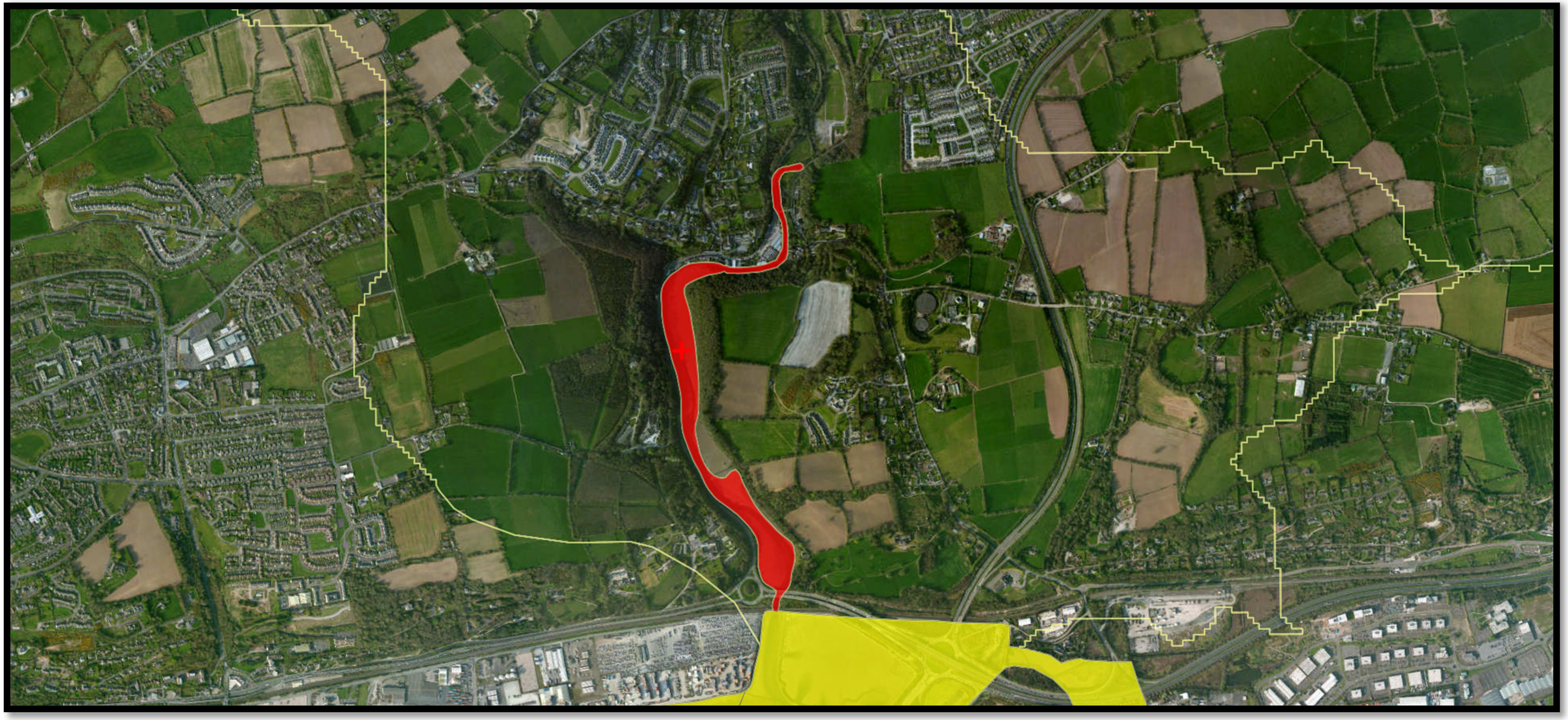


Image 10.1.5 EPA Map showing the Glashaboy River Estuary water quality status 2016 – 2021 as 'bad'.
(The Lough Mahon transitional waters in Upper Cork Harbour are classed as 'moderate' quality.)

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eireann – Surveying)

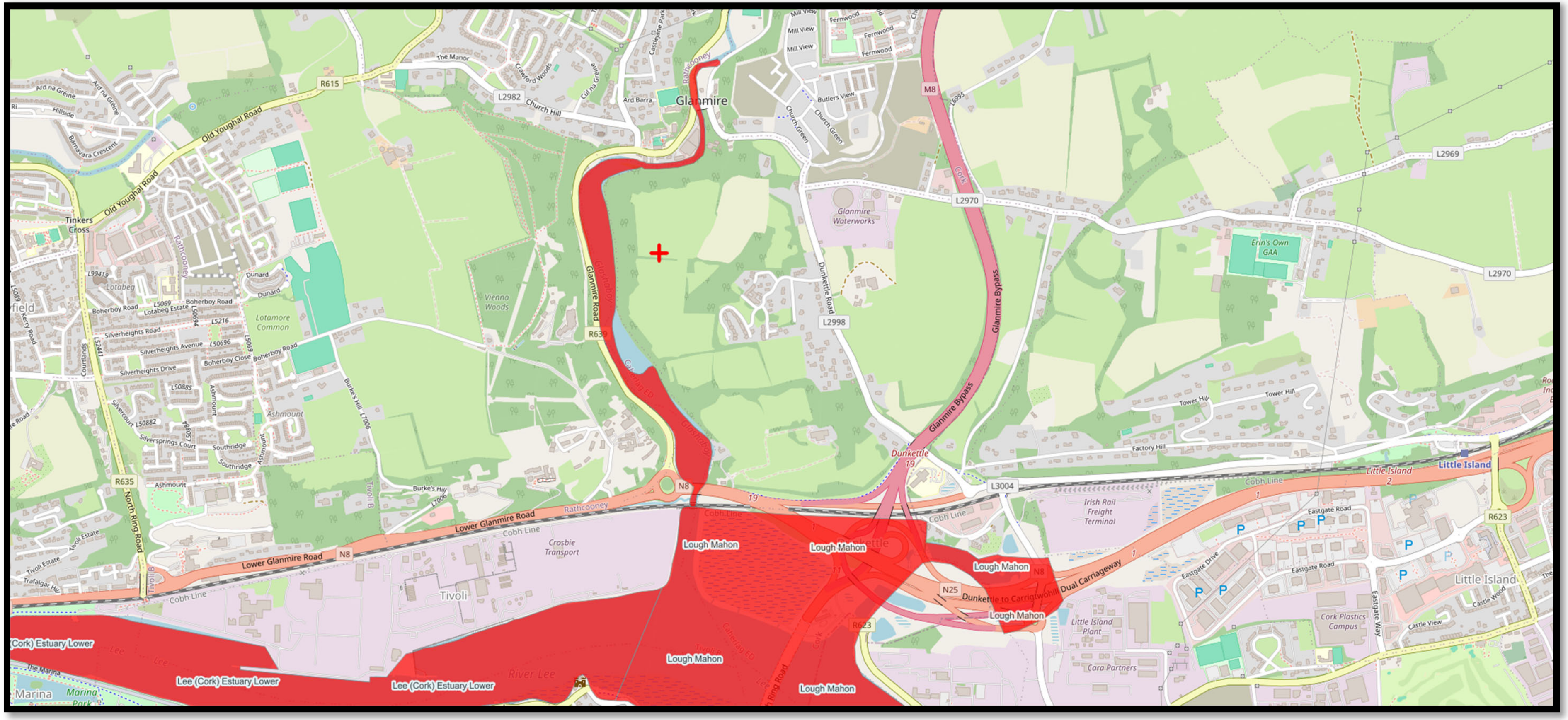


Image 10.1.6 EPA Map showing the Glashaboy River Estuary water quality as 'at risk'.
(The Lough Mahon transitional waters in Upper Cork Harbour are also classed as 'at risk'.)
(The main pressures identified are Urban and Agricultural sources of runoff.)

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Appendix 10.2 WFD Cycle 2

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WFD Cycle 2

Catchment Lee, Cork Harbour and Youghal Bay

Subcatchment Glashaboy [L.Mahon]_SC_010

Code 19_11

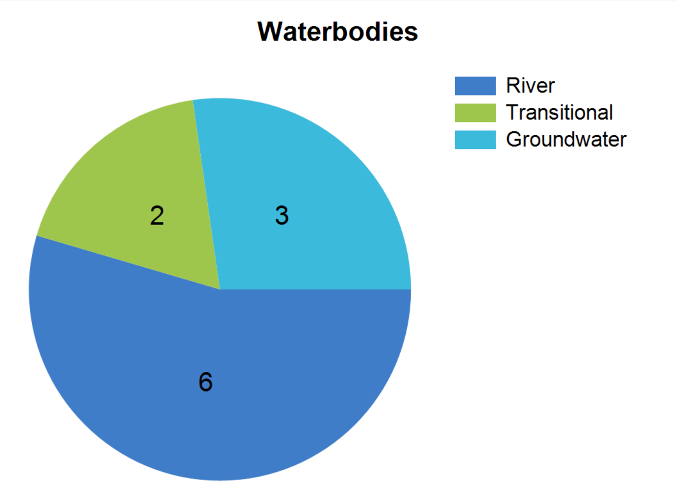
Generated on: 20 Sep 2022

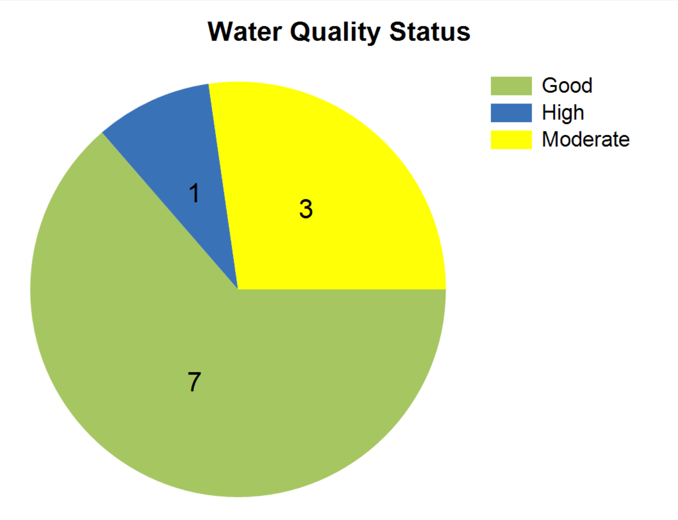
Generated by WFD Application

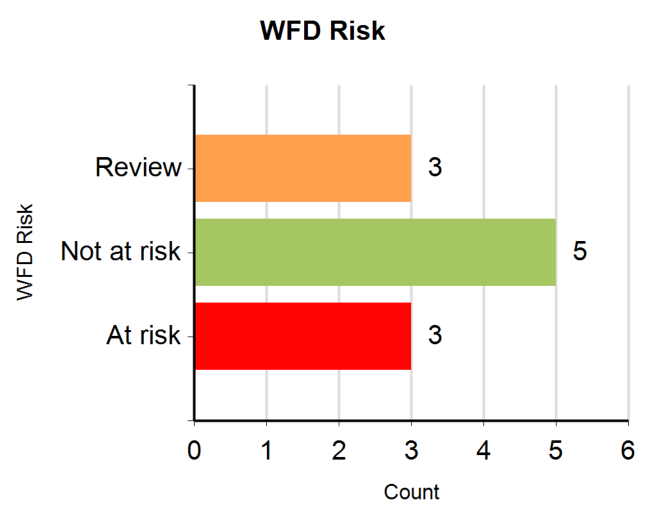
Assessment Purpose

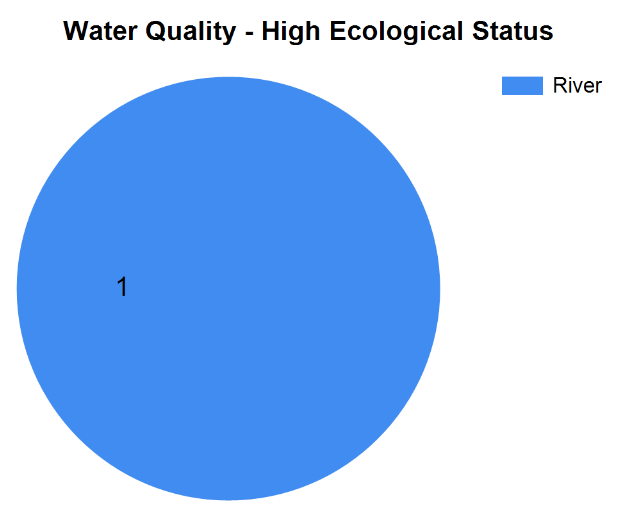
This assessment has been produced as part of the national characterisation programme undertaken for the Water Framework Directive river basin management planning. It has been led by the EPA, with input from Local Authorities and other public bodies.

The characterisation assessments are automatically generated from the information stored in the WFD Application. The assessments may change as information is updated in the WFD application. Users should ensure that they have the most up to date information by downloading the latest assessment before use.


Waterbodies


Water Quality Status


WFD Risk


Water Quality - High Ecological Status

Evaluation of PrioritySubcatchment Issues

One out of six river water bodies within this subcatchment is AT RISK, Butlerstown_010 due to Moderate biological status.

Siltation is likely to be the issue within this water body possibly due to road activities.

Map Subcatchment Risk

River And Lake Waterbodies: WFD Risk

The following river and lake waterbodies are in the subcatchment.

Code	Name	Type	WFD Risk	Significant Pressure
IE_SW_19B060200	BUTLERSTOWN_010	River	At risk	Yes
IE_SW_19B060500	BUTLERSTOWN_020	River	Not at risk	No
IE_SW_19B060800	BUTLERSTOWN_030	River	Not at risk	Yes
IE_SW_19G010200	GLASHABOY (LOUGH MAHON)_010	River	Not at risk	Yes
IE_SW_19G010400	GLASHABOY (LOUGH MAHON)_020	River	Not at risk	Yes
IE_SW_19G010600	GLASHABOY (LOUGH MAHON)_030	River	Not at risk	No

Map Subcatchment Water Quality Status

River And Lake Waterbodies: Water Quality Status

The water quality status of river and lake waterbodies in the subcatchment is as follows.

Name	2007-09	2010-12	2010-15	2013-18
BUTLERSTOWN_010	Moderate	Good	Moderate	Moderate
BUTLERSTOWN_020	Good	High	High	High
BUTLERSTOWN_030	Good	Good	Good	Good
GLASHABOY (LOUGH MAHON)_010	Good	Good	Good	Moderate
GLASHABOY (LOUGH MAHON)_020	Good	Good	Good	Good
GLASHABOY (LOUGH MAHON)_030	Good	Good	High	Good

Potentially Dependent Transitional and Coastal Waterbodies

The Transitional and Coastal waterbodies listed below intersect spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Local Authority	WFD Risk
IE_SW_060_0750	Lough Mahon	Transitional	Cork County Council	At risk
IE_SW_060_0800	Glashaboy Estuary	Transitional	Cork County Council	At risk

Potentially Dependent Groundwater Waterbodies

The groundwaters listed below interset spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Local Authority	WFD Risk
IE_SW_G_002	Ballincollig	Groundwater	Cork County Council	Review
IE_SW_G_004	Ballinhassig East	Groundwater	Cork County Council	At risk
IE_SW_G_004	Ballinhassig East	Groundwater	Cork County Council	Review
IE_SW_G_037	Glenville	Groundwater	Cork County Council	At risk
IE_SW_G_037	Glenville	Groundwater	Cork County Council	Review

Protected Areas intersecting River and Lake Waterbodies

The Protected Areas listed below intersect spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Waterbody Name	Association Type
IEPA1_SW_19B060500	BUTLERSTOWN_020	Drinking Water	BUTLERSTOWN_020	Within Protected Area
IEPA1_SW_19G010600	GLASHABOY (LOUGH MAHON)_030	Drinking Water	GLASHABOY (LOUGH MAHON)_030	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	BUTLERSTOWN_010	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	BUTLERSTOWN_020	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	BUTLERSTOWN_030	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	GLASHABOY (LOUGH MAHON)_010	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	GLASHABOY (LOUGH MAHON)_020	Within Protected Area
IEPA1_SW_G_004	Ballinhassig East	Drinking Water	GLASHABOY (LOUGH MAHON)_030	Within Protected Area
IETW_SW_2004_0041	Lee Estuary / Lough Mahon	Nutrient Sensitive Area	GLASHABOY (LOUGH MAHON)_030	Overlapping / partly within Protected Area

Pressures

Below is a list of all significant pressures identified in the subcatchment.

Code	Name	WFD Risk	Pressure Category	Pressure Sub Category	Created In
IE_SW_060_0750	Lough Mahon	At risk	Urban Waste Water	Agglomeration PE > 10,000	WFD Cycle 2
IE_SW_060_0800	Glashaboy Estuary	At risk	Urban Run-off	Diffuse Sources Run-Off	WFD Cycle 2
IE_SW_19B060200	BUTLERSTOWN_010	At risk	Urban Run-off	Diffuse Sources Run-Off	WFD Cycle 2
IE_SW_G_004	Ballinhassig East	Review	Anthropogenic Pressures	Unknown	WFD Cycle 2
IE_SW_060_0750	Lough Mahon	At risk	Urban Waste Water	Combined Sewer Overflows	WFD Cycle 2
IE_SW_060_0800	Glashaboy Estuary	At risk	Agriculture	Pasture	WFD Cycle 2

Further Characterisation Actions

The following further characterisation actions have been identified. These are necessary to help understand more fully issues in the subcatchment and their likely cause.

Code	Name	Action	Responsible Organisation	Created In
IE_SW_19B060200	BUTLERSTOWN_010	IA7 Multiple Sources in Multiple Areas	Cork County Council	WFD Cycle 2
IE_SW_19B060200	BUTLERSTOWN_010	IA6 Multiple Sources in Large Urban Area	Cork County Council	WFD Cycle 2

Appendix 10.3 EPA Groundwater Catchment Maps

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Image 10.3.1 EPA Groundwater Map showing site area (red cross) located in the Ballinhassig East (IE_SW_G_004) GW Catchment.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

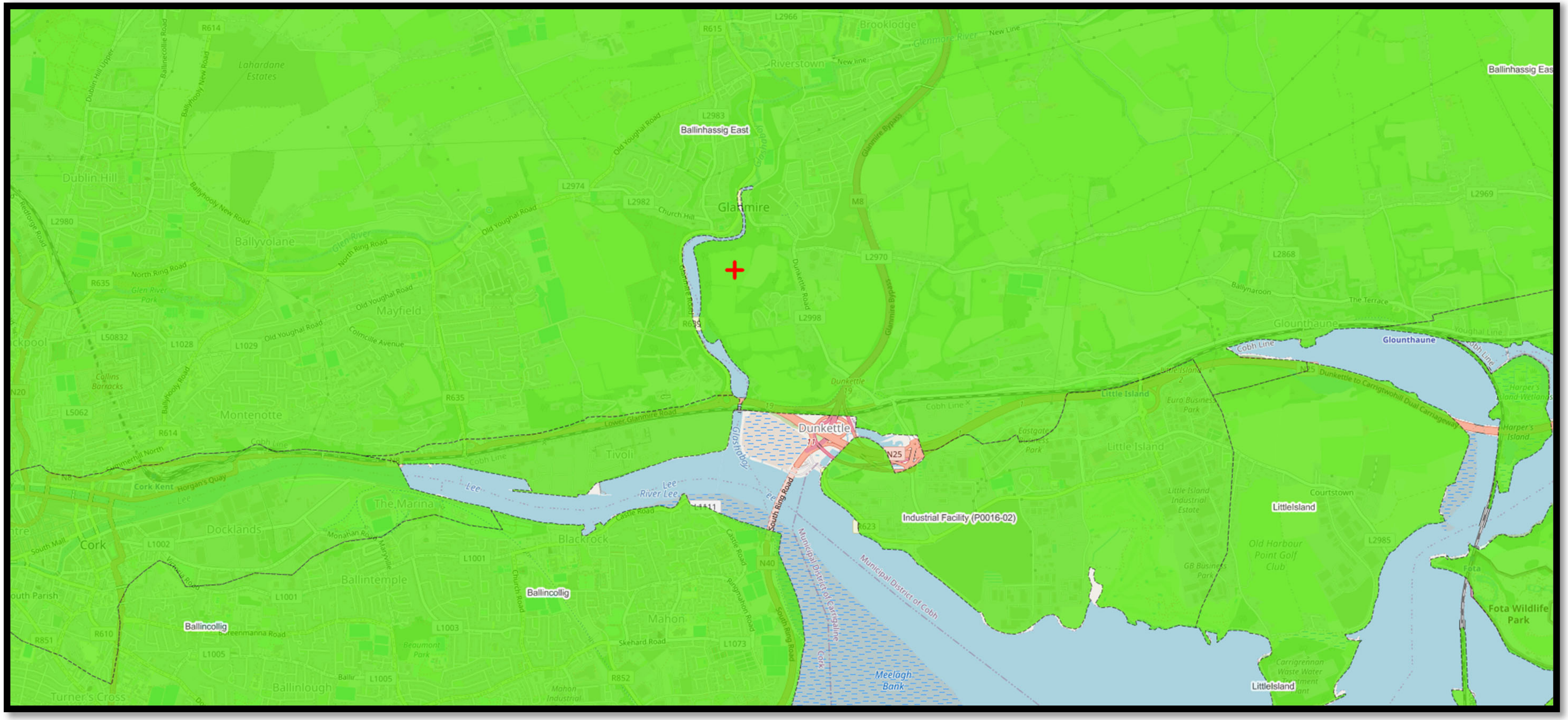

Image 10.3.2 EPA Groundwater Map showing the Ballinhassig East (IE_SW_G_004) GW body having 'good' water quality status.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

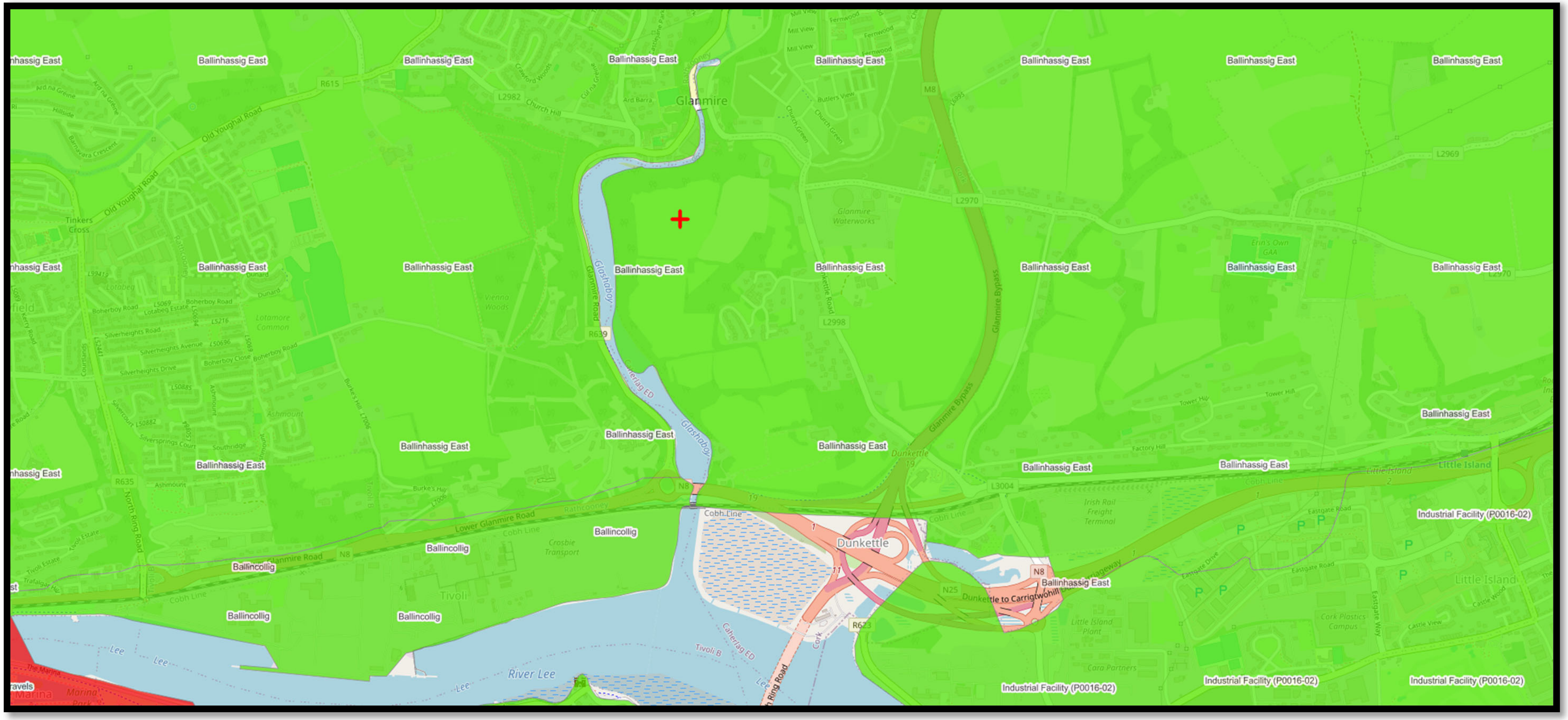

Image 10.3.3 EPA Groundwater Map showing the Ballinhassig East (IE_SW_G_004) GW Body as ‘not at risk’.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

Appendix 10.4 EPA & GSI Bedrock & Aquifer Mapping

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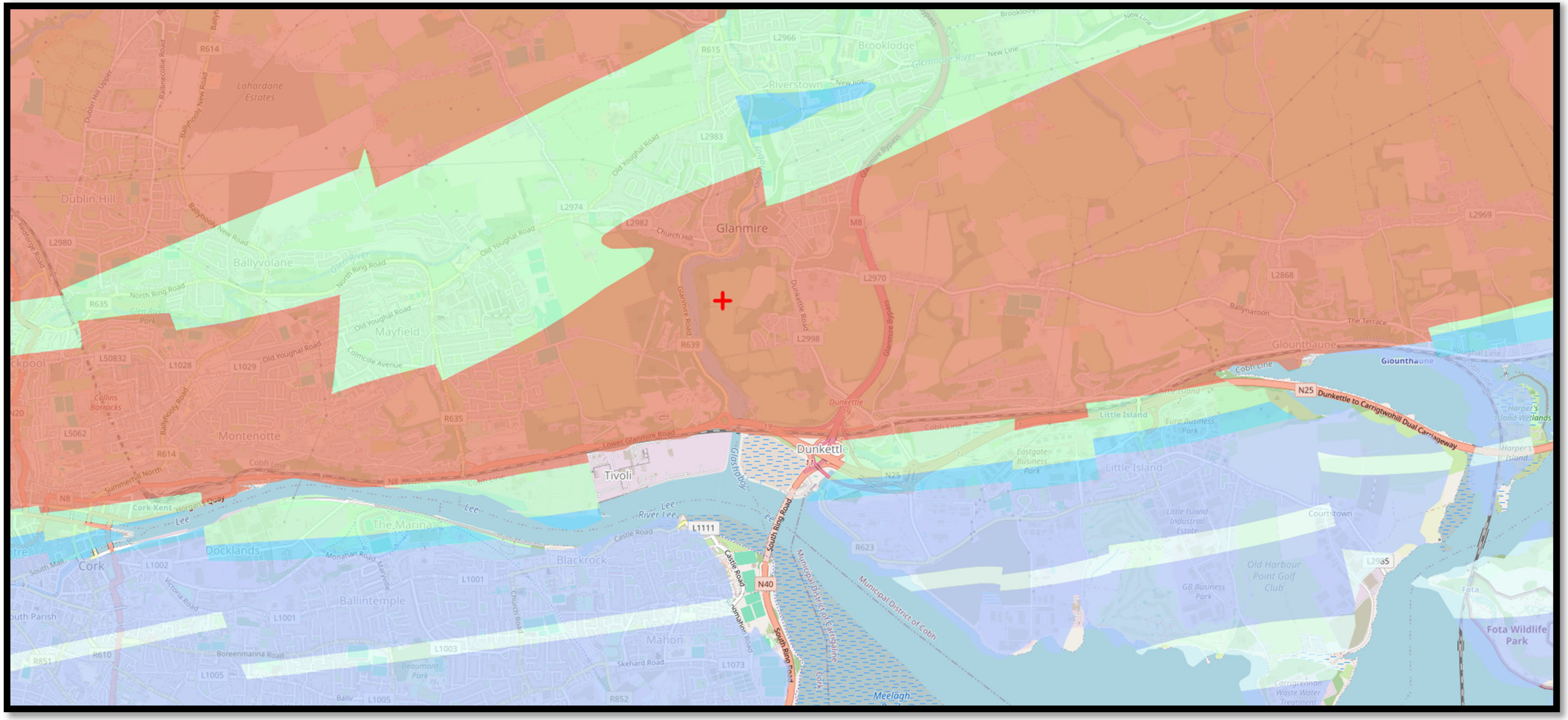

Image 10.4.1 EPA Rock Unit Group mapping showing site (red cross) underlain by Old Red Sandstone (ORS) bedrock.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

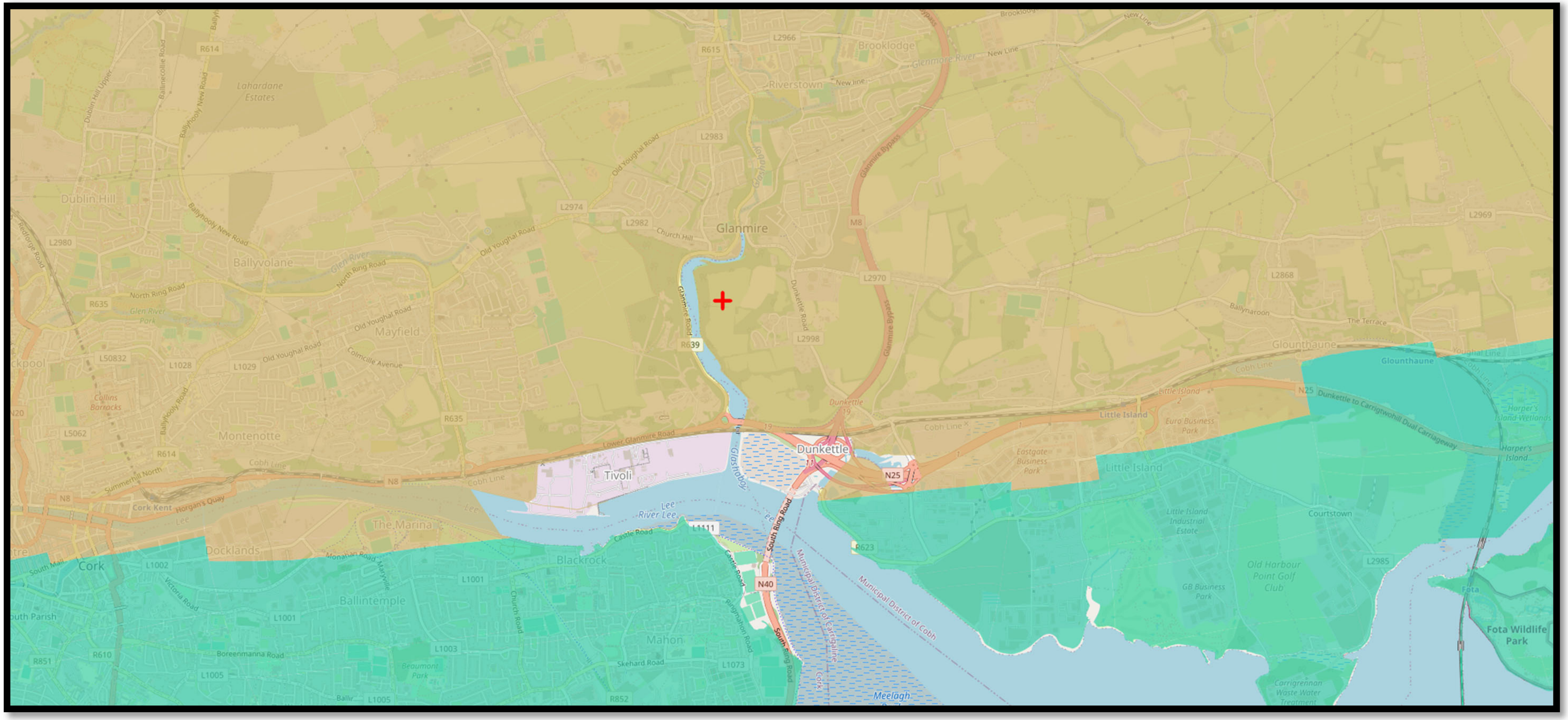

Image 10.4.2 EPA/GSI Aquifer Classification Mapping with the site area underlain by a Locally Important (LI) Aquifer.

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

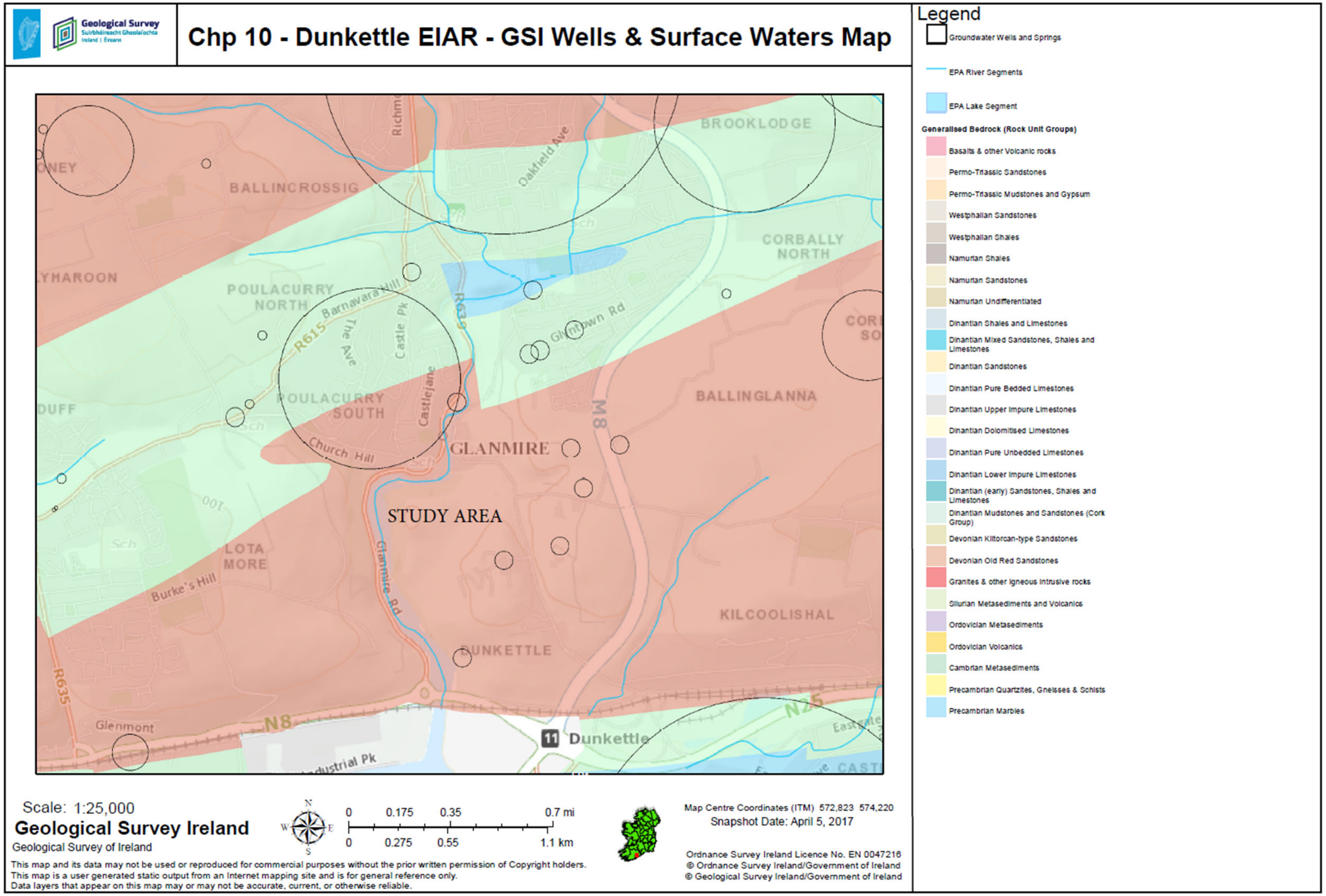

Image 10.4.3 GSI Bedrock Mapping showing location of possible borehole/wells (black circles).

(Sourced from EPA Web Site – Reproduced under Licence Ref CYAL50388987 © Tailte Eirann – Surveying)

Dunkettle EIAR

CHAPTER 11 Biodiversity

Appendix 11.1	Legislation and Policy
Appendix 11.2	Value of Ecological Resources
Appendix 11.3	Bat Report

November 2024

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Appendix 11.1 Legislation and Policy

November 2024

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APPENDIX I – LEGISLATION AND POLICY

International Legislation

EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland.

EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approx. 1000 species throughout Europe. The habitats and species are listed in the Directives annexes where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation (SACs) for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive from a network of protected sites called Natura 2000.

Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced in order to give protection to migratory species across borders in Europe.

Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994ha.

Water Framework Directive

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles; the second cycle ran from 2016 – 2021, and the current (third) cycle runs from 2022-2027. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least ‘good’ ecological status, through River Basin Management Plans (RBMP), by 2027.

National Legislation

Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. With regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all wild birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The current list of plant species protected by Section 21 of the Wildlife Act, 1976 (and amendments) is set out in the Flora (Protection) Order, 2015 (S.I. No. 356/2015). The Flora (Protection) Order affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regard to the listed species, “Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence.”

Invasive Species Legislation

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

“49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht]*, any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace* [a restricted non-native plant]*, shall be guilty of an offence.*

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she […] offers or exposes for sale, transportation, distribution, introduction, or release—
(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,
(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or
(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material.”

National Biodiversity Action Plan 2023-2030

The National Biodiversity Plan (NBAP) 2023-2030, the fourth such plan for Ireland, captures the objectives, targets and actions for biodiversity that will be undertaken by a wide range of government, civil society and private sectors. Actions required to achieve the strategic objectives as well as the lead and key partners responsible for their implementation are set out for each of the objectives and their outcomes (Table A1).

TABLE A1: OBJECTIVES AND OUTCOMES OF THE NATIONAL BIODIVERSITY ACTION PLAN 2023-2030.

Objective	Outcome
1: Adopt a Whole-of-Government, Whole-of-Society Approach to Biodiversity	1A. Governance structures and reporting outputs have improved.
	1B. Organisational capacity and resources for biodiversity have increased at all levels of Government.
	1C: Responsibility for biodiversity is shared across the whole of government.
	1D: Biodiversity initiatives are supported across the whole of society.
	1E. The legislative framework for biodiversity conservation is robust, clear and enforceable.
2: Meet Urgent Conservation and Restoration Needs	2A: The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced.
	2B: Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry.
	2C: Biodiversity and ecosystem services in the wider countryside are conserved and restored – peatlands & climate action.
	2D: Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.
	2E: Genetic diversity of wild and domesticated species is safeguarded.
	2F: A National Restoration Plan is in place to contribute to the ambition of the EU Biodiversity Strategy 2030 and global restoration targets.
	2H: Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.
3. Secure Nature’s Contribution to People	3A: Ireland’s natural heritage and biocultural diversity is recognised, valued, enhanced and promoted in policy and practice.
	3B: The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.

	3C: Planning and development will facilitate and secure biodiversity's contributions to people.
4. Enhance the Evidence Base for Action on Biodiversity	4A: Research funding bodies will have an improved understanding of the research and skills required to address biodiversity research gaps.
	4B: Data relevant to biodiversity and ecosystems, including conservation needs, is widely accessible and standardised.
	4C: Long-term monitoring programmes are in place to guide conservation and restoration goals.
	4D: Ireland has prepared national assessments of ecosystem services.
5. Strengthen Ireland's Contribution to International Biodiversity Initiatives	5A: Science, policy and action on biodiversity conservation and restoration is effectively coordinated in an all-island approach.
	5B: Ireland takes action internationally to cooperate with other countries, sectors, disciplines and communities to address the biodiversity crisis.
	5C: Ireland enhances its contributions to the international biodiversity data drive.

Appendix 11.2 Value of Ecological Resources

November 2024

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APPENDIX II – VALUE OF ECOLOGICAL RESOURCES

The criteria outlined in the table below, taken from the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* published by the NRA, were used for assigning value to designated sites, habitats and species within the Site of the Proposed Development and surrounding area.

TABLE A2.1. DESCRIPTION OF VALUES FOR ECOLOGICAL RESOURCES BASED ON GEOGRAPHIC HIERARCHY OF IMPORTANCE (NRA, 2009B).

Importance	Criteria
International Importance	- ‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a ‘European Site’ (see Annex III of the Habitats Directive, as amended). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing ‘best examples’ of the habitat types listed in Annex I of the Habitats Directive. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). - Biosphere Reserve (UNESCO Man & The Biosphere Programme) - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe. - European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	- Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing ‘viable areas’ of the habitat types listed in Annex I of the Habitats Directive
County Importance	- Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan.

	- Resident or regularly occurring populations (assessed to be important at the County level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o o Species listed on the relevant Red Data list. o Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

Appendix 11.3 Bat Report

November 2024

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Bat Report

PRESENTED TO

O’Flynn Construction Co. Unlimited Company

Environmental Consultancy Services

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DOCUMENT CONTROL SHEET

Client	O’Flynn Construction Co. Unlimited Company
Project Title	Residential Development at Dunkettle, Co. Cork
Document Title	Bat Report

Rev.	Status	Author(s)	Reviewed by	Approved by	Issue Date
00	DRAFT	TR			31.10.2024
01	FINAL	TR	SOD	SOD	07.11.2024

Contents

Table of Tables

Table of Figures

1 Introduction

Enviroguide conducted bat surveys and subsequent analysis on behalf of O'Flynn Construction CO. Unlimited Company. Surveys were conducted in August, September and October of 2023, and April, June and August of 2024. A total of seven bat activity surveys and one preliminary bat roost and habitat suitability assessment were carried out within the overall landholding of the applicant, which includes the phase 1 Proposed Development to the north of the area.

2 Desktop Study

A comprehensive desktop study was carried out prior to field surveys.

A total of six bat species have been recorded within the 2km (W77G) grid square which encompasses the Site and are detailed in Table 7 below.

TABLE 1. RECORDS OF BATS FOR THE SURROUNDING 2KM GRID SQUARE (W77G) WHICH ENCOMPASSES THE SITE (NBDC)

Species	Date of last record	Database	Designation
Brown Long-eared Bat (*Plecotus auritus)*	09/06/2005	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)
Common Pipistrelle (Pipistrellus pipistrellus sensu stricto)	31/12/2011	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)
Lesser Noctule (Ny*ctalus leisleri)*	31/12/2011	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)
Natterer's Bat (Myotis nattereri)	09/06/2005	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)
Pipistrelle (Pipistrellus pipistrellus sensu lato)	31/12/2011	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)
Soprano Pipistrelle (Pipistrellus pygmaeus)	31/12/2011	National Bat Database of Ireland	• EU Habitats Directive Annex IV • Wildlife Act 1976 (as amended)

The landscape suitability for all bat species is assessed as 35.56. This ranks as Moderate to High on the suitability scale for foraging and commuting bats.

3 Methodology

3.1 Field Surveys

3.1.1 Daytime Bat Roost Assessment

The Site was assessed in relation to potential bat foraging habitat and potential bat commuting routes. Aerial images were assessed so that bat habitats and commuting routes identified were identified and considered in relation to the wider landscape to determine landscape connectivity for local bat populations through examination of aerial photographs. Suitability was assigned as per Table 4.1 in the Bat Conservations Trust's Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023). presented in Table 4.1 (Collins, 2023):

- Negligible – No suitable features observed, however, a small element of uncertainty remain;
- Low – A structure with one or more roost features as used by individual bats opportunistically at any time of year;
- Moderate – A structure with one or more roost features that could be used by bats on a regular basis or by a larger number of bats; and
- High – A structure with one or more roost features that are obviously suitable for use by a larger number of bats on a regular basis, and potentially for longer periods of time. These features have the potential to support high conservation status roosts.

Trees are categorized separately accordingly to Table 4.2 of Collins (2023). These classifications are:

- NONE – Either no PRFs in the tree or highly unlikely to be any;
- FAR – Further assessment required to establish if PRFs are present in the tree; and
- PRF – A tree with at least one PRF present.

Where a tree contains at least one PRF, each PRF is further assessed according to Table 6.2 (Collins 2023). PRFs are scored as either:

- PRF-I – PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
- PRF-M – PRF is suitable for multiple bats and may therefore be used by a maternity colony.

For trees with PRF-I's only, no further surveys may be required, but appropriate compensation for all PRF-Is must be designed and incorporated in advance of impacts along with a Precautionary Working Method Statement (PWMS). As the Site increases in suitability for roosting bats e.g., PRF-Ms present, the survey effort increases accordingly. A PRF-M will require a detailed inspection, such as aerial inspection, conducted over three survey visits, a minimum of three weeks apart, which should be carried out between May and September with at least two in the period May to August. Where features are inaccessible by ladder, climbing, or MEWP, or too extensive for a PRF inspection, the aerial inspection should be replaced with emergence surveys carried out between May and September with Night Vision Aids (NVA) where possible or otherwise surveyed using Advanced Licence Bat Survey Techniques (ALBST), such as trapping, tagging, and radio-tracking to inform of the importance of a roost.

3.1.2 Preliminary Bat Habitat Suitability Assessment

A Bat Habitat Suitability Assessment was carried out in conjunction with the roost assessment on the 28th of August 2023. This assessment evaluated the habitats present on Site and in the wider area for bat foraging and commuting suitability. Habitat suitability is assessed qualitatively from Negligible to High:

- Negligible – No suitable foraging or commuting habitats on Site
- Low – Suitable but isolated habitats that could be used by small numbers of commuting and/or foraging bats, such as poorly connected gappy hedgerows, lone trees, unvegetated streams, etc.
- Moderate – Suitable continuous habitat connected to the wider landscape that could be used by commuting and/or foraging bats, such as treelines, scrub, grassland, water, etc.
- High – Continuous high-quality habitat that is well-connected to the wider landscape, and is likely used regularly by commuting and/or foraging bats, such as river valleys, broadleaved woodland, woodland edge, grazed parkland, etc.

3.1.2.1 Bat Landscape Suitability

The Bat Conservation Ireland Landscape Suitability Model (Lundy *et al*., 2011) provides a habitat suitability index for bat species across Ireland. The model divides the country into 1 km grid squares and ranks the habitat within the squares according to its suitability for various bat species. The scores are divided into five qualitative categories of suitability, namely:

- 0.0000000 - 13.000000: Low
- 13.000001 - 21.333300: Low – Medium
- 21.333301 - 28.111099: Medium
- 28.111100 - 36.444401: Medium – High
- 36.444402 - 58.555599: High

During the preliminary site visit, the habitats present along the field margins were assessed as having High habitat suitability for commuting and foraging bats.

As per the Bat Conservation Trust Guidelines (Collins, 2023), habitats assessed as having High suitability for bats are required to undergo further survey effort in the form of up to two transect survey visits per month of the Site (between April – October) in appropriate weather conditions for bats.

Survey methodologies were adapted from the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023). As per the best practice guidelines (Collins, 2023), activity surveys should be undertaken in the period of May to September where possible. Surveys in March, April or October are possible, if weather conditions allow.

Surveyors were equipped with a full spectrum Elekon Bat Logger M2 bat detector, along with a powerful L.E.D. torch and head torches. Echolocations were recorded and saved by the Elekon Batlogger for more detailed species analysis using BatExplorer analytical software.

To comply with best practice guidelines, dusk activity surveys began at least 15 minutes before sunset and were sustained for a minimum of 2 hours (Collins, 2023). Weather conditions (Collins, 2023) and the time of year (Marnell et al., 2022) were suitable for bat surveys (Appendix I).

The transect routes undertaken for activity surveys are shown in Figure 1, below, along with the point count locations. A total of 5 minutes was spent at each point count location.

3.1.3 Bat Activity Surveys

During the preliminary site visit, the habitats present along the field margins were assessed as having High habitat suitability for commuting and foraging bats.

As per the Bat Conservation Trust Guidelines (Collins, 2023), habitats assessed as having High suitability for bats are required to undergo further survey effort in the form of up to two transect survey visits per month of the Site (between April – October) in appropriate weather conditions for bats.

Dusk transect bat activity surveys were completed in Autum 2023 and Spring/Summer 2024 (by Enviroguide Consulting). Survey methodologies were adapted from the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023). As per the best practice guidelines (Collins, 2023), activity surveys should be undertaken in the period of May to September where possible. Surveys in March, April or October are possible, if weather conditions allow.

Surveyors were equipped with a full spectrum Elekon Bat Logger M2 bat detector, along with a powerful L.E.D. torch and head torches. Echolocations were recorded and saved by the Elekon Batlogger for more detailed species analysis using BatExplorer analytical software.

The transect routes undertaken for activity surveys are shown in Figure 1 below, along with the point count locations. A total of 5 minutes was spent at each point count location.

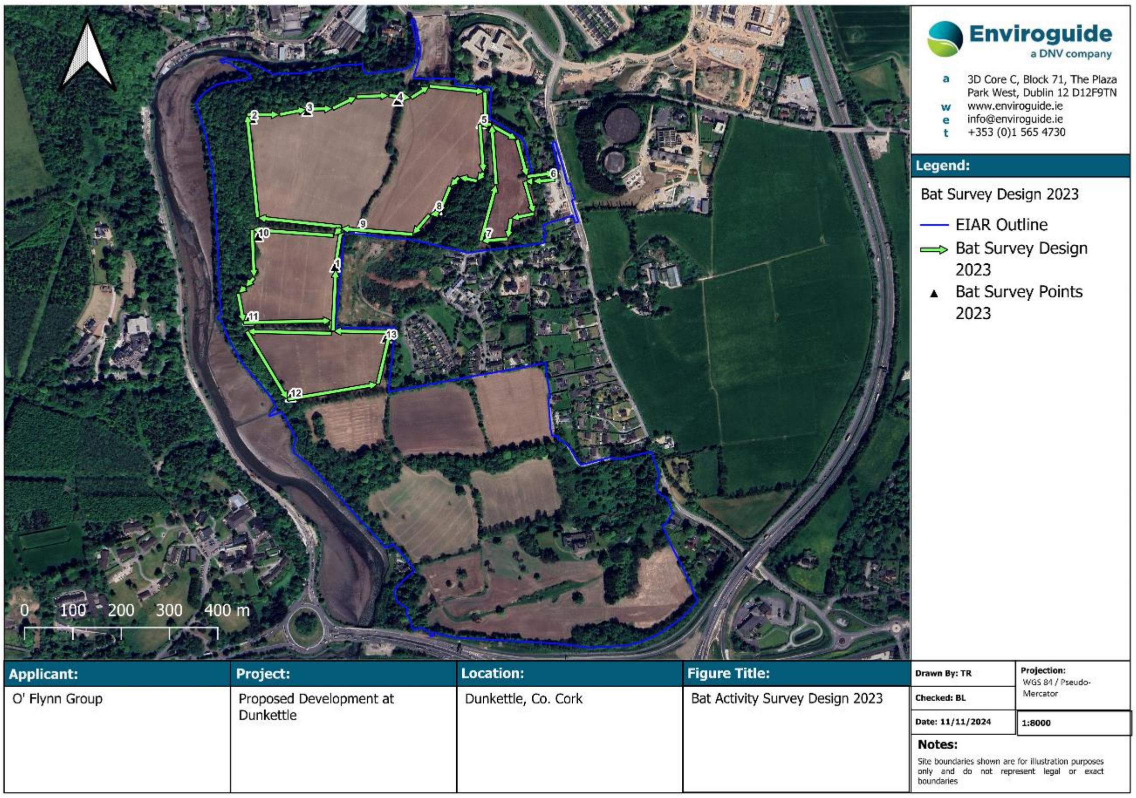

FIGURE 1. BAT ACTIVITY SURVEY DESIGN USED IN SEPTEMBER AND OCTOBER 2023 SURVEYS

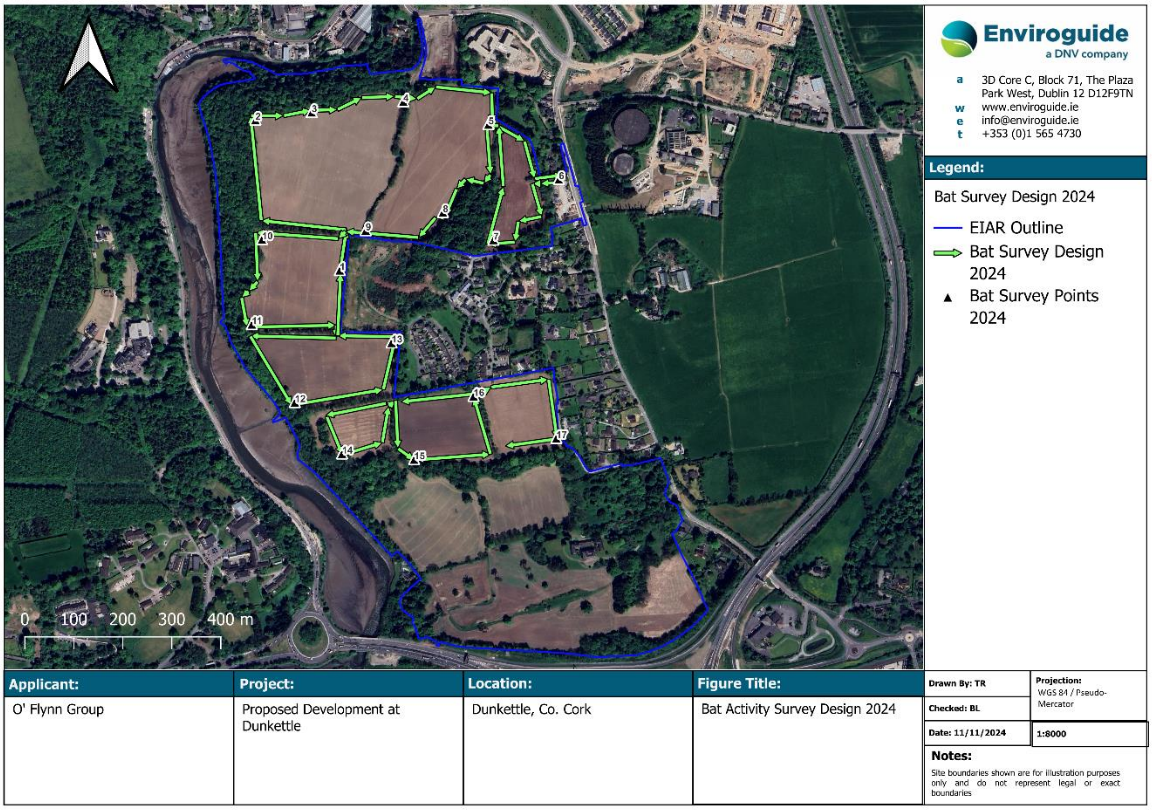

FIGURE 2. BAT ACTIVITY SURVEY DESIGN USED IN THE PERIOD APRIL TO AUGUST2024

TABLE 2. BAT ACTIVITYSURVEY EFFORT

Survey Date	Ecologists	Wind (Beaufort)	Precipitation	Temp (°C)
21.09.2023	Ecology Ireland	F3, NW	Dry	11-10
10.10.2023	Ecology Ireland	F3, SW	Dry	15-12
29.04.2024	BMc & TR Enviroguide	F3, S	Dry	9-7
06.06.2024	HR & TR Enviroguide	F2, SW	Dry	12-11
26.06.2024	KM & CRK Enviroguide	F1, SW	Dry	12-9
06.08.2024	BT & YM Enviroguide	F3, SW	Dry	13-11
21.08.2024	TR & BT Enviroguide	F4, SW	Light Showers	15-11

4 Results

4.1.1 Potential Bat Roost Assessment and Habitat Suitability

The results determined that there was no evidence of bats detected on Site, and the majority of trees present were assessed as having negligible value for roosting bats due to a distinct lack of suitable access points, cracks and crevices for roosting (Collins, 2023). However, a total of 8 no. trees within the Site provided some roosting potential for bat species, varying from Low to Moderate, via significant gaps or cracks which were evident on the trees, that may be capable of supporting roosting bats. The location of these trees with PRFs are shown in Figure 2 below, and the co-ordinates of each are listed in Table 3.

4.1.1.1 Trees

The following Figure shows the location of each PRF observed on Site. Table 3 lists each tree shown in the map, detailing the tree species, the co-ordinates of each tree, as well as the bat roost suitability assessment rating for each.

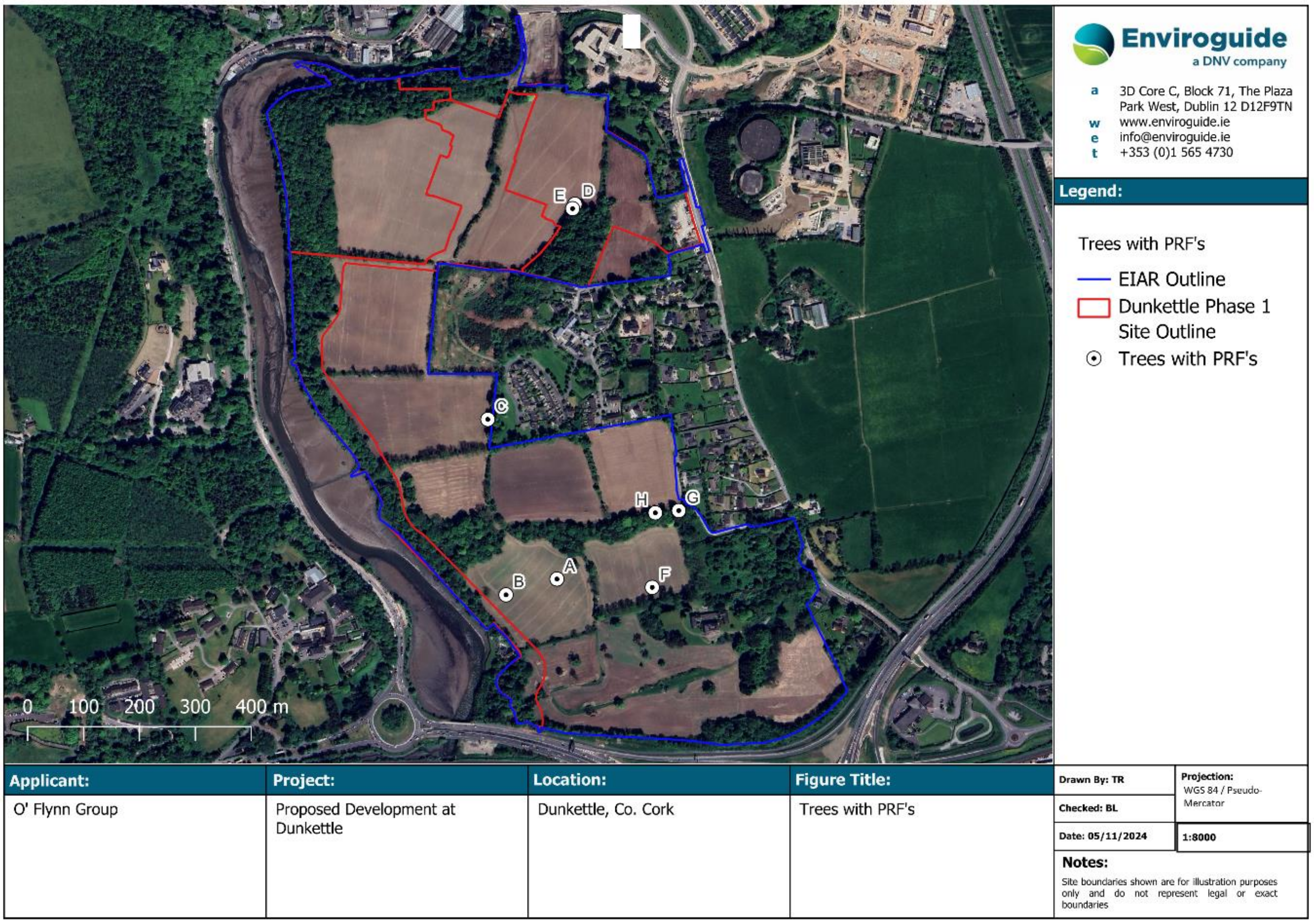

FIGURE 3. TREES WITH PRF'S

TABLE 3. TREES PRF DETAILS

Tree ID.	Tree Species	Co-ordinates	PRF Features	Bat Roost Suitability
A	Pine (exact species TBC)	51.908892, -8.393722	Cracks and crevices present along trunk and potentially higher up the tree	Low
B	Pine (exact species TBC)	51.908635, -8.394755	Cracks and crevices present along trunk and potentially higher up the tree	Low
C	Ash (Fraxinus excelsior)	51.911521, -8.395427	Cracks and crevices along arms and trunk of the tree	Moderate
D	Ash (Fraxinus excelsior)	51.914777, -8.393448	Cracks and crevices along arms	Moderate
E	Ash (Fraxinus excelsior)	51.914777, -8.393448	Minor cracks and crevices along arms	Low

Tree ID.	Tree Species	Co-ordinates	PRF Features	Bat Roost Suitability
F	Ash (Fraxinus excelsior)	51.909184, -8.391306	Cracks and crevices along arms and trunk of the tree	Moderate
G	Beech (Fagus sylvatica)	51.910060, -8.390501	Bats observed in **emergence behaviour** coming from the tree in August 2024. No obvious PRF's visible from the ground.	Moderate
H	Ash (Fraxinus excelsior)	51.909973859, -8.390817353	Bats observed in **emergence behaviour** coming from the tree in August 2024. No obvious PRF's visible from the ground.	Moderate

During the Site preliminary visit in August 2023, a preliminary bat roost assessment was conducted on all trees and buildings within the Site. No evidence of bats was detected on Site and the trees proposed for removal or significant alteration present were assessed as having negligible value for roosting bats (Collins, 2023). No evidence of roosting bats was present, nor were any significant gaps or cracks evident on the trees capable of supporting roosting bats.

During the initial Site walkover survey, eight trees (8 no.) were assessed as having potential roost features (PRF's) within this overall EIAR study area. As most trees are to be retained as part of the Proposed Development, no bat emergence surveys were carried out due to the planned retention of said trees. All works in proximity to trees with PRF's including alteration or removal will need to be assessed further for bat presence prior to works.

4.1.1.2 Habitats and Landscape Suitability

The habitats present on Site were also assessed for their potential to provide suitable features which could be used by commuting and foraging bat species which may be present in the area. The dominant habitat types on Site were ancient riparian and oak birch holly woodland, arable crops, horticultural crops and treelines. The overall landholding as well as habitats within the Phase 1 Site boundary are classed as High suitability for foraging and commuting bats (Collins, 2023).

FIGURE 4. BAT LANDSCAPE SUITABILITY (ALL BATS) (NBDC, 2024)

4.1.1.3 Buildings

Additionally, there were three buildings located to the southeast of the Site. All were assessed for potential Roost Features (PRFs). The three buildings are shown in Figure 5 below. There are no buildings within the current developable area capable of supporting roosting bats, however any planned works including alterations, upgrade works, or demolition to Dunkettle House and the surrounding outbuildings in the future will need to take account of the moderate suitability of two of these building to support roosting bat species and a suitably qualified ecologist consulted prior to works.

[redacted]

FIGURE 5. BUILDINGS WHERE PRELIMINARY BAT ROOST ASSESSMENT WAS UNDERTAKEN IN AUGUST 2023. LOCATED WITHIN THE SURROUNDS OF DUNKETTLE HOUSE, EAST OF THE PHASE 1 AREA AND WITHIN THE SOUTHEASTERN SECTION OF THE APPLICANT'S LANDHOLDING.

The eastern most building (B3) is known as Gate Lodge and is located near the gated entrance to Dunkettle House (B1), the largest and western-most building of the three buildings present on site. Behind Dunkettle House lies a collection of outhouses (B2) in various degrees of disrepair.

Of the three buildings, Dunkettle House is the only house that is currently occupied for residential purposes. Both Gate Lodge and the Outhouses are vacant and disused. The roof is almost entirely collapsed on the outhouses, with parts of the roof collapsed in at Gate Lodge. These buildings, like the trees, have been assessed for their potential for use by roosting bats, the results of which are included in the table below.

TABLE 4. ASSESSING THE BUILDINGS FOR SUITABLE PRFS ON SITE

Building Number	Details	Potential Roost Features	Bat Roost Suitability
1	Dunkettle House	Some slates lifting in the roof, the side walls are all very well sealed, some lifting near chimney and gutters/fascia	Moderate

Building Number	Details	Potential Roost Features	Bat Roost Suitability
2	Outhouses (to the rear of Dunkettle House)	The roof is largely caved in, leaving the internal sections very exposed, access was difficult in parts owing to significant vegetation cover, walls generally well-sealed although there may be some potential for roosting bats to occur in a small section of these outhouses (corrugated roof, lifting fascia)	Moderate
3	Gate Lodge (east of Dunkettle House near the gated entrance/public road)	Roof caved in, windows broken, lots of light entering, lots of vegetation cover	Negligible

4.1.2 Emergence Surveys

No emergence surveys were carried out on Site. This was considered unnecessary for the current project due to the planned schedule of works, and the location of PRF’s. The PRF’S identified on trees (Table 3) are shown to be largely located on the periphery of the EIAR study area. Trees containing PRF’s within the study area are not to be interfered with in any way during the current Proposed Development and have been accounted for in the proposed schedule of mitigation and enhancement measures, and in consultation with the landscape and lighting consultant for the project.

4.1.3 Bat Activity Survey Results

4.1.3.1 Bat Activity September 2023

TABLE 5. BAT REGISTRATIONS FROM TRANSECT WALKOVER PERIOD (DUNKETTLE, SEPTEMBER 2023).

Species	No. of Registrations	Notes
Soprano Pipistrelle (Pipistrellus pygmaeus)	39	Strong activity from 19:55 -20:00
Common Pipistrelle (Pipistrellus pipistrellus)	8	
Leisler's Bat	1	At 20:09

(Nyctalus leisleri)		

Table 6. Showing the species and the total number of calls recorded for each species during the September 2023 Bat Activity Transect Survey.

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Lesser Noctule	Nyctalus leisleri	1	1.0%
Common Pipistrelle	Pipistrellus pipistrellus	19	19.4%
Soprano Pipistrelle	Pipistrellus pygmaeus	78	79.6%
Total number of calls		98	100%

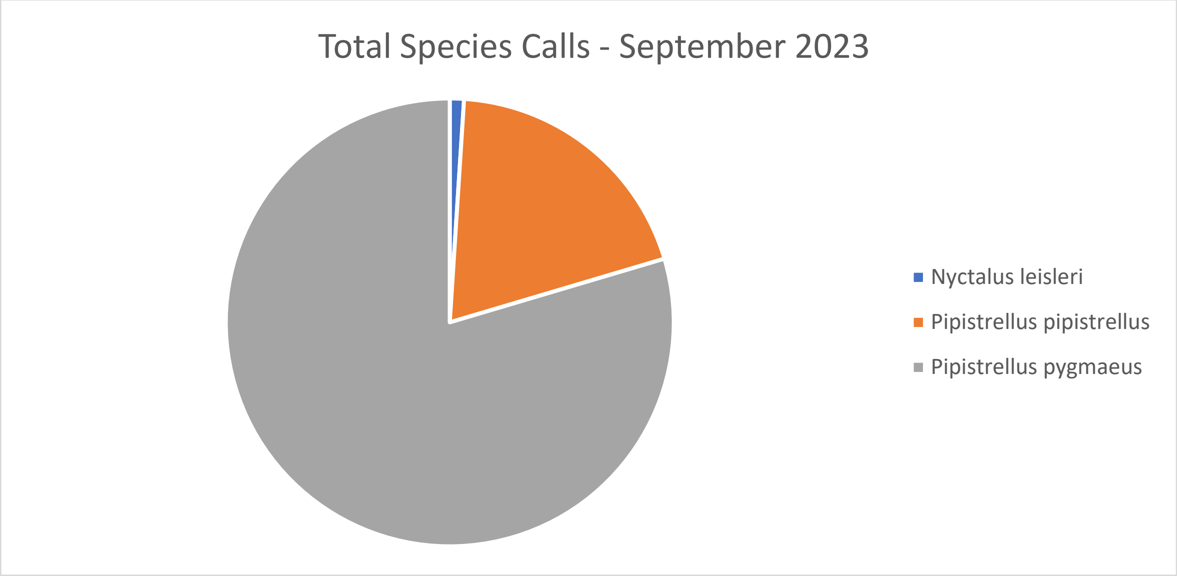

FIGURE 6. TOTAL SPECIES CALLS – SEPTEMBER 2023

FIGURE 7. BAT ACTIVITY SURVEY RESULTS MAP SEPTEMBER 2023

4.1.3.2 Bat Activity October 2023

It is noted that the activity transect route was completed in reverse during the October 2023 survey, so as to survey the transect points at different times than the September 2023 survey, giving a greater overview of bat activity on Site.

In total, five bat species were recorded during the October 2023 survey (**Error! Reference source not found.**). Relative species compositions are shown in **Error! Reference source**

not found.. Soprano pipistrelle (*n*=802) was the most common bat species recorded accounting for 86.9% of all bat passes. Common pipistrelle (*n*=60) was the second most recorded species making up 6.5% of recorded bat passes. Myotis species was the next most commonly recorded species, followed by Leisler's Bat, and lastly Brown Long-eared Bat (*Plecotus auritus*), which had the lowest number of recorded calls. No other species were recorded during the October 2023 bat survey. These records differed slightly from the survey in September 2023. The results of the September surveys showed activity which was more strongly correlated with the field boundary to the north of the Proposed Development Site (**Error! Reference source not found.**). While the same species were also recorded along this northern boundary during the October 2023 survey, a greater level of activity was recorded throughout the Site. Pipistrelle species were recorded along treelines further east, Soprano Pipistrelle was recorded along treelines to the southeast also, and Brown Long-eared Bat was recorded along the western extent of the Site, bordering a mature treeline and the Glashaboy River to the west, as shown in **Error! Reference source not found.** below.

TABLE 7. SHOWING THE SPECIES AND THE TOTAL NUMBER OF CALLS RECORDED FOR EACH SPECIES DURING THE OCTOBER 2023 BAT ACTIVITY TRANSECT SURVEY

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Myotis species	Myotis species	26	2.8%
Lesser Noctule	Nyctalus leisleri	19	2.0%
Common Pipistrelle	Pipistrellus pipistrellus	60	6.5%
Soprano Pipistrelle	Pipistrellus pygmaeus	802	86.9%
Brown Long-eared Bat	Plecotus auritus	17	1.8%
Total number of calls		924	100%

TABLE 8. BAT REGISTRATIONS FROM POINT COUNT LOCATIONS (DUNKETTLE, OCTOBER 2023).

Point Count Location + Time	Field Notes
P8 18:52	No activity observed
P9 18:59	No activity observed
P10 19:09	No activity observed
P11 19:18	x2 Pipistrelle bats foraging and circling at tree junction at this point.
P12 19:32	No activity observed
P13 19:42	No activity observed
P1 19:53	No activity observed
P2 20:06	X1 Pipistrelle foraging and commuting along treeline
P3 20:14	No activity observed

Point Count Location + Time	Field Notes
P4 20:23	X1 Pipistrelle commuting along treeline between P4 and P9
P5 20:35	No activity observed
P6 20:48	Common Pipistrelle detected but not seen x3 times at this point
P7 21:00	Common Pipistrelle detected but not seen at this point

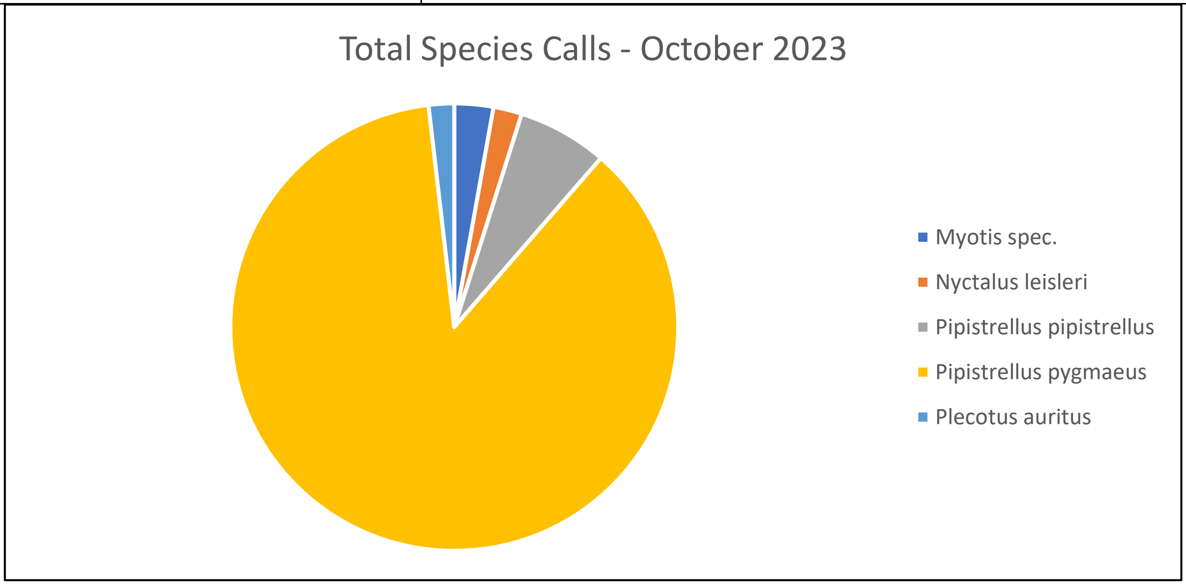

FIGURE 8. TOTAL SPECIES CALLS OCTOBER 2023

Enviroguide
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t +353 (0)1 565 4730

Legend:

Bat Survey Results Oct 2023

- — EIAR Outline
- ● Leisler's Bat
- ● Common Pipistrelle
- ● Brown Long-eared Bat
- ● Soprano Pipistrelle
- ● Myotis species

Applicant:	**Project:**	**Location:**	**Figure Title:**
O' Flynn Group	Proposed Development at Dunkettle	Dunkettle, Co. Cork	Bat Activity Survey Results October 2023

Drawn By: TR
Checked: BL
Date: 11/11/2024
Projection: WGS 84 / Pseudo-Mercator
1:8000

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

FIGURE 9. BAT ACTIVITY SURVEY RESULTS MAP OCTOBER 2023

4.1.3.3 Bat Activity April 2024

TABLE 9. BAT ACTIVITY APRIL 2024

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Myotis spec.	*Myotis sp.*	371	34.8%
Common Pipistrelle	*Pipistrellus pipistrellus*	329	30.9%
Soprano Pipistrelle	*Pipistrellus pygmaeus*	306	28.7%
Leisler's	*Nyctalus leisleri*	59	5.5%
Total number of calls		1065	100%

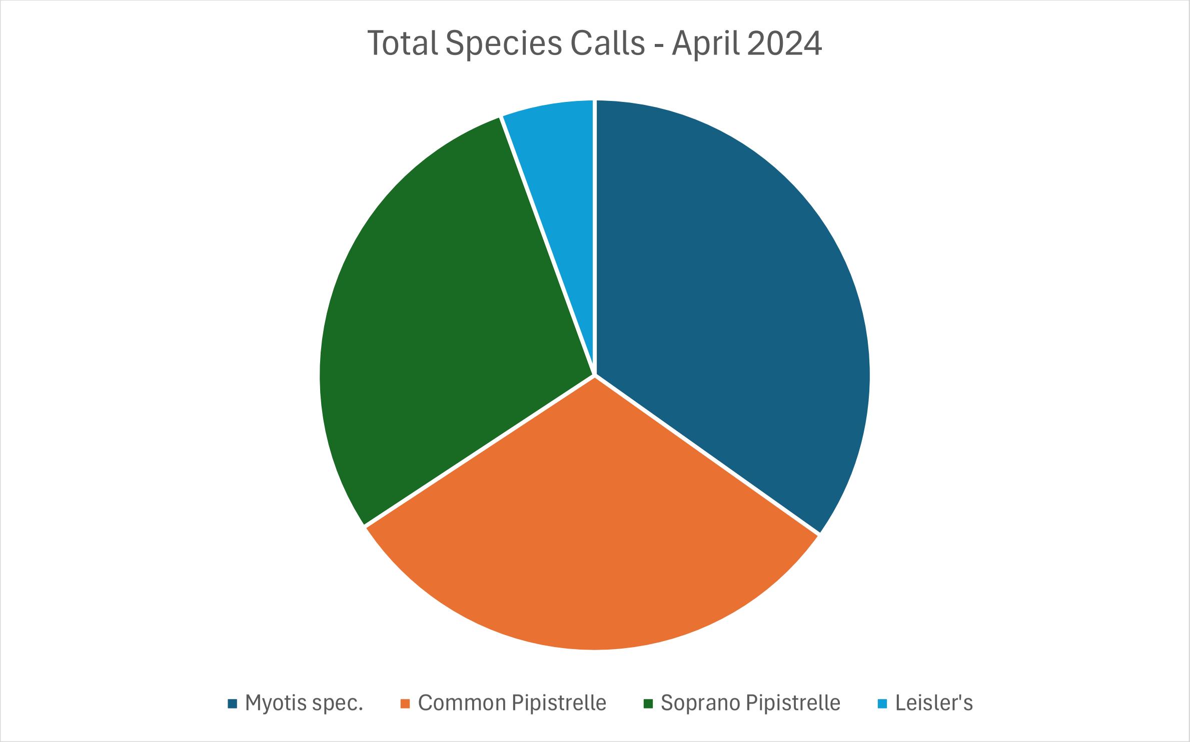

Figure 10. Total Species Call April 2024

Applicant:	Project:	Location:	Figure Title:
O' Flynn Group	Proposed Development at Dunkettle	Dunkettle, Co. Cork	Bat Activity Survey Results April 2024

Drawn By: TR	Projection: WGS 84 / Pseudo-Mercator
Checked: BL	
Date: 11/11/2024	1:8000

Notes:

Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

FIGURE 11. BAT ACTIVITY SURVEY RESULTS MAP APRIL 2024

4.1.3.4 Bat Activity June 2024

TABLE 10. BAT ACTIVITY JUNE 2024

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Myotis spec.	Myotis species	1563	39.4%
Soprano Pipistrelle	Pipistrellus pygmaeus	1617	40.75%
Common Pipistrelle	Pipistrellus pipistrellus	675	17.0%
Leisler's	Nyctalus leisleri	63	1.6%
Brown Long-eared	Plecotus auritus	4	0.1%
Total number of calls		3968	100%

TABLE 11. BAT ACTIVITY RESULTS OVERVIEW FOR SURVEY CARRIED OUT ON THE 6TH OF JUNE 2024 USING KALEIDOSCOPE ECHOMETER TOUCH 2 PRO, SHOWING REGISTRATIONS FOR SOPRANO PIPISTRELLE, AND COMMON PIPISTRELLE

IN FILE	DURATION	DATE	TIME
NoID_20240606_234328.wav	0	06/06/2024	23:43:28
NoID_20240606_221049.wav	159.14	06/06/2024	22:10:49
NoID_20240606_234329.wav	421.76	06/06/2024	23:43:29
NoID_20240606_222826.wav	900	06/06/2024	22:28:26
PIPPYG_20240606_221330.wav	900	06/06/2024	22:13:30
NoID_20240606_224326.wav	900	06/06/2024	22:43:26
PIPPYG_20240606_231327.wav	900	06/06/2024	23:13:27
PIPPYG_20240606_225826.wav	900	06/06/2024	22:58:26
NoID_20240606_232827.wav	900	06/06/2024	23:28:27

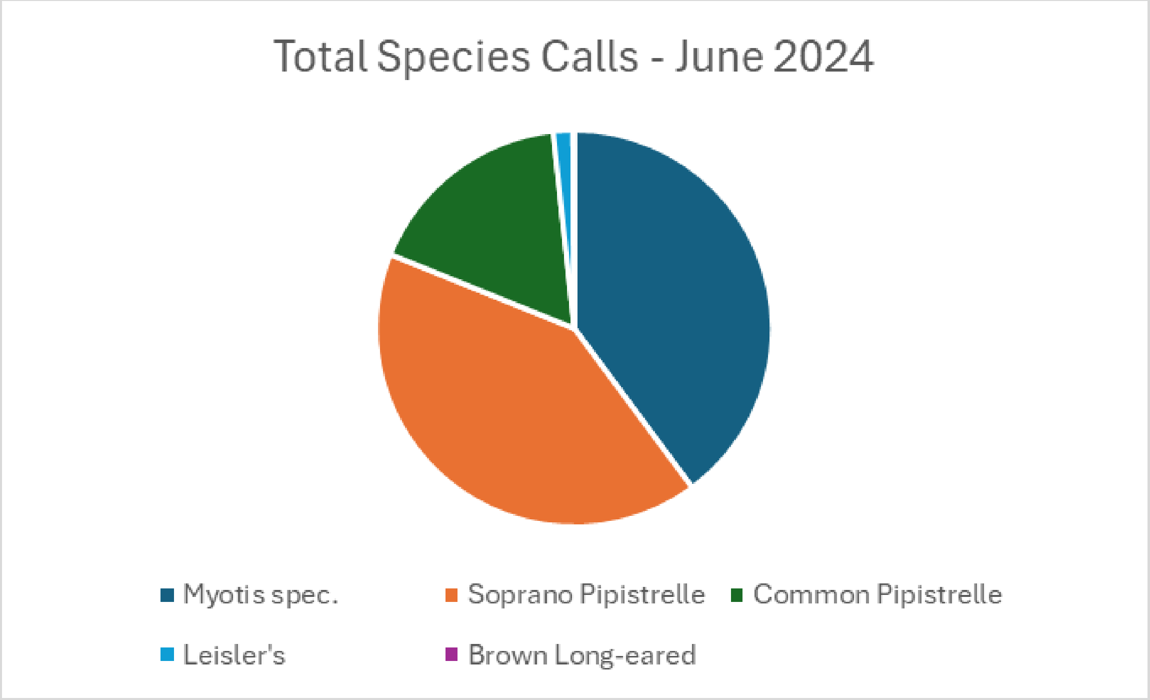

FIGURE 12. TOTAL SPECIES CALLS JUNE 2024

Applicant:	Project:	Location:	Figure Title:
O' Flynn Group	Proposed Development at Dunkettle	Dunkettle, Co. Cork	Bat Activity Survey Results June 2024

Drawn By: TR	Projection: WGS 84 / Pseudo-Mercator
Checked: BL	
Date: 11/11/2024	1:8000

Notes:

Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

FIGURE 13. BAT ACTIVITY SURVEY RESULTS MAP JUNE 2024

4.1.3.5 Bat Activity August 2024

TABLE 12. BAT ACTIVITY AUGUST (1) 2024

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Common Pipistrelle	Pipistrellus pipistrellus	667	40.7%
Myotis spec.	Myotis species	642	39.2%
Soprano Pipistrelle	Pipistrellus pygmaeus	298	18.2%
Leisler's	Nyctalus leisleri	29	1.8%
Total number of calls		1636	100%

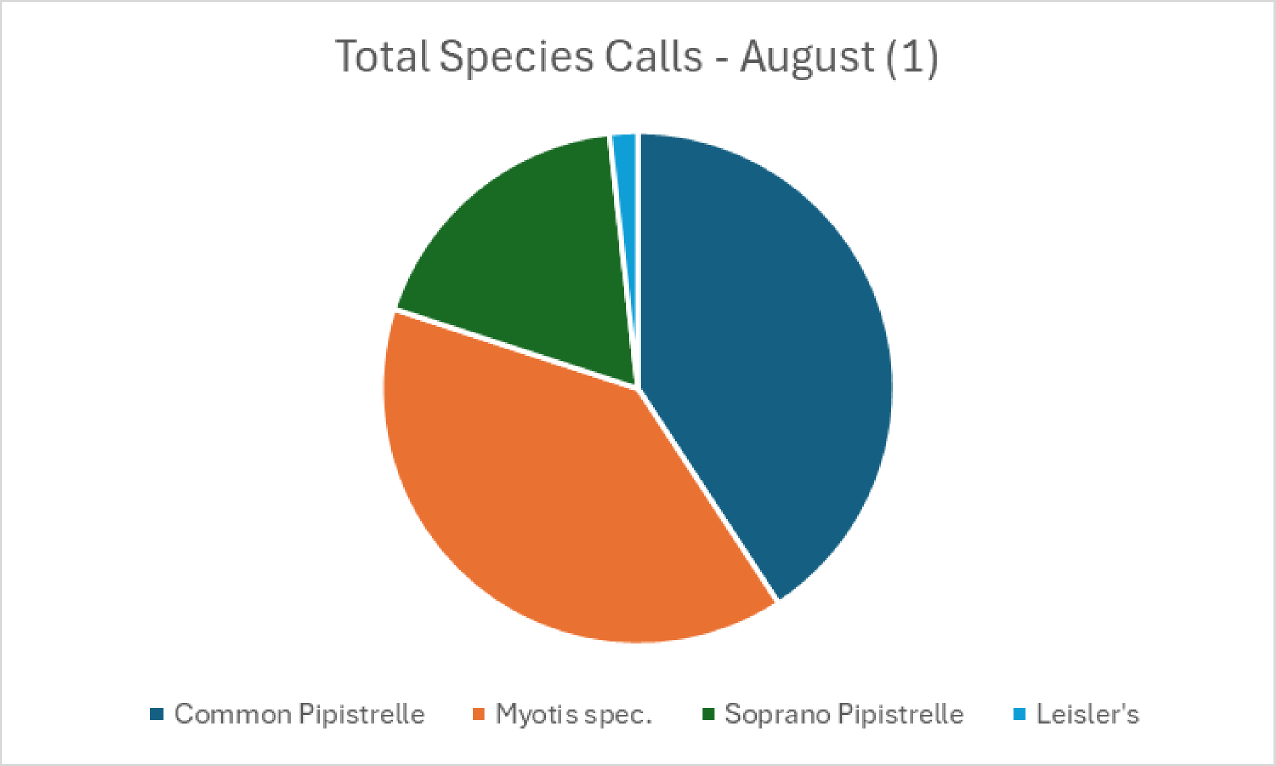

FIGURE 14. TOTAL SPECIES CALLS AUGUST (1) 2024

Applicant:	Project:	Location:	Figure Title:
O' Flynn Group	Proposed Development at Dunkettle	Dunkettle, Co. Cork	Bat Activity Survey Results August (1) 2024

Drawn By: TR	Projection: WGS 84 / Pseudo-Mercator
Checked: BL	
Date: 11/11/2024	1:8000

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

FIGURE 15. BAT ACTIVITY SURVEY RESULTS MAP AUGUST (1) 2024

TABLE 13. BAT ACTIVITY AUGUST (2) 2024

Species Common Name	Species Latin Name	Number (n) of Calls [#]	% of Total Calls
Soprano Pipistrelle	Pipistrellus pygmaeus	2845	65.7
Common Pipistrelle	Pipistrellus pipistrellus	965	22.6
Myotis Species	Myotis species	349	8.2
Leislers	Nyctalus leisleri	109	2.5
Nathusius Pipistrelle	Pipistrellus nathusii	2	0.05
Brown Long-eared	Plecotus auritus	1	0.02
Total number of calls		4271	100

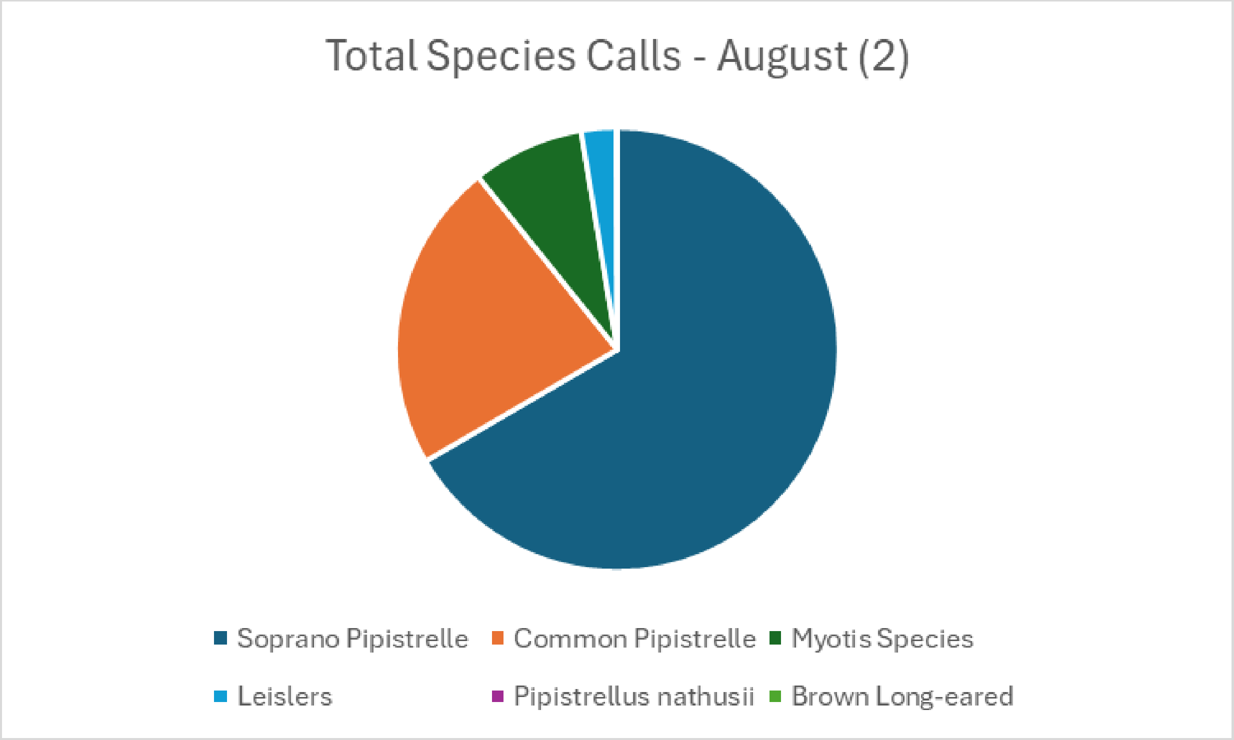

FIGURE 16. BAT SPECIES CALLS AUGUST (2)

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t +353 (0)1 565 4730

Legend:

Bat Survey Results August 202

- ● Leislers
- ● Myotis spec.
- ● Nathusius Pipistrelle
- ● Common Pipistrele
- ● Soprano Pipistrelle
- ● Brown Long-eared
- — EIAR Outline

Applicant:	Project:	Location:	Figure Title:
O' Flynn Group	Proposed Development at Dunkettle	Dunkettle, Co. Cork	Bat Activity Survey Results August (2) 2024

Drawn By: TR	**Projection:** WGS 84 / Pseudo-Mercator
Checked: BL	
Date: 11/11/2024	**1:8000**

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

Figure 17. Bat Activity Survey Results Map August (2) 2024

5 Conclusion

Enviroguide bat surveys conducted in 2023/2024 detected five specific bat species using the overall landholding, including Leisler's bat and Common, Soprano and Nathusius Pipistrelle, Brown Long-eared bat. Numerous registrations were also recorded for Myotis species also, which cannot readily be identified to species level. Roosting behaviour was recorded during August 2024 surveys, in the vicinity of Beech and Sycamore trees, to the southeast of the EIAR study area. (Figure3, tress H&G).

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7 Survey Dataset - Bat Activity Surveys

TABLE 14. OCTOBER 2023 BAT ACTIVITY DATA

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750000	10/10/2023 19:18	*Pipistrellus pygmaeus*	27	54.8	69.4	53.8	6	75	17	72	51.91244	-8.39978
3750001	10/10/2023 19:18	*Pipistrellus pygmaeus*	9	54.7	62	53.5	6	173	17	72	51.9124	-8.39977
3750002	10/10/2023 19:18	*Pipistrellus pygmaeus*	50	55	72.7	54.2	5	80	17	72	51.91238	-8.39975
3750003	10/10/2023 19:18	*Pipistrellus pygmaeus*	17	54.8	62.7	53.5	6	80	17	72	51.91231	-8.39971
3750008	10/10/2023 19:18	*Pipistrellus pygmaeus*	18	53.1	56	52.5	6	96	17	72	51.91225	-8.39968
3750009	10/10/2023 19:19	*Pipistrellus pygmaeus*	6	54.3	55.4	53.1	7	272	17	72	51.91224	-8.39967
3750010	10/10/2023 19:19	*Pipistrellus pygmaeus*	0	0	0	0	0	0	17	72	51.91224	-8.39966

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750011	10/10/2023 19:19	*Pipistrellus pygmaeus*	7	54.3	55.5	53.4	7	226	17	72	51.91224	-8.39966
3750012	10/10/2023 19:19	*Pipistrellus pygmaeus*	10	54.3	56.6	53.3	5	166	17	72	51.91224	-8.39966
3750013	10/10/2023 19:19	*Pipistrellus pygmaeus*	6	53.8	54.2	52.9	7	325	17	72	51.91225	-8.39967
3750014	10/10/2023 19:19	*Pipistrellus pygmaeus*	5	53.6	55.9	53.1	6.8	119	17	72	51.91224	-8.39966
3750015	10/10/2023 19:19	*Pipistrellus pygmaeus*	7	54.3	54.8	53.2	8	274	17	72	51.91226	-8.39966
3750016	10/10/2023 19:20	*Pipistrellus pygmaeus*	4	55	57.5	54.4	5.6	154	17	73	51.91226	-8.39968
3750017	10/10/2023 19:20	*Pipistrellus pygmaeus*	12	55	67.4	54	5	90	17	73	51.91224	-8.39964
03750018_2	10/10/2023 19:20	*Nyctalus leisleri*	2	26.4	26.6	25.5	3.7	518	17	73	51.91223	-8.39961

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
03750018_1	10/10/2023 19:20	*Pipistrellus pygmaeus*	6	53.9	55.2	52.1	9	437	17	73	51.91223	-8.39961
3750019	10/10/2023 19:21	*Pipistrellus pygmaeus*	16	54.9	79.2	53.8	5	70	17	73	51.91223	-8.39962
3750020	10/10/2023 19:21	*Pipistrellus pygmaeus*	51	54.4	71	53.5	6	90	17	73	51.91223	-8.39963
3750021	10/10/2023 19:21	*Pipistrellus pipistrellus*	21	50.8	51.7	49.7	7	96	18	73	51.91225	-8.39967
03750022_2	10/10/2023 19:22	*Plecotus auritus*	4	19.5	32.8	17.3	6	394	18	73	51.91225	-8.39967
03750022_1	10/10/2023 19:22	*Pipistrellus pygmaeus*	30	52.1	57.6	51.4	6	80	18	73	51.91225	-8.39967
03750023_1	10/10/2023 19:22	*Nyctalus leisleri*	1	22.1	39.4	19.5	6.4	0	18	73	51.91225	-8.39969
03750023_2	10/10/2023 19:22	*Pipistrellus pygmaeus*	1	54.8	57	54.4	4.3	0	18	73	51.91225	-8.39969

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750024	10/10/2023 19:22	*Pipistrellus pygmaeus*	9	55	57.6	54.1	5	248	18	73	51.91225	-8.39969
03750025_1	10/10/2023 19:22	*Pipistrellus pygmaeus*	8	54.6	56.9	54	7	243	18	73	51.91225	-8.39968
03750025_2	10/10/2023 19:22	*Plecotus auritus*	1	20.6	40.5	17.3	9.1	0	18	73	51.91225	-8.39968
03750026_2	10/10/2023 19:22	*Plecotus auritus*	2	21.6	42.8	19.7	7.5	829	18	73	51.91224	-8.39968
03750026_1	10/10/2023 19:22	*Pipistrellus pygmaeus*	8	55.9	67.8	54.7	6.8	218	18	73	51.91224	-8.39968
03750027_2	10/10/2023 19:22	*Plecotus auritus*	3	19.5	35.6	18.8	5.2	3039	18	73	51.91224	-8.39967
03750027_1	10/10/2023 19:22	*Pipistrellus pygmaeus*	36	54.6	61.1	53.7	7	90	18	73	51.91224	-8.39967
03750028_2	10/10/2023 19:22	*Nyctalus leisleri*	1	19.5	31.9	16.5	6.9	0	18	73	51.91225	-8.39967
03750028_1	10/10/2023 19:22	*Pipistrellus*	8	54.9	57	53.9	7	232	18	73	51.91225	-8.39967

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pygmaeus										
03750029_2	10/10/2023 19:23	*Plecotus auritus*	2	21	41.8	17.8	6.9	664	18	73	51.91227	-8.39968
03750029_1	10/10/2023 19:23	*Pipistrellus pygmaeus*	22	55.1	79.4	54	7	70	18	73	51.91227	-8.39968
03750030_2	10/10/2023 19:23	*Nyctalus leisleri*	4	21.1	43.4	19.1	6.7	775	18	73	51.91226	-8.39967
03750030_1	10/10/2023 19:23	*Pipistrellus pygmaeus*	15	55.4	62.9	54.3	7	210	18	73	51.91226	-8.39967
3750031	10/10/2023 19:24	*Pipistrellus pygmaeus*	3	54.5	59.5	54.1	4.8	113	18	73	51.91228	-8.3997
03750032_2	10/10/2023 19:24	*Plecotus auritus*	1	24.8	40.5	18.4	6.9	0	18	73	51.91228	-8.39969
03750032_1	10/10/2023 19:24	*Pipistrellus pygmaeus*	29	54.6	79.2	54	5	80	18	73	51.91228	-8.39969
3750033	10/10/2023 19:24	*Pipistrellus pygmaeus*	51	55.1	89.4	54.4	4	80	18	73	51.91225	-8.39956

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750035	10/10/2023 19:29	*Pipistrellus pygmaeus*	35	54.6	87.2	53.9	4	66	17	73	51.91213	-8.3993
3750036	10/10/2023 19:30	*Pipistrellus pygmaeus*	8	56.6	74.3	55.1	6	107	17	73	51.91167	-8.39912
3750038	10/10/2023 19:40	*Pipistrellus pygmaeus*	40	57.3	82.3	55.3	4	60	17	74	51.91104	-8.39576
03750039_2	10/10/2023 19:40	*Pipistrellus pygmaeus*	1	31.9	32.3	31.5	9.6	0	17	74	51.91105	-8.39571
03750039_1	10/10/2023 19:40	*Pipistrellus pygmaeus*	9	54.1	59.8	53.5	4	90	17	74	51.91105	-8.39571
3750040	10/10/2023 19:40	*Pipistrellus pygmaeus*	57	55.6	82.2	54.8	6	90	17	74	51.91104	-8.39566
3750041	10/10/2023 19:41	*Pipistrellus pygmaeus*	5	54.7	59.6	54.2	3	128	17	74	51.91108	-8.39553
3750047	10/10/2023 20:08	*Pipistrellus pygmaeus*	16	55	63.9	54	6	100	16	76	51.9161	-8.39963

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
03750048_2	10/10/2023 20:08	*Pipistrellus pygmaeus*	2	22.9	42.9	21.9	6.1	722	16	76	51.91609	-8.39962
03750048_1	10/10/2023 20:08	*Pipistrellus pygmaeus*	16	55.5	65.7	54.7	9	160	16	76	51.91609	-8.39962
3750050	10/10/2023 20:14	*Pipistrellus pipistrellus*	22	46.2	64.4	45.5	6	90	16	76	51.91627	-8.39796
3750054	10/10/2023 20:26	*Pipistrellus pipistrellus*	2	45.4	49.5	44.8	3.5	478	17	77	51.91647	-8.39509
3750055	10/10/2023 20:26	*Pipistrellus pipistrellus*	4	45.8	50.7	45.1	4	180	17	77	51.91647	-8.3951
3750057	10/10/2023 20:27	*Pipistrellus pipistrellus*	5	47.2	53.6	46.1	3	589	17	77	51.91647	-8.39509
3750058	10/10/2023 20:29	*Pipistrellus pipistrellus*	3	47.1	52.4	46.1	3.7	441	17	77	51.91644	-8.39508
3750059	10/10/2023 20:29	*Pipistrellus pipistrellus*	3	46	54.1	45.5	3.9	187	17	77	51.91644	-8.39508

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750067	10/10/2023 20:50	*Pipistrellus pygmaeus*	8	56.9	67.2	55.4	6	80	16	77	51.91499	-8.39098
3750068	10/10/2023 20:50	*Pipistrellus pygmaeus*	25	57.2	79	55.9	5	75	16	77	51.91499	-8.39098
3750069	10/10/2023 20:50	*Pipistrellus pygmaeus*	20	57.3	74.7	55.7	5	85	16	77	51.91495	-8.39098
3750070	10/10/2023 20:51	*Pipistrellus pygmaeus*	23	56.4	69.8	55.3	6	100	16	77	51.91498	-8.39098
03750071_1	10/10/2023 20:53	*Myotis spec.*	20	58.5	72.8	55.9	2	70	16	77	51.915	-8.39095
03750071_2	10/10/2023 20:53	*Myotis spec.*	1	71.3	90.8	64.1	1.6	0	16	77	51.915	-8.39095
03750071_3	10/10/2023 20:53	*Myotis spec.*	1	75.4	91.1	65.3	1.6	0	16	77	51.915	-8.39095
3750072	10/10/2023 20:53	*Pipistrellus pygmaeus*	18	56.6	75.5	55.9	4	170	16	77	51.91501	-8.39096

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750074	10/10/2023 20:59	*Pipistrellus pygmaeus*	14	56.9	68	56.4	3	90	16	76	51.91397	-8.39184
03750085_1	10/10/2023 21:14	*Pipistrellus pygmaeus*	2	56.1	62.8	55.3	6.1	226	16	77	51.91492	-8.39301
03750086_2	10/10/2023 21:16	*Nyctalus leisleri*	7	20	37.8	17.8	6	841	16	77	51.91416	-8.39405
03750086_1	10/10/2023 21:16	*Pipistrellus pygmaeus*	14	55.5	62.5	54.9	6	281	16	77	51.91416	-8.39405
03750088_2	10/10/2023 21:17	*Nyctalus leisleri*	2	19.5	33.8	18.4	5.9	901	16	77	51.91417	-8.39404
03750088_1	10/10/2023 21:17	*Myotis spec.*	4	55.6	59.8	54.8	4	304	16	77	51.91417	-8.39404
03750089_2	10/10/2023 21:17	*Nyctalus leisleri*	2	19.9	31.9	18.8	5.1	871	16	77	51.91416	-8.39404
03750089_1	10/10/2023 21:17	*Pipistrellus pygmaeus*	3	54.9	57.4	53.9	5	464	16	77	51.91416	-8.39404
03750091_1	10/10/2023 21:19	*Pipistrellus*	15	55.6	62.1	54.9	6	160	16	77	51.91398	-8.39446

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pygmaeus										
03750091_2	10/10/2023 21:19	*Plecotus auritus*	4	20.8	32.6	18.6	6.8	861	16	77	51.91398	-8.39446

Table 15. All survey data April 2024 activity survey.

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750000	29/04/2024 20:50	*Noise*	0	0	0	0	0	0	15	55		
3750001	29/04/2024 21:06	*Noise*	0	0	0	0	0	0	11	60	51.90804	-8.3919
3750002	29/04/2024 21:17	*Noise*	0	0	0	0	0	0	11	63	51.9068	-8.3886

Recording	**Timestamp**	**Species**	**Calls [#]**	**Mean Peak Frequency [kHz]**	**Mean Max Frequency [kHz]**	**Mean Min Frequency [kHz]**	**Mean Call Length [ms]**	**Mean Call Distance [ms]**	**Temperature [°C]**	**Humidity [%r.H.]**	**Latitude [WGS84]**	**Longitude [WGS84]**
3750003	29/04/2024 21:18	*Myotis spec.*	0	0	0	0	0	0	11	63	51.90671	-8.38958
3750004	29/04/2024 21:19	*Soprano Pip*	6	52.8	55.6	52.4	6	175	11	63	51.90662	-8.38999
3750005	29/04/2024 21:19	*Soprano Pip*	3	52.3	53.6	51.3	7.5	341	11	63	51.90662	-8.39
3750006	29/04/2024 21:23	*Noise*	0	0	0	0	0	0	11	64	51.90704	-8.39383
3750007	29/04/2024 21:25	*?*	0	0	0	0	0	0	11	64	51.90777	-8.39355
3750008	29/04/2024 21:25	*Myotis spec.*	27	55.1	59	54.5	6	90	11	64	51.90777	-8.39354
3750009	29/04/2024 21:25	*Soprano Pip*	4	56.5	59.8	55.9	4.7	359	11	64	51.90779	-8.39342
3750010	29/04/2024 21:25	*Soprano Pip*	4	56.8	60.4	55.7	4.1	200	11	64	51.90781	-8.3933
3750011	29/04/2024 21:25	*Myotis spec.*	16	56.2	83.7	55.4	6	80	11	64	51.90782	-8.39324
3750012	29/04/2024 21:25	*Soprano Pip*	9	56.1	61.8	55.4	4	80	11	64	51.90784	-8.39316

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750013	29/04/2024 21:25	*Myotis spec.*	23	56.4	64.8	55.6	4	170	11	64	51.90784	-8.39316
3750014	29/04/2024 21:26	*Soprano Pip*	17	56	61	55.3	4	86	11	64	51.90784	-8.39317
3750015	29/04/2024 21:26	*Noise*	0	0	0	0	0	0	11	64	51.90796	-8.39265
3750016	29/04/2024 21:31	*?*	2	54.6	60.2	53.4	10.4	91	11	64	51.9084	-8.39523
3750017	29/04/2024 21:33	*?*	0	0	0	0	0	0	11	65	51.90928	-8.39521
3750018	29/04/2024 21:34	*?*	0	0	0	0	0	0	11	65	51.90944	-8.395
3750019	29/04/2024 21:34	*Noise*	0	0	0	0	0	0	11	65	51.90952	-8.39493
3750020	29/04/2024 21:34	*Soprano Pip*	29	53.8	73.6	52.6	4	85	11	65	51.90964	-8.39495
03750021_1	29/04/2024 21:34	*Myotis spec.*	63	54	83.9	52	6	90	11	65	51.90967	-8.39508
03750021_2	29/04/2024 21:34	*Myotis spec.*	1	24.4	27.4	23.6	3.2	0	11	65	51.90967	-8.39508

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750022	29/04/2024 21:35	*Myotis spec.*	6	56	62.1	53.5	3	70	11	65	51.90968	-8.39512
03750023_1	29/04/2024 21:35	*Soprano Pip*	22	53.4	74.7	52	6	90	11	65	51.90969	-8.39512
03750023_2	29/04/2024 21:35	*Soprano Pip*	1	23.6	28.5	22.9	2.1	0	11	65	51.90969	-8.39512
03750024_1	29/04/2024 21:35	*Soprano Pip*	56	53.1	77.4	52.3	6	95	11	65	51.90968	-8.39513
03750024_2	29/04/2024 21:35	*Soprano Pip*	1	24	28.5	19.9	2.7	0	11	65	51.90968	-8.39513
3750025	29/04/2024 21:35	*Myotis spec.*	26	54.3	88.8	53.4	5	93	11	65	51.90969	-8.39515
3750026	29/04/2024 21:35	*Myotis spec.*	44	52.9	74.3	52	4	84	11	65	51.90978	-8.39522
3750027	29/04/2024 21:36	*Myotis spec.*	22	52.6	66.2	51.6	5	90	11	65	51.90998	-8.3958
3750028	29/04/2024 21:37	*Noise*	1	23.6	27.8	18	2.1	0	11	65	51.90993	-8.39617
3750029	29/04/2024 21:39	*Myotis spec.*	15	55.7	89.3	54.1	5	80	11	65	51.91013	-8.3972

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750030	29/04/2024 21:39	*Soprano Pip*	10	55.5	71.2	54.8	3	70	11	65	51.91014	-8.39721
3750031	29/04/2024 21:39	*Soprano Pip*	6	55.3	60.7	54.8	3	185	11	65	51.91013	-8.39721
3750032	29/04/2024 21:40	*?*	0	0	0	0	0	0	11	65	51.91043	-8.39739
3750033	29/04/2024 21:41	*Soprano Pip*	24	55.1	71.6	54.4	4	150	11	65	51.91046	-8.39743
3750034	29/04/2024 21:41	*Soprano Pip*	4	53.9	62.1	53.4	5.5	380	11	65	51.9105	-8.39748
3750035	29/04/2024 21:41	*?*	0	0	0	0	0	0	11	65	51.91071	-8.39745
3750036	29/04/2024 21:42	*Noise*	0	0	0	0	0	0	11	66	51.91079	-8.39682
3750037	29/04/2024 21:43	*Soprano Pip*	6	54.9	59.6	53.9	3	195	11	66	51.91084	-8.39644
3750038	29/04/2024 21:43	*Soprano Pip*	9	54	60.2	53.2	4	190	11	66	51.91088	-8.3961
3750039	29/04/2024 21:44	*Noise*	0	0	0	0	0	0	11	66	51.91093	-8.39559

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750040	29/04/2024 21:45	?	0	0	0	0	0	0	11	65	51.91103	-8.3959
3750041	29/04/2024 21:45	*Leisler's*	6	22.5	23.3	20.3	14	486	11	65	51.91102	-8.39608
3750042	29/04/2024 21:53	*Leisler's*	0	0	0	0	0	0	11	66	51.91229	-8.39761
3750043	29/04/2024 21:53	*Leisler's*	5	21.6	22.4	20.6	15.9	218	11	66	51.9123	-8.39765
3750044	29/04/2024 21:59	*Noise*	0	0	0	0	0	0	11	67	51.914	-8.39863
03750045_1	29/04/2024 21:59	*Soprano Pip*	1	22.9	24	21.8	4.3	0	11	67	51.91399	-8.39845
03750045_2	29/04/2024 21:59	*Soprano Pip*	1	32.3	33	30.4	6.4	0	11	67	51.91399	-8.39845
03750045_3	29/04/2024 21:59	*Soprano Pip*	1	55.9	59.3	55.5	4.3	0	11	67	51.91399	-8.39845
3750046	29/04/2024 22:00	*Noise*	0	0	0	0	0	0	11	67	51.91386	-8.39706
3750047	29/04/2024 22:00	*Pipistrellus pipistrellus*	5	45.5	50	44.9	4	143	11	67	51.91375	-8.39683

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750048	29/04/2024 22:01	*Pipistrellus pipistrellus*	19	44.9	54	44.3	4	96	11	67	51.91381	-8.39681
3750049	29/04/2024 22:01	*Myotis spec.*	0	0	0	0	0	0	11	67	51.91393	-8.39678
03750050_1	29/04/2024 22:01	*Pipistrellus pipistrellus*	32	45.1	63.4	44.2	5	165	11	67	51.91395	-8.39677
03750050_2	29/04/2024 22:01	*Pipistrellus pipistrellus*	1	91.1	108	90.8	5.3	0	11	67	51.91395	-8.39677
3750051	29/04/2024 22:01	*Myotis spec.*	6	55.6	64	54.2	3	150	11	67	51.91401	-8.39667
3750052	29/04/2024 22:01	*Soprano Pip*	5	55	66.1	53.7	3	132	11	67	51.91401	-8.39663
3750053	29/04/2024 22:01	*Myotis spec.*	2	55.9	62.6	54.4	2.7	1070	11	67	51.91401	-8.3966
3750054	29/04/2024 22:01	*Soprano Pip*	13	55.3	71.1	54.4	3	83	11	67	51.91402	-8.39651
3750055	29/04/2024 22:01	*?*	18	55	69.8	54.2	4	80	11	67	51.91402	-8.39645

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750056	29/04/2024 22:01	*Myotis spec.*	17	55.7	67.3	54.6	3	75	11	67	51.914	-8.39635
3750057	29/04/2024 22:03	*Myotis spec.*	1	19.1	23.3	18.4	6.4	0	10	66	51.91392	-8.39476
3750058	29/04/2024 22:03	*Leisler's*	3	25.3	28.6	23.1	8.7	737	10	66	51.91403	-8.3943
3750059	29/04/2024 22:03	*Leisler's*	4	22.4	23.7	21.5	10	368	10	66	51.91406	-8.39426
3750060	29/04/2024 22:03	*Noise*	0	0	0	0	0	0	10	66	51.91417	-8.39411
3750061	29/04/2024 22:04	*Leisler's*	5	25.5	30.5	24.2	8	300	10	66	51.9142	-8.39406
3750062	29/04/2024 22:04	*Leisler's*	8	25.5	33.6	24	7	335	10	66	51.91421	-8.39407
3750063	29/04/2024 22:13	*Noise*	0	0	0	0	0	0	10	68	51.91664	-8.39307
3750064	29/04/2024 22:14	*Leisler's*	2	26.4	30	24.4	9.3	408	10	68	51.91672	-8.39409
3750065	29/04/2024 22:14	*Leisler's*	3	22.9	23.9	22.3	13.9	659	10	68	51.91672	-8.39412

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750066	29/04/2024 22:15	*Leisler's*	4	22	22.4	21.1	18	466	10	68	51.91671	-8.39415
3750067	29/04/2024 22:15	*Myotis spec.*	26	48.4	71	47.6	3	90	10	68	51.91651	-8.39463
3750068	29/04/2024 22:16	*Pipistrellus pipistrellus*	19	48.5	62.1	47.7	3	90	10	69	51.91649	-8.3947
3750069	29/04/2024 22:16	*Pipistrellus pipistrellus*	35	48.4	63.3	47.3	3	84	10	69	51.91648	-8.39477
3750070	29/04/2024 22:16	*Pipistrellus pipistrellus*	39	48.4	76.4	47.5	4	90	10	69	51.91646	-8.39483
3750071	29/04/2024 22:16	*Pipistrellus pipistrellus*	8	47.9	63.3	47.2	4	156	10	69	51.9164	-8.39492
3750072	29/04/2024 22:16	*Pipistrellus pipistrellus*	5	48	51.3	47	4	298	10	68	51.91635	-8.39497
3750073	29/04/2024 22:16	*Leisler's*	5	21.8	22.5	21.3	16	729	10	68	51.91632	-8.39499

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750074	29/04/2024 22:17	*Leisler's*	4	24.3	26.7	23.3	11.2	337	10	68	51.91612	-8.39508
3750075	29/04/2024 22:17	*Leisler's*	1	24	24.8	22.9	13.9	0	10	68	51.9161	-8.39508
3750076	29/04/2024 22:19	*Myotis spec.*	42	55.6	85.4	54.5	4	83	10	68	51.91477	-8.39558
3750077	29/04/2024 22:19	*Myotis spec.*	12	55.4	87.9	54.7	4	208	10	68	51.91473	-8.39563
3750078	29/04/2024 22:22	*Myotis spec.*	1	36.8	37.1	30.4	5.3	0	10	68	51.91445	-8.39537
3750079	29/04/2024 22:30	*Noise*	1	23.6	24.4	23.3	4.3	0	10	69	51.91472	-8.39416
3750080	29/04/2024 22:32	*Noise*	0	0	0	0	0	0	10	69	51.91592	-8.39483
3750081	29/04/2024 22:36	*Myotis spec.*	0	0	0	0	0	0	10	70	51.91634	-8.39473
3750082	29/04/2024 22:36	*Soprano Pip*	4	48.8	56.8	48.1	3	214	10	70	51.91634	-8.39472
03750083_1	29/04/2024 22:38	*Pipistrellus pipistrellus*	30	50.5	60	49.4	5	180	10	70	51.91634	-8.39473

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
03750083_2	29/04/2024 22:38	*Pipistrellus pipistrellus*	5	25.4	40.9	20.8	9	1208	10	70	51.91634	-8.39473
3750084	29/04/2024 22:38	*Soprano Pip*	28	55.9	89.5	54.2	5	90	10	70	51.91648	-8.39484
3750085	29/04/2024 22:39	*Myotis spec.*	20	55.5	98.6	54.7	4	85	10	70	51.91655	-8.39492
3750086	29/04/2024 22:42	*Noise*	0	0	0	0	0	0	10	69	51.91625	-8.39803
3750087	29/04/2024 22:44	*Leisler's*	3	23.1	25.5	22.4	8.5	396	10	70	51.91574	-8.39949
3750088	29/04/2024 22:44	*Leisler's*	3	23.6	25.9	21.9	13.9	341	10	70	51.9157	-8.39948
3750089	29/04/2024 22:45	*Leisler's*	1	21.8	24	21.4	21.9	0	10	70	51.91545	-8.39944
3750090	29/04/2024 22:45	*Leisler's*	2	21	21.6	20.3	17.3	417	10	70	51.91531	-8.39944
3750091	29/04/2024 22:49	*?*	0	0	0	0	0	0	10	70	51.91367	-8.39682
3750092	29/04/2024 22:50	*Noise*	0	0	0	0	0	0	10	70	51.91328	-8.39653

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750093	29/04/2024 22:51	*Soprano Pip*	22	53.8	58.2	52.9	6	94	10	70	51.91302	-8.39624
03750094_1	29/04/2024 22:53	*Pipistrellus pipistrellus*	43	46.3	77.6	45.1	4	160	10	70	51.91239	-8.3953
03750094_2	29/04/2024 22:53	*Myotis spec.*	1	55.1	70.9	46.9	4.8	0	10	70	51.91239	-8.3953
3750095	29/04/2024 22:53	*Pipistrellus pipistrellus*	13	49.1	59.3	48.2	4	90	10	70	51.91239	-8.39529
3750096	29/04/2024 22:53	*Pipistrellus pipistrellus*	27	50.5	63.9	48.1	4	96	10	70	51.91239	-8.39529
3750097	29/04/2024 22:54	*Pipistrellus pipistrellus*	14	49.7	65.5	47.9	5	100	10	71	51.9124	-8.3953
3750098	29/04/2024 22:54	*Pipistrellus pipistrellus*	8	48.9	57.3	48.3	3	90	10	71	51.91239	-8.3953
3750099	29/04/2024 22:54	*Pipistrellus pipistrellus*	2	48.9	55.1	48.4	3.5	152	10	71	51.9124	-8.3953

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
3750100	29/04/2024 22:54	*Pipistrellus pipistrellus*	11	49.3	79.6	48.1	4	100	10	71	51.9124	-8.3953
3750101	29/04/2024 22:54	*Pipistrellus pipistrellus*	1	48.8	56.6	47.6	4.3	0	10	71	51.9124	-8.39531
3750102	29/04/2024 22:55	*Pipistrellus pipistrellus*	12	47.1	62.6	46	6	170	10	71	51.91239	-8.3953

TABLE 16. ALL SURVEY DATA JUNE 2024 ACTIVITY SURVEYS

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370191_2	27/06/2024 00:29	*Soprano Pip*	3	45.1	48.3	43.1	8.9	1034	13	75	51.90983	-8.39499
7370000	26/06/2024 21:57	*Soprano Pip*	3	53.5	57.1	52.9	3.6	211	18	58	51.91376	-8.39793
7370001	26/06/2024 21:58	*Noise*	1	87.4	87.8	86.6	14.4	0	18	59	51.91376	-8.39797

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370002	26/06/2024 22:08	*Soprano Pip*	6	57.7	77.1	56.6	3	103	16	64	51.91616	-8.39966
7370003	26/06/2024 22:08	*Soprano Pip*	19	56.1	90.7	54	4	83	16	64	51.91616	-8.39967
7370004	26/06/2024 22:09	*Noise*	0	0	0	0	0	0	16	65	51.9162	-8.3997
7370005	26/06/2024 22:10	*Soprano Pip*	19	55.5	78.9	54.5	5	70	16	65	51.91618	-8.39968
7370006	26/06/2024 22:19	*Soprano Pip*	18	54.2	61.5	53.4	3	155	16	68	51.91654	-8.39597
7370007	26/06/2024 22:19	*Soprano Pip*	5	56	61.4	55.1	3	122	16	68	51.91654	-8.39591
7370008	26/06/2024 22:20	*Soprano Pip*	33	54.6	88.4	53.7	4	80	16	68	51.91654	-8.39585
7370009	26/06/2024 22:20	*Soprano Pip*	48	55.4	96.7	54.3	4	80	16	68	51.91655	-8.39575
7370010	26/06/2024 22:20	*Soprano Pip*	48	55.4	97.4	54.5	4	80	16	68	51.91656	-8.39567
7370011	26/06/2024 22:20	*Soprano Pip*	6	53.4	57	52.7	6	137	16	68	51.91655	-8.39552

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370012	26/06/2024 22:21	*Noise*	1	29.3	30.4	22.1	12.3	0	16	68	51.91648	-8.3951
7370013	26/06/2024 22:21	*Soprano Pip*	10	54.1	61.1	53.5	4	80	15	68	51.91649	-8.3951
7370014	26/06/2024 22:23	*Pipistrellus pipistrellus*	7	45.2	52.8	44.4	4	80	15	69	51.91649	-8.3951
7370015	26/06/2024 22:24	*Pipistrellus pipistrellus*	20	47.2	66.3	46.5	4	86	15	69	51.91652	-8.39511
7370016	26/06/2024 22:26	*Pipistrellus pipistrellus*	9	46.4	51.9	45.5	3	90	15	70	51.91659	-8.39457
7370017	26/06/2024 22:26	*Pipistrellus pipistrellus*	13	47.3	64.7	46.5	3	80	15	70	51.91661	-8.39453
7370018	26/06/2024 22:28	*Soprano Pip*	17	56.7	63.6	55.8	5	74	15	71	51.91664	-8.39273
7370019	26/06/2024 22:28	*Myotis spec.*	61	56.3	82.6	55.2	6	80	15	71	51.91664	-8.39266
7370020	26/06/2024 22:28	*Myotis spec.*	95	56.2	84.1	54.9	7	80	15	71	51.9166	-8.3925

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370021	26/06/2024 22:28	*Myotis spec.*	53	55.7	77	54.9	7	80	15	71	51.9166	-8.39249
7370022	26/06/2024 22:29	*Soprano Pip*	21	55.8	81.9	54.6	5	83	15	71	51.91661	-8.39248
7370023	26/06/2024 22:29	*Soprano Pip*	100	56.3	84.8	55	6	80	15	71	51.91662	-8.39246
7370024	26/06/2024 22:29	*Myotis spec.*	102	56.3	91.8	54.8	5	85	15	71	51.9165	-8.39248
7370025	26/06/2024 22:31	*Soprano Pip*	1	57	60.8	56.3	6.4	0	15	71	51.91614	-8.39246
7370026	26/06/2024 22:32	*Myotis spec.*	28	57.9	90.2	57.2	5	80	15	71	51.91613	-8.39247
7370027	26/06/2024 22:32	*Myotis spec.*	19	55.6	88	54.9	5	80	15	71	51.91613	-8.39244
7370028	26/06/2024 22:33	*Noise*	0	0	0	0	0	0	15	71	51.91608	-8.39227
7370029	26/06/2024 22:37	*?*	0	0	0	0	0	0	15	71	51.91492	-8.39118
7370030	26/06/2024 22:37	*Noise*	0	0	0	0	0	0	15	71	51.91493	-8.39118

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370031	26/06/2024 22:41	*Myotis spec.*	25	57.5	87.7	56.2	5	83	15	71	51.91493	-8.39121
7370032	26/06/2024 22:41	*Soprano Pip*	3	56.9	61.4	56.4	3.4	116	15	71	51.91493	-8.39121
7370033	26/06/2024 22:41	*Soprano Pip*	32	55.9	76.2	55.2	6	90	15	71	51.91493	-8.39125
7370034	26/06/2024 22:41	*Noise*	0	0	0	0	0	0	15	71	51.91495	-8.39147
7370035	26/06/2024 22:42	*Myotis spec.*	20	57.1	94.1	56.6	4	50	15	71	51.91495	-8.39151
7370036	26/06/2024 22:44	*Soprano Pip*	16	55.2	61.6	54.4	5	60	15	71	51.91387	-8.3918
7370037	26/06/2024 22:45	*Soprano Pip*	6	54.7	59.2	53.9	6	232	15	71	51.91377	-8.39181
7370038	26/06/2024 22:46	*Noise*	0	0	0	0	0	0	15	71	51.91371	-8.39264
7370039	26/06/2024 22:47	*Noise*	1	58.5	62.3	52.5	21.9	0	15	71	51.91372	-8.3927
7370040	26/06/2024 22:47	*Noise*	1	32.3	33.4	31.1	8	0	15	72	51.91372	-8.3927

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370041	26/06/2024 22:48	*Leisler's*	5	24.2	26.7	23.1	11.3	220	15	72	51.91372	-8.3927
7370042	26/06/2024 22:48	*Leisler's*	5	22.7	23.6	21.9	13.1	373	15	72	51.91373	-8.39268
7370043	26/06/2024 22:48	*Leisler's*	11	23.9	27.5	22.7	12	299	15	72	51.91372	-8.39268
7370044	26/06/2024 22:49	*Soprano Pip*	13	55.1	60.9	54.1	5	85	15	72	51.91372	-8.39269
07370045_1	26/06/2024 22:49	*Soprano Pip*	12	54.9	57.3	53.6	5	199	15	72	51.91372	-8.3927
7370046	26/06/2024 22:49	*Leisler's*	3	24.1	27.4	23	11.6	689	15	72	51.91373	-8.39275
7370047	26/06/2024 22:50	*Leisler's*	9	22.9	24.1	21.6	14	342	15	72	51.91373	-8.39274
7370048	26/06/2024 22:50	*Myotis spec.*	21	30.5	64	28.1	5	103	15	72	51.91376	-8.39272
7370049	26/06/2024 22:50	*Myotis spec.*	15	26.8	34.8	25.6	6	227	15	72	51.9138	-8.39271
7370050	26/06/2024 22:50	*Leisler's*	6	22.8	23.8	21.4	12	357	15	72	51.91382	-8.3927

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370051	26/06/2024 22:51	*Myotis spec.*	20	25.6	37.4	24	10	200	15	72	51.91397	-8.39264
7370052	26/06/2024 22:51	*Soprano Pip*	3	54.6	56.1	53.8	6.4	177	15	72	51.91403	-8.39264
07370053_1	26/06/2024 22:51	*Soprano Pip*	31	54.6	62.5	53.4	6	90	15	72	51.91405	-8.39264
07370054_1	26/06/2024 22:51	*Soprano Pip*	32	54.9	58.3	53.7	6	90	15	72	51.91415	-8.3926
7370055	26/06/2024 22:51	*Soprano Pip*	11	54.2	55.6	53.3	6	262	15	72	51.91424	-8.39255
7370056	26/06/2024 22:55	*Soprano Pip*	23	54.8	63.2	53	7	90	15	71	51.91585	-8.39225
7370057	26/06/2024 22:56	*Noise*	0	0	0	0	0	0	15	71	51.91584	-8.39248
7370058	26/06/2024 22:57	*Noise*	0	0	0	0	0	0	15	72	51.91529	-8.39254
7370059	26/06/2024 22:59	*Pipistrellus pipistrellus*	22	47	89.7	46.3	4	80	15	72	51.91468	-8.39345
7370060	26/06/2024 23:04	*Leisler's*	3	22.1	22.6	21.6	18.3	615	15	72	51.91445	-8.39367

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370061	26/06/2024 23:05	*Pipistrellus pipistrellus*	14	47.4	67.8	46.6	4	80	15	72	51.91391	-8.3947
7370062	26/06/2024 23:06	*Pipistrellus pipistrellus*	19	47.3	83.8	46.3	4	90	15	72	51.91392	-8.39489
7370063	26/06/2024 23:06	*Pipistrellus pipistrellus*	27	46.7	67.9	45.7	5	100	15	72	51.91392	-8.39508
7370064	26/06/2024 23:06	*Pipistrellus pipistrellus*	22	47.1	77.1	46.3	5	90	15	72	51.91391	-8.39508
7370065	26/06/2024 23:07	*Pipistrellus pipistrellus*	11	46.1	49	45.5	5	100	15	72	51.91391	-8.39536
7370066	26/06/2024 23:07	*Pipistrellus pipistrellus*	1	46.5	50.3	45.8	4.3	0	15	72	51.91391	-8.39542
07370067_1	26/06/2024 23:07	*Noise*	1	15.4	15.8	15	9.6	0	15	72	51.91396	-8.39561
7370068	26/06/2024 23:07	*Pipistrellus pipistrellus*	24	46.2	50.1	45.4	6	115	15	72	51.91398	-8.39583

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370069	26/06/2024 23:08	*Pipistrellus pipistrellus*	23	46.5	80.1	45.8	5	90	15	72	51.91403	-8.39622
7370070	26/06/2024 23:08	*Pipistrellus pipistrellus*	26	46.9	81.2	46.1	5	90	15	72	51.91403	-8.39624
7370071	26/06/2024 23:08	*Pipistrellus pipistrellus*	27	46.8	57.5	45.8	6	100	15	72	51.91403	-8.39623
07370072_1	26/06/2024 23:09	*Pipistrellus pipistrellus*	18	47.5	71.6	46.4	3	86	15	72	51.91404	-8.39623
07370073_1	26/06/2024 23:09	*Pipistrellus pipistrellus*	84	48.1	72.2	46.5	3	80	15	72	51.91403	-8.39623
07370074_1	26/06/2024 23:09	*Pipistrellus pipistrellus*	48	45.7	87	44.9	4	80	15	72	51.91403	-8.39624
07370075_1	26/06/2024 23:09	*Pipistrellus pipistrellus*	39	45.9	85.7	45.3	4	85	15	72	51.91403	-8.39625
7370076	26/06/2024 23:10	*Pipistrellus pipistrellus*	29	46.8	70.3	45.9	5	100	15	72	51.91402	-8.39624

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370077	26/06/2024 23:10	*?*	1	69.8	70.9	69	5.9	0	15	72	51.91403	-8.39624
7370078	26/06/2024 23:10	*?*	9	54.1	54.7	53	8	206	15	72	51.91404	-8.39624
7370079	26/06/2024 23:11	*Pipistrellus pipistrellus*	2	53.6	61.1	52.7	9.9	83	15	72	51.91404	-8.39639
7370080	26/06/2024 23:17	*Noise*	1	30.4	32.3	22.9	2.7	0	15	71	51.91643	-8.39517
7370081	26/06/2024 23:17	*Leisler's*	4	25.6	30.1	23.7	9.1	362	15	71	51.91643	-8.39518
7370082	26/06/2024 23:18	*Soprano Pip*	5	52.7	54.7	52.1	7.1	222	15	71	51.91643	-8.39516
7370083	26/06/2024 23:20	*Noise*	0	0	0	0	0	0	15	71	51.91647	-8.39532
7370084	26/06/2024 23:22	*Noise*	1	15	20.3	15	4.3	0	15	71	51.91633	-8.39673
7370085	26/06/2024 23:26	*Noise*	0	0	0	0	0	0	14	70	51.9161	-8.39905
7370086	26/06/2024 23:26	*Soprano Pip*	46	54.1	75.7	53.4	6	85	14	71	51.91612	-8.39946

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370087_1	26/06/2024 23:27	*Myotis spec.*	8	53.7	60.2	53.1	5	173	14	71	51.91614	-8.39955
07370088_1	26/06/2024 23:29	*Soprano Pip*	9	54.3	57.3	53.4	6	140	15	71	51.91613	-8.3996
7370089	26/06/2024 23:30	*Soprano Pip*	15	55.3	58.9	54.4	7	95	15	71	51.91598	-8.39952
7370090	26/06/2024 23:31	*Soprano Pip*	36	53.5	78.6	52.9	5	90	14	71	51.9157	-8.39938
7370091	26/06/2024 23:31	*Soprano Pip*	88	53.9	84.6	53.3	5	80	14	70	51.91567	-8.39938
07370092_1	26/06/2024 23:31	*Myotis spec.*	78	53.5	83	52.8	6	90	14	70	51.9156	-8.39938
7370093	26/06/2024 23:32	*Leisler's*	7	25	29.5	23.6	9	250	14	70	51.91559	-8.39938
7370094	26/06/2024 23:32	*Myotis spec.*	20	53.1	64.2	52.4	6	90	14	70	51.91559	-8.39938
7370095	26/06/2024 23:32	*Myotis spec.*	6	25.6	31.9	24.3	11	412	14	70	51.91552	-8.39939
7370096	26/06/2024 23:32	*?*	5	26	36.5	24.9	10.6	327	14	70	51.9155	-8.39939

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370097_1	26/06/2024 23:32	*Myotis spec.*	4	24.6	27.7	23.6	7.7	441	14	70	51.91548	-8.39939
07370098_1	26/06/2024 23:32	*Myotis spec.*	5	28.5	34.4	26.9	5.8	197	14	70	51.91542	-8.39938
7370099	26/06/2024 23:33	*Soprano Pip*	1	55.9	59.6	55.5	5.3	0	14	70	51.91513	-8.39939
7370100	26/06/2024 23:33	*Myotis spec.*	37	56.3	74.8	55.7	5	85	14	70	51.91512	-8.3994
7370101	26/06/2024 23:33	*Noise*	2	29.6	30.2	29.1	26.9	177	14	70	51.91495	-8.39936
7370102	26/06/2024 23:33	*Noise*	0	0	0	0	0	0	14	70	51.91486	-8.39933
7370103	26/06/2024 23:34	*Noise*	0	0	0	0	0	0	14	70	51.91479	-8.39932
7370104	26/06/2024 23:34	*Myotis spec.*	16	28.3	54.3	27.2	6	205	14	70	51.9147	-8.39932
7370105	26/06/2024 23:34	*Noise*	1	31.1	31.5	30	17.1	0	14	70	51.91457	-8.3993
7370106	26/06/2024 23:35	*Soprano Pip*	11	54.6	58.3	54	5	80	14	71	51.91424	-8.39923

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370107	26/06/2024 23:36	?	5	53.1	54.5	52.5	6.6	279	14	71	51.91419	-8.39933
7370108	26/06/2024 23:36	*Noise*	1	90.8	91.1	87.8	3.7	0	14	71	51.9142	-8.39934
7370109	26/06/2024 23:36	*Pipistrellus pipistrellus*	11	45.9	49.7	45	6	244	14	71	51.91421	-8.39931
7370110	26/06/2024 23:38	*Noise*	0	0	0	0	0	0	14	72	51.91417	-8.39846
7370111	26/06/2024 23:38	*Pipistrellus pipistrellus*	37	48.5	86.3	47.8	5	180	14	72	51.91415	-8.39783
07370112_1	26/06/2024 23:39	*Pipistrellus pipistrellus*	48	48.7	90.3	47.4	4	84	14	72	51.91407	-8.39702
7370113	26/06/2024 23:41	*Soprano Pip*	8	53	54	52.5	7	100	14	72	51.91321	-8.39695
7370114	26/06/2024 23:42	*Soprano Pip*	7	53.6	56.8	53.1	5	326	14	72	51.91291	-8.39697
7370115	26/06/2024 23:42	*Soprano Pip*	3	54.5	56.6	53.8	4.4	529	14	72	51.91279	-8.39699

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370116_1	26/06/2024 23:42	*Noise*	1	20.6	24.8	19.9	3.2	0	14	72	51.91264	-8.39702
7370117	26/06/2024 23:43	*Myotis spec.*	36	54.2	87.8	53.6	4	74	14	72	51.91221	-8.39702
7370118	26/06/2024 23:43	*Soprano Pip*	6	54	62	53.4	4	90	14	72	51.91218	-8.39705
7370119	26/06/2024 23:45	*Myotis spec.*	25	55.4	81.6	54.6	3	73	14	72	51.91212	-8.39755
7370120	26/06/2024 23:45	*Myotis spec.*	63	53.7	85.2	52.9	5	84	14	72	51.91212	-8.39762
7370121	26/06/2024 23:45	*Myotis spec.*	46	53.8	88	53.1	4	70	14	72	51.91212	-8.39779
07370122_1	26/06/2024 23:45	*Soprano Pip*	12	53.3	61.8	52.9	4	80	14	72	51.91214	-8.39794
7370123	26/06/2024 23:45	*Myotis spec.*	34	53.4	82.4	52.8	4	80	14	72	51.91215	-8.39798
7370124	26/06/2024 23:48	*Myotis spec.*	6	55.8	58.6	54.8	5	260	13	72	51.91209	-8.3995
7370125	26/06/2024 23:48	*Myotis spec.*	18	54.8	57.7	53.3	6	90	13	72	51.91209	-8.39949

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370126	26/06/2024 23:49	*Myotis spec.*	12	56.8	69.1	55.6	5	238	14	72	51.91208	-8.39949
07370127_1	26/06/2024 23:49	*Myotis spec.*	25	57.7	80.6	55.8	5	90	14	73	51.91207	-8.3995
7370128	26/06/2024 23:49	*Soprano Pip*	13	55.1	58.8	54.4	4	84	14	72	51.91209	-8.39949
7370129	26/06/2024 23:50	*Soprano Pip*	12	56.5	61	55.9	2	158	14	72	51.9121	-8.39949
7370130	26/06/2024 23:50	*Myotis spec.*	75	55	84	54	5	80	13	72	51.91206	-8.39945
7370131	26/06/2024 23:51	*Myotis spec.*	71	55.1	94.9	54.4	5	75	13	72	51.91204	-8.39945
7370132	26/06/2024 23:51	*Myotis spec.*	31	55.3	92.8	54.5	4	80	13	72	51.91196	-8.39939
7370133	26/06/2024 23:51	*Myotis spec.*	30	55.1	95.8	54.2	5	75	13	72	51.91191	-8.39933
7370134	26/06/2024 23:53	*Myotis spec.*	51	55.5	67.3	54.8	4	85	13	72	51.91102	-8.39833
07370135_1	26/06/2024 23:53	*Myotis spec.*	9	55.2	59.9	54.8	3	274	13	72	51.91094	-8.39826

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370136	26/06/2024 23:53	*Soprano Pip*	32	54.3	69.5	53.7	6	90	13	72	51.9109	-8.39823
7370137	26/06/2024 23:55	*Soprano Pip*	12	54.9	62.3	54.2	5	225	13	73	51.91088	-8.39824
7370138	26/06/2024 23:55	*Myotis spec.*	0	0	0	0	0	0	13	73	51.91088	-8.39823
7370139	27/06/2024 00:03	*Noise*	0	0	0	0	0	0	13	73	51.91203	-8.3954
7370140	27/06/2024 00:03	*Noise*	0	0	0	0	0	0	13	73	51.91205	-8.39542
7370141	27/06/2024 00:04	*Noise*	0	0	0	0	0	0	13	73	51.91204	-8.39542
7370142	27/06/2024 00:08	*Pipistrellus pipistrellus*	15	49.1	88.6	48.3	4	90	13	74	51.91104	-8.39541
07370143_1	27/06/2024 00:08	*Noise*	2	23.3	23.6	22.5	5.9	2041	13	74	51.911	-8.39543
7370144	27/06/2024 00:08	*Myotis spec.*	11	61.6	94.4	60.6	3	80	13	74	51.91097	-8.39545
7370145	27/06/2024 00:08	*Myotis spec.*	11	60.1	104.9	59.1	3	80	13	74	51.91095	-8.3955

Recording	**Timestamp**	**Species**	**Calls [#]**	**Mean Peak Frequency [kHz]**	**Mean Max Frequency [kHz]**	**Mean Min Frequency [kHz]**	**Mean Call Length [ms]**	**Mean Call Distance [ms]**	**Temperature [°C]**	**Humidity [%r.H.]**	**Latitude [WGS84]**	**Longitude [WGS84]**
7370146	27/06/2024 00:09	*Noise*	0	0	0	0	0	0	13	75	51.91088	-8.39628
7370147	27/06/2024 00:09	*Noise*	3	26.1	26.4	24.9	11.6	647	13	75	51.91084	-8.39666
07370148_1	27/06/2024 00:10	*Noise*	1	23.3	23.6	22.9	8.5	0	13	75	51.91079	-8.39693
7370149	27/06/2024 00:11	*Soprano Pip*	23	55.6	66	55	3	76	13	74	51.91059	-8.39766
7370150	27/06/2024 00:11	*Soprano Pip*	2	55.3	59.4	54.9	2.9	335	13	74	51.91057	-8.39765
7370151	27/06/2024 00:12	*Noise*	0	0	0	0	0	0	13	74	51.91041	-8.39758
7370152	27/06/2024 00:12	*Soprano Pip*	22	56.7	88.1	55.3	4	80	13	75	51.91034	-8.39735
7370153	27/06/2024 00:13	*Soprano Pip*	39	55	78.5	54	5	84	13	75	51.90994	-8.39703
7370154	27/06/2024 00:14	*Soprano Pip*	14	55.3	64.3	54.6	5	236	13	75	51.90994	-8.39702
7370155	27/06/2024 00:14	*Soprano Pip*	25	55.5	71.4	54.7	4	80	13	75	51.90994	-8.39703

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370156	27/06/2024 00:14	*Soprano Pip*	60	54.6	80.7	53.9	6	80	13	75	51.90995	-8.39703
7370157	27/06/2024 00:14	*Soprano Pip*	43	54.1	67.8	53.2	6	90	13	75	51.90994	-8.39704
7370158	27/06/2024 00:15	*Soprano Pip*	2	54.8	57.8	54.4	4.8	550	13	75	51.90994	-8.39705
7370159	27/06/2024 00:15	*Soprano Pip*	20	54.8	81.2	54.2	6	75	13	75	51.90994	-8.39705
7370160	27/06/2024 00:15	*Soprano Pip*	2	54	57.4	52.5	4.3	1445	13	75	51.90992	-8.39705
7370161	27/06/2024 00:15	*Myotis spec.*	12	53.3	70.3	52.4	5	80	13	75	51.90992	-8.39705
7370162	27/06/2024 00:16	*Soprano Pip*	21	54.7	76.6	53.9	6	86	13	75	51.90991	-8.39704
7370163	27/06/2024 00:16	*Soprano Pip*	19	54.3	69.1	53.7	5	84	13	75	51.90992	-8.39704
7370164	27/06/2024 00:16	*Soprano Pip*	28	54.7	81.9	53.9	6	85	13	75	51.90992	-8.39704
7370165	27/06/2024 00:16	*Soprano Pip*	15	55.1	63.3	54.5	4	80	13	75	51.90992	-8.39704

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370166	27/06/2024 00:16	*Noise*	0	0	0	0	0	0	13	75	51.90991	-8.39704
7370167	27/06/2024 00:16	*Soprano Pip*	20	55.2	62.1	54.2	5	80	13	75	51.90991	-8.39703
7370168	27/06/2024 00:16	*Soprano Pip*	17	54.5	61	53.4	5	90	13	75	51.90992	-8.39704
7370169	27/06/2024 00:17	*Soprano Pip*	18	55.2	60.8	54.1	4	90	13	75	51.90993	-8.39705
7370170	27/06/2024 00:17	*Soprano Pip*	15	54.4	74.8	53.6	6	80	13	75	51.90994	-8.39705
7370171	27/06/2024 00:17	*Myotis spec.*	11	54.7	62.9	53.5	6	256	13	75	51.90993	-8.39665
7370172	27/06/2024 00:18	*Soprano Pip*	7	54.8	60.3	54.1	4.9	240	13	75	51.90992	-8.39656
7370173	27/06/2024 00:18	*Noise*	1	27	28.5	25.9	35.7	0	13	75	51.90991	-8.39634
07370174_1	27/06/2024 00:18	*Noise*	1	25.5	26.6	25.1	37.9	0	13	74	51.90994	-8.39615
7370175	27/06/2024 00:20	*Noise*	0	0	0	0	0	0	13	74	51.90996	-8.39536

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370176	27/06/2024 00:20	*Noise*	1	27.8	30.8	25.5	24.5	0	13	74	51.9101	-8.39548
7370177	27/06/2024 00:21	*Noise*	0	0	0	0	0	0	13	74	51.9104	-8.39552
7370178	27/06/2024 00:21	*Noise*	3	28.3	28.9	27.9	17.1	439	13	74	51.91069	-8.3955
07370179_1	27/06/2024 00:21	*Pipistrellus pipistrellus*	11	45.3	47	44.8	6	190	13	74	51.91074	-8.39548
07370180_1	27/06/2024 00:21	*Noise*	2	27.2	28.3	26.6	21.9	71	13	74	51.91081	-8.39545
7370181	27/06/2024 00:23	*Soprano Pip*	4	56.1	61.2	54.6	4.5	657	13	74	51.91097	-8.39542
7370182	27/06/2024 00:23	*Myotis spec.*	5	56.6	65.8	55.1	3	463	13	74	51.91097	-8.39543
7370183	27/06/2024 00:23	*Soprano Pip*	12	55.9	78.9	55.3	4	90	13	74	51.91097	-8.39542
7370184	27/06/2024 00:23	*Soprano Pip*	25	56.4	84.6	55.5	4	76	13	74	51.91095	-8.39541
7370185	27/06/2024 00:24	*Noise*	0	0	0	0	0	0	13	75	51.91096	-8.3954

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370186	27/06/2024 00:24	*Pipistrellus pipistrellus*	16	46.4	53.5	45	5	180	13	75	51.91094	-8.39534
7370187	27/06/2024 00:25	*Noise*	1	35.3	36	31.9	6.9	0	13	75	51.91043	-8.39534
7370188	27/06/2024 00:26	*Pipistrellus pipistrellus*	9	47.7	54.5	47.1	4	190	13	74	51.90986	-8.39506
7370189	27/06/2024 00:27	*Soprano Pip*	46	54.1	92	53.5	4	80	13	74	51.90983	-8.39501
7370190	27/06/2024 00:28	*Soprano Pip*	2	52.9	55.3	51.9	4.5	1228	13	74	51.90983	-8.39501
07370191_1	27/06/2024 00:29	*Myotis spec.*	35	54.3	84.9	53.2	5	90	13	75	51.90983	-8.39499
7370192	27/06/2024 00:30	*Pipistrellus pipistrellus*	31	48.1	84	46.7	4	85	13	75	51.90985	-8.39475
7370193	27/06/2024 00:31	*Noise*	0	0	0	0	0	0	13	74	51.90986	-8.39396
7370194	27/06/2024 00:31	*Myotis spec.*	10	50.2	86.7	48.5	4	131	13	74	51.90986	-8.39369

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370195_1	27/06/2024 00:31	*Noise*	1	27.4	27.8	26.6	14.9	0	13	73	51.90986	-8.39318
7370196	27/06/2024 00:32	*Myotis spec.*	10	61.8	88.2	60.1	2	91	13	73	51.90989	-8.39251
7370197	27/06/2024 00:35	*Noise*	0	0	0	0	0	0	13	74	51.90988	-8.39246
7370198	27/06/2024 00:37	*Noise*	2	28.7	29.8	27.8	31.5	46	13	74	51.91001	-8.39169
7370199	27/06/2024 00:37	*Noise*	0	0	0	0	0	0	13	74	51.91005	-8.39142
7370200	27/06/2024 00:38	*Noise*	1	28.1	28.5	27	7.5	0	13	74	51.9101	-8.39093
7370201	27/06/2024 00:38	*Soprano Pip*	73	57.1	92.5	55.9	4	80	13	74	51.91015	-8.39054
7370202	27/06/2024 00:38	*Leisler's*	8	56.5	60.4	55.5	3	170	13	74	51.91015	-8.39051
07370203_1	27/06/2024 00:38	*Noise*	7	56.9	60.4	56.1	3	193	13	74	51.91014	-8.39051
7370204	27/06/2024 00:38	*Soprano Pip*	60	57.7	86.3	55.7	5	80	13	74	51.91014	-8.39051

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
7370205	27/06/2024 00:39	*Myotis spec.*	40	56.6	82.3	55.5	5	90	13	74	51.91014	-8.39051
7370206	27/06/2024 00:39	*Myotis spec.*	47	56.5	81.1	55.1	5	80	13	74	51.91015	-8.39051
7370207	27/06/2024 00:39	*Myotis spec.*	49	56.9	70.3	55	6	90	13	74	51.91015	-8.39049
7370208	27/06/2024 00:40	*?*	59	56.4	76	54.9	6	80	13	74	51.91013	-8.3905
7370209	27/06/2024 00:40	*?*	27	56.4	73.5	55.4	5	80	13	74	51.91012	-8.3905
7370210	27/06/2024 00:41	*Myotis spec.*	84	56.7	80.1	55	6	85	13	74	51.91013	-8.39049
7370211	27/06/2024 00:41	*Myotis spec.*	58	57.6	83.2	54.9	7	90	13	74	51.91013	-8.39049
7370212	27/06/2024 00:41	*Myotis spec.*	3	57	66	56	3.7	74	13	74	51.91012	-8.39049
07370045_2	26/06/2024 22:49	*Soprano Pip*	4	23.3	25.9	22.7	10	345	15	72	51.91372	-8.3927
07370053_2	26/06/2024 22:51	*Soprano Pip*	3	22.1	22.9	21	16.2	601	15	72	51.91405	-8.39264

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370054_2	26/06/2024 22:51	*Soprano Pip*	2	24	26.3	23.4	7.5	246	15	72	51.91415	-8.3926
07370067_2	26/06/2024 23:07	*Noise*	1	23.3	23.6	22.9	6.9	0	15	72	51.91396	-8.39561
07370072_2	26/06/2024 23:09	*Pipistrellus pipistrellus*	3	54.9	77.4	50.6	3.4	805	15	72	51.91404	-8.39623
07370073_2	26/06/2024 23:09	*Brown Long-eared*	4	27	36.9	22.6	4	130	15	72	51.91403	-8.39623
07370073_3	26/06/2024 23:09	*?*	2	84	101.1	52.5	1.6	299	15	72	51.91403	-8.39623
07370074_2	26/06/2024 23:09	*?*	3	91.3	113.5	73.9	3.7	1435	15	72	51.91403	-8.39624
07370075_2	26/06/2024 23:09	*Soprano Pip*	2	93.9	111.2	93	3.5	4652	15	72	51.91403	-8.39625
07370075_3	26/06/2024 23:09	*Pipistrellus pipistrellus*	1	54.4	111.4	44.6	4.3	0	15	72	51.91403	-8.39625
07370087_2	26/06/2024 23:27	-	1	19.9	37.9	15	2.7	0	14	71	51.91614	-8.39955

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370088_2	26/06/2024 23:29	*Soprano Pip*	1	23.3	23.6	22.9	5.9	0	15	71	51.91613	-8.3996
07370092_2	26/06/2024 23:31	*Myotis spec.*	6	25.6	33.8	24.1	10	305	14	70	51.9156	-8.39938
07370097_2	26/06/2024 23:32	*Leisler's*	1	37.5	38.3	36	11.2	0	14	70	51.91548	-8.39939
07370098_2	26/06/2024 23:32	*Leisler's*	1	20.3	21.4	16.9	4.8	0	14	70	51.91542	-8.39938
07370112_2	26/06/2024 23:39	*Pipistrellus pipistrellus*	2	96.8	108.6	88.1	2.7	5538	14	72	51.91407	-8.39702
07370116_2	26/06/2024 23:42	*Noise*	1	24.4	25.1	24	5.9	0	14	72	51.91264	-8.39702
07370122_2	26/06/2024 23:45	*Soprano Pip*	2	19.1	22.3	18	5.3	851	14	72	51.91214	-8.39794
07370127_2	26/06/2024 23:49	*Soprano Pip*	10	26.3	40.3	25.1	7	200	14	73	51.91207	-8.3995
07370127_3	26/06/2024 23:49	*Myotis spec.*	1	48.8	93.4	48.4	6.4	0	14	73	51.91207	-8.3995
07370135_2	26/06/2024 23:53	*Soprano Pip*	1	23.3	23.6	22.9	7.5	0	13	72	51.91094	-8.39826

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370135_3	26/06/2024 23:53	*Soprano Pip*	1	29.6	30.4	29.3	6.9	0	13	72	51.91094	-8.39826
07370143_2	27/06/2024 00:08	*Noise*	1	65.6	79.1	61.5	2.7	0	13	74	51.911	-8.39543
07370148_2	27/06/2024 00:10	*Noise*	1	28.5	30.4	28.1	32.5	0	13	75	51.91079	-8.39693
07370174_2	27/06/2024 00:18	*Noise*	1	36	36.8	35.3	8	0	13	74	51.90994	-8.39615
07370179_2	27/06/2024 00:21	*Pipistrellus pipistrellus*	1	27.8	28.5	27	22.9	0	13	74	51.91074	-8.39548
07370180_2	27/06/2024 00:21	*Noise*	1	23.6	24	22.9	7.5	0	13	74	51.91081	-8.39545
07370195_2	27/06/2024 00:31	*Noise*	1	31.1	32.6	30.8	14.4	0	13	73	51.90986	-8.39318
07370203_2	27/06/2024 00:38	*Soprano Pip*	1	22.9	23.3	18.8	3.2	0	13	74	51.91014	-8.39051

TABLE 17. ALL SURVEY DATA AUGUST 2024 ACTIVITY SURVEY

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
07370191_2	27/06/2024 00:29	*Soprano Pip*	3	45.1	48.3	43.1	8.9	1034	13	75	51.90983	-8.39499
50500312	06/08/2024 23:14	*?*	1	30.8	33.2	25	2	0	17	NaN	51.91051	-8.39773
50500001	06/08/2024 21:13	*Noise*	0	0	0	0	0	0	16	NaN	51.91335	-8.39684
50500002	06/08/2024 21:13	*Noise*	0	0	0	0	0	0	16	NaN	51.91335	-8.39684
50500003	06/08/2024 21:13	*Noise*	1	15.6	15.9	14.9	4.6	0	16	NaN	51.91335	-8.39684
50500004	06/08/2024 21:14	*Noise*	3	16.8	17.8	15.5	5	1659	16	NaN	51.91334	-8.39689
50500005	06/08/2024 21:14	*Noise*	0	0	0	0	0	0	16	NaN	51.91334	-8.39686
50500006	06/08/2024 21:15	*Noise*	0	0	0	0	0	0	16	NaN	51.91335	-8.39687
50500007	06/08/2024 21:15	*Noise*	0	0	0	0	0	0	16	NaN	51.91335	-8.39683
50500008	06/08/2024 21:15	*Noise*	0	0	0	0	0	0	16	NaN	51.91335	-8.39683

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500009	06/08/2024 21:16	*Noise*	1	26.2	27.8	23.2	4.6	0	16	NaN	51.91334	-8.39688
50500010	06/08/2024 21:16	*Noise*	0	0	0	0	0	0	16	NaN	51.91334	-8.39691
50500011	06/08/2024 21:17	*Noise*	1	31.1	32.3	29.9	2	0	16	NaN	51.91334	-8.3969
50500012_1	06/08/2024 21:17	*Noise*	3	18.5	19.4	16.5	7.6	7872	16	NaN	51.91335	-8.39685
50500012_2	06/08/2024 21:17	*Noise*	1	25.6	25.9	24.1	6.6	0	16	NaN	51.91335	-8.39685
50500013_1	06/08/2024 21:17	*Noise*	5	18.2	18.7	16.5	5	4279	16	NaN	51.91357	-8.39679
50500013_2	06/08/2024 21:17	*Noise*	1	24.1	24.4	23.5	5.2	0	16	NaN	51.91357	-8.39679
50500013_3	06/08/2024 21:17	*Noise*	1	36.6	37.2	32.3	3.3	0	16	NaN	51.91357	-8.39679
50500014_1	06/08/2024 21:18	*Noise*	2	23.6	27.9	22.9	6.6	10528	16	NaN	51.91384	-8.39667
50500014_2	06/08/2024 21:18	*Noise*	1	19.5	19.8	15.3	7.2	0	16	NaN	51.91384	-8.39667

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500014_3	06/08/2024 21:18	*Noise*	1	32.6	33.6	32.3	5.2	0	16	NaN	51.91384	-8.39667
50500015	06/08/2024 21:18	*Noise*	1	26.5	27.5	26.2	4.6	0	16	NaN	51.91405	-8.39674
50500016_1	06/08/2024 21:18	*Noise*	5	20.1	21.8	18.8	5	2901	16	NaN	51.91408	-8.39717
50500016_2	06/08/2024 21:18	*Noise*	1	28.4	29.6	27.5	7.9	0	16	NaN	51.91408	-8.39717
50500016_3	06/08/2024 21:18	*Noise*	1	34.5	34.8	32	5.2	0	16	NaN	51.91408	-8.39717
50500017_1	06/08/2024 21:19	*Noise*	3	25.8	26.5	25	5	4001	16	NaN	51.91413	-8.39759
50500017_2	06/08/2024 21:19	*Noise*	2	15.1	16	14.9	6.2	17414	16	NaN	51.91413	-8.39759
50500018_1	06/08/2024 21:19	*Noise*	2	22.1	22.9	21.4	4.9	17254	16	NaN	51.91417	-8.39797
50500018_2	06/08/2024 21:19	*Noise*	1	17.4	17.7	16.5	4.6	0	16	NaN	51.91417	-8.39797
50500019_1	06/08/2024 21:20	*Noise*	2	21.7	22.6	21	7.2	3449	16	NaN	51.91417	-8.39802

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500019_2	06/08/2024 21:20	*Noise*	1	16.2	18.3	15.9	6.6	0	16	NaN	51.91417	-8.39802
50500019_3	06/08/2024 21:20	*Noise*	1	29.6	30.2	28.1	4.6	0	16	NaN	51.91417	-8.39802
50500020	06/08/2024 21:20	*Noise*	4	18.4	20.5	17.1	6.1	2000	16	NaN	51.91418	-8.39887
50500021	06/08/2024 21:20	*Noise*	5	20.9	22	18.8	6.2	2039	16	NaN	51.91436	-8.39909
50500022	06/08/2024 21:21	*Noise*	9	22.2	23.7	21.1	7	2289	16	NaN	51.91462	-8.39913
50500023_1	06/08/2024 21:21	*Noise*	3	26.4	27.1	25.2	4.8	7824	16	NaN	51.91484	-8.39917
50500023_2	06/08/2024 21:21	*Noise*	1	14.9	16.2	14.9	4.6	0	16	NaN	51.91484	-8.39917
50500023_3	06/08/2024 21:21	*Noise*	1	21.7	22	20.4	9.2	0	16	NaN	51.91484	-8.39917
50500023_4	06/08/2024 21:21	*Noise*	1	31.7	32.3	31.4	5.9	0	16	NaN	51.91484	-8.39917
50500024_1	06/08/2024 21:22	*Noise*	1	21.4	22	20.1	4.6	0	16	NaN	51.91512	-8.39924

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500024_2	06/08/2024 21:22	*Noise*	1	24.4	24.7	23.5	4.6	0	16	NaN	51.91512	-8.39924
50500025_1	06/08/2024 21:22	*Noise*	3	19.1	19.6	18.5	5	8301	16	NaN	51.91541	-8.39934
50500025_2	06/08/2024 21:22	*Noise*	2	26.5	28.1	25.5	8.2	9814	16	NaN	51.91541	-8.39934
50500026_1	06/08/2024 21:22	*Noise*	6	16.9	17.6	15.9	5	3754	16	NaN	51.91569	-8.39935
50500026_2	06/08/2024 21:22	*Noise*	2	22.9	23.5	22.1	5.2	10880	16	NaN	51.91569	-8.39935
50500026_3	06/08/2024 21:22	*Noise*	1	26.2	26.8	25.6	6.6	0	16	NaN	51.91569	-8.39935
50500027_1	06/08/2024 21:23	*Noise*	2	30.7	32.3	25.2	4.9	8952	16	NaN	51.91571	-8.39935
50500027_2	06/08/2024 21:23	*Noise*	1	20.1	25.6	19.5	4.6	0	16	NaN	51.91571	-8.39935
50500027_3	06/08/2024 21:23	*Noise*	1	24.7	25.9	24.1	4.6	0	16	NaN	51.91571	-8.39935
50500028	06/08/2024 21:23	*Noise*	0	0	0	0	0	0	16	NaN	51.91606	-8.39956

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500029	06/08/2024 21:24	*Noise*	1	15.3	15.6	14.9	7.2	0	16	NaN	51.91607	-8.39955
50500030_1	06/08/2024 21:24	*Noise*	3	17.2	17.9	16.7	5	6764	16	NaN	51.91608	-8.39954
50500030_2	06/08/2024 21:24	*Noise*	2	46.1	48.5	45.6	2.9	2737	16	NaN	51.91608	-8.39954
50500030_3	06/08/2024 21:24	*Noise*	1	23.8	26.2	22.3	3.3	0	16	NaN	51.91608	-8.39954
50500031	06/08/2024 21:24	*Noise*	1	16.5	18.6	14.9	5.9	0	16	NaN	51.91608	-8.39951
50500032	06/08/2024 21:25	*Noise*	0	0	0	0	0	0	16	NaN	51.91608	-8.39949
50500033_1	06/08/2024 21:25	*Noise*	1	18.3	18.6	18	5.9	0	16	NaN	51.91609	-8.39952
50500033_2	06/08/2024 21:25	*Noise*	1	53.4	54.6	52.8	6.6	0	16	NaN	51.91609	-8.39952
50500034	06/08/2024 21:26	*Noise*	0	0	0	0	0	0	16	NaN	51.91608	-8.39953
50500035	06/08/2024 21:26	*Noise*	1	16.8	17.1	14.9	7.2	0	16	NaN	51.91607	-8.39952

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500036	06/08/2024 21:26	*Pipistrellus pipistrellus*	13	46	57.4	45.6	7	86	16	NaN	51.9161	-8.39952
50500037	06/08/2024 21:27	*Noise*	0	0	0	0	0	0	16	NaN	51.91608	-8.39951
50500038	06/08/2024 21:27	*Noise*	0	0	0	0	0	0	16	NaN	51.91608	-8.3995
50500039	06/08/2024 21:27	*Noise*	2	19.7	20.3	19.1	4.6	7345	16	NaN	51.91609	-8.3995
50500040_1	06/08/2024 21:28	*Noise*	4	18.2	19.4	17.5	5.6	5670	16	NaN	51.91609	-8.3995
50500040_2	06/08/2024 21:28	*Noise*	1	27.1	28.1	24.7	4.6	0	16	NaN	51.91609	-8.3995
50500041_1	06/08/2024 21:28	*Noise*	7	18.5	19.3	17.2	5	2711	16	NaN	51.91615	-8.39907
50500041_2	06/08/2024 21:28	*Noise*	1	25.3	30.8	25	7.2	0	16	NaN	51.91615	-8.39907
50500041_3	06/08/2024 21:28	*Noise*	1	29.9	31.4	28.4	6.6	0	16	NaN	51.91615	-8.39907
50500042	06/08/2024 21:29	*Noise*	5	18.8	19.9	17.3	5.8	2143	16	NaN	51.91612	-8.39863

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500043	06/08/2024 21:29	*Noise*	2	17.5	18.5	15.7	7.2	3937	16	NaN	51.91617	-8.39824
50500044	06/08/2024 21:29	*Noise*	2	16.3	17.1	15.6	6.2	2559	16	NaN	51.91623	-8.39797
50500045_1	06/08/2024 21:30	*Noise*	1	16.8	18.9	15.9	3.3	0	16	NaN	51.91624	-8.39798
50500045_2	06/08/2024 21:30	*Noise*	1	27.1	28.1	25.9	4.6	0	16	NaN	51.91624	-8.39798
50500046	06/08/2024 21:30	*Leisler's*	15	22.5	25.1	21.6	16	327	16	NaN	51.91623	-8.39797
50500047	06/08/2024 21:31	*Noise*	0	0	0	0	0	0	16	NaN	51.91623	-8.39797
50500048	06/08/2024 21:31	*Noise*	0	0	0	0	0	0	16	NaN	51.91622	-8.39795
50500049	06/08/2024 21:31	*Noise*	0	0	0	0	0	0	16	NaN	51.91621	-8.39795
50500050	06/08/2024 21:32	*Noise*	0	0	0	0	0	0	16	NaN	51.91621	-8.39796
50500051	06/08/2024 21:32	*Pipistrellus pipistrellus*	8	46.1	52	45.4	4	148	16	NaN	51.91622	-8.39795

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500052	06/08/2024 21:33	*Noise*	0	0	0	0	0	0	16	NaN	51.91623	-8.39795
50500053	06/08/2024 21:33	*Noise*	1	23.5	25	23.2	4.6	0	16	NaN	51.91622	-8.39794
50500054	06/08/2024 21:33	*Noise*	1	24.7	31.7	18.9	2.6	0	16	NaN	51.91623	-8.39794
50500055	06/08/2024 21:34	*Noise*	4	18.5	19.7	17.5	5	3372	16	NaN	51.91622	-8.39793
50500056_1	06/08/2024 21:34	*Noise*	5	19	19.7	17.3	5	3534	16	NaN	51.91625	-8.39763
50500056_2	06/08/2024 21:34	*Noise*	4	26.2	27.4	25.3	5.9	4790	16	NaN	51.91625	-8.39763
50500057	06/08/2024 21:34	*Noise*	1	18.9	20.1	17.4	4.6	0	16	NaN	51.91624	-8.39726
50500058_1	06/08/2024 21:35	*Noise*	1	19.8	20.4	17.7	7.9	0	16	NaN	51.9163	-8.39687
50500058_2	06/08/2024 21:35	*Noise*	1	22.9	24.1	21	7.2	0	16	NaN	51.9163	-8.39687
50500059_1	06/08/2024 21:35	*Soprano Pip*	37	54.7	61.7	54	5	84	16	NaN	51.91642	-8.39651

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500059_2	06/08/2024 21:35	*Soprano Pip*	1	19.8	22.3	18.6	7.9	0	16	NaN	51.91642	-8.39651
50500060_1	06/08/2024 21:36	*Pipistrellus pipistrellus*	46	46.4	53.5	45.6	6	90	16	NaN	51.91647	-8.39613
50500060_2	06/08/2024 21:36	*Pipistrellus pipistrellus*	2	17.2	17.5	15.9	6.6	583	16	NaN	51.91647	-8.39613
50500060_3	06/08/2024 21:36	*Pipistrellus pipistrellus*	1	23.5	23.8	22.9	4.6	0	16	NaN	51.91647	-8.39613
50500060_4	06/08/2024 21:36	*Pipistrellus pipistrellus*	1	27.8	29	26.8	7.2	0	16	NaN	51.91647	-8.39613
50500061_1	06/08/2024 21:36	*Pipistrellus pipistrellus*	116	49.6	59.5	48.9	7	90	16	NaN	51.9165	-8.39568
50500061_2	06/08/2024 21:36	*Pipistrellus pipistrellus*	2	21.4	21.8	20.7	5.9	6153	16	NaN	51.9165	-8.39568
50500061_3	06/08/2024 21:36	*Pipistrellus pipistrellus*	2	24.4	26.2	23.9	7.9	2147	16	NaN	51.9165	-8.39568

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500061_4	06/08/2024 21:36	*Pipistrellus pipistrellus*	1	16.2	18.3	14.9	6.6	0	16	NaN	51.9165	-8.39568
50500062	06/08/2024 21:36	*Myotis spec.*	164	53.8	70.4	52.9	5	74	16	NaN	51.91647	-8.39528
50500063_1	06/08/2024 21:37	*Soprano Pip*	93	54.1	69.6	53.1	5	70	16	NaN	51.91649	-8.39508
50500063_2	06/08/2024 21:37	*Myotis spec.*	1	46.1	52.5	45.4	4.6	0	16	NaN	51.91649	-8.39508
50500064	06/08/2024 21:37	*Myotis spec.*	109	53.3	68.5	52.4	5	80	16	NaN	51.91651	-8.39511
50500065	06/08/2024 21:38	*Myotis spec.*	106	52.6	68.7	52	5	80	16	NaN	51.91649	-8.39509
50500066	06/08/2024 21:38	*Noise*	7	54.7	58.9	54.2	4	1255	16	NaN	51.91649	-8.39509
50500067	06/08/2024 21:38	*Myotis spec.*	66	55.6	69	54.9	5	90	16	NaN	51.91649	-8.39512
50500068	06/08/2024 21:39	*Myotis spec.*	36	55.9	69.2	55.4	5	75	16	NaN	51.91647	-8.39511
50500069	06/08/2024 21:39	*Myotis spec.*	27	54.9	66.3	54.3	5	80	16	NaN	51.91647	-8.39507

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500070_1	06/08/2024 21:40	*Pipistrellus pipistrellus*	10	47.5	53.5	46.8	3	80	16	NaN	51.91649	-8.39505
50500070_2	06/08/2024 21:40	*Pipistrellus pipistrellus*	4	54.4	56.4	54.1	5	6345	16	NaN	51.91649	-8.39505
50500071	06/08/2024 21:40	*Myotis spec.*	67	56	68.2	55.4	5	80	16	NaN	51.91649	-8.39506
50500072_1	06/08/2024 21:40	*Myotis spec.*	30	57.2	77.4	56	4	74	16	NaN	51.91649	-8.39507
50500072_2	06/08/2024 21:40	*Pipistrellus pipistrellus*	21	46.5	59.8	45.5	5	84	16	NaN	51.91649	-8.39507
50500072_3	06/08/2024 21:40	*Soprano Pip*	1	68.9	78.4	59.5	2	0	16	NaN	51.91649	-8.39507
50500073	06/08/2024 21:41	*?*	7	47.4	53.8	46.8	3	1772	16	NaN	51.91649	-8.39507
50500074	06/08/2024 21:41	*Pipistrellus pipistrellus*	44	47.1	54.8	46.4	5	100	16	NaN	51.91651	-8.39508
50500075	06/08/2024 21:42	*Pipistrellus*	121	47.5	66.2	46.8	5	90	16	NaN	51.91657	-8.39498

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pipistrellus										
50500076_1	06/08/2024 21:42	*Noise*	5	47.5	51.1	46.8	4.1	160	16	NaN	51.91654	-8.39472
50500076_2	06/08/2024 21:42	*Pipistrellus pipistrellus*	1	15.6	17.1	14.9	4.6	0	16	NaN	51.91654	-8.39472
50500077	06/08/2024 21:42	*Noise*	1	22.9	23.2	21	6.6	0	16	NaN	51.91666	-8.39437
50500078	06/08/2024 21:43	*Noise*	11	24.8	25.8	22.7	5	1932	16	NaN	51.91674	-8.39397
50500079_1	06/08/2024 21:43	*Noise*	5	21.5	22.5	20.4	7	4096	16	NaN	51.91673	-8.39355
50500079_2	06/08/2024 21:43	*Noise*	1	31.1	33.9	28.4	2.6	0	16	NaN	51.91673	-8.39355
50500080	06/08/2024 21:43	*Noise*	5	21.5	22.9	20.5	5.4	4574	16	NaN	51.91669	-8.39312
50500081_1	06/08/2024 21:44	*Pipistrellus pipistrellus*	24	46.1	55.4	45.5	5	83	16	NaN	51.91668	-8.39273
50500081_2	06/08/2024 21:44	*Pipistrellus*	1	25.6	28.7	24.1	6.6	0	16	NaN	51.91668	-8.39273

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pipistrellus										
50500082_1	06/08/2024 21:44	*?*	3	16.3	17.1	15.4	5.7	5570	16	NaN	51.91654	-8.39247
50500082_2	06/08/2024 21:44	*Soprano Pip*	3	46.1	55.9	45.4	4.4	60	16	NaN	51.91654	-8.39247
50500082_3	06/08/2024 21:44	*?*	1	20.4	21.7	19.5	3.9	0	16	NaN	51.91654	-8.39247
50500082_4	06/08/2024 21:44	*?*	1	30.2	31.1	29.3	4.6	0	16	NaN	51.91654	-8.39247
50500083_1	06/08/2024 21:45	*Noise*	2	16.5	20.6	15.6	3.6	10915	16	NaN	51.9163	-8.39246
50500083_2	06/08/2024 21:45	*Noise*	2	23.5	24.1	22.4	4.6	5546	16	NaN	51.9163	-8.39246
50500084	06/08/2024 21:45	*Noise*	0	0	0	0	0	0	16	NaN	51.91612	-8.39236
50500085	06/08/2024 21:45	*Noise*	0	0	0	0	0	0	16	NaN	51.91611	-8.39233
50500086	06/08/2024 21:46	*Noise*	0	0	0	0	0	0	16	NaN	51.91611	-8.39235

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500087	06/08/2024 21:46	*Noise*	0	0	0	0	0	0	16	NaN	51.9161	-8.39238
50500088	06/08/2024 21:47	*Noise*	0	0	0	0	0	0	16	NaN	51.9161	-8.39238
50500089	06/08/2024 21:47	*Noise*	0	0	0	0	0	0	16	NaN	51.9161	-8.39238
50500090	06/08/2024 21:47	*Noise*	0	0	0	0	0	0	16	NaN	51.91609	-8.39239
50500091	06/08/2024 21:48	*Noise*	0	0	0	0	0	0	16	NaN	51.91608	-8.39241
50500092	06/08/2024 21:48	*Noise*	0	0	0	0	0	0	16	NaN	51.91607	-8.39243
50500093	06/08/2024 21:49	*Pipistrellus pipistrellus*	41	46	53.6	45.3	5	90	16	NaN	51.91607	-8.39243
50500094	06/08/2024 21:49	*Soprano Pip*	61	55.2	59.9	54.5	9	85	16	NaN	51.91607	-8.39243
50500095	06/08/2024 21:49	*Noise*	0	0	0	0	0	0	16	NaN	51.91606	-8.39246
50500096	06/08/2024 21:50	*Noise*	0	0	0	0	0	0	16	NaN	51.91606	-8.39246

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500097	06/08/2024 21:50	*Noise*	0	0	0	0	0	0	16	NaN	51.91606	-8.39241
50500098	06/08/2024 21:51	*Noise*	2	18.3	20.3	16.5	6.2	2283	16	NaN	51.91603	-8.39231
50500099_1	06/08/2024 21:51	*Noise*	4	23.1	25.6	21.7	4.8	5633	16	NaN	51.9159	-8.39198
50500099_2	06/08/2024 21:51	*Noise*	1	17.1	17.4	16.2	6.6	0	16	NaN	51.9159	-8.39198
50500100	06/08/2024 21:51	*Noise*	5	19	20.9	18.4	7	2735	16	NaN	51.9158	-8.39165
50500101_1	06/08/2024 21:52	*Noise*	6	22.5	23.5	20.3	5.4	2592	16	NaN	51.91564	-8.39142
50500101_2	06/08/2024 21:52	*Noise*	1	37.2	37.5	36.6	8.5	0	16	NaN	51.91564	-8.39142
50500102_1	06/08/2024 21:52	*Noise*	5	37.2	37.9	36.5	9	3997	16	NaN	51.9154	-8.39136
50500102_2	06/08/2024 21:52	*Noise*	3	27.2	29.7	23.8	10.3	5837	16	NaN	51.9154	-8.39136
50500102_3	06/08/2024 21:52	*Noise*	1	18	18.6	17.4	5.9	0	16	NaN	51.9154	-8.39136

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500103	06/08/2024 21:52	*Noise*	0	0	0	0	0	0	16	NaN	51.91519	-8.3913
50500104	06/08/2024 21:53	*Noise*	0	0	0	0	0	0	16	NaN	51.91514	-8.3913
50500105	06/08/2024 21:53	*Soprano Pip*	45	57.4	72.9	56.5	3	60	16	NaN	51.91514	-8.39127
50500106	06/08/2024 21:54	*Noise*	1	19.8	20.1	19.2	8.5	0	16	NaN	51.91513	-8.39129
50500107	06/08/2024 21:54	*Noise*	1	25.3	26.5	24.7	6.6	0	16	NaN	51.91512	-8.39124
50500108	06/08/2024 21:54	*Noise*	0	0	0	0	0	0	16	NaN	51.91512	-8.39124
50500109	06/08/2024 21:55	*Pipistrellus pipistrellus*	23	44.2	53.2	43.5	6	100	16	NaN	51.91511	-8.39124
50500110	06/08/2024 21:55	*Pipistrellus pipistrellus*	1	14.9	15.6	14.9	4.6	0	16	NaN	51.9151	-8.39123
50500111	06/08/2024 21:56	*Pipistrellus pipistrellus*	0	0	0	0	0	0	16	NaN	51.91511	-8.39125

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500112	06/08/2024 21:56	*Noise*	0	0	0	0	0	0	16	NaN	51.91511	-8.39125
50500113	06/08/2024 21:56	*Pipistrellus pipistrellus*	0	0	0	0	0	0	16	NaN	51.9151	-8.39125
50500114	06/08/2024 21:57	*Noise*	0	0	0	0	0	0	16	NaN	51.91511	-8.39124
50500115	06/08/2024 21:57	*Noise*	0	0	0	0	0	0	16	NaN	51.91512	-8.39126
50500116_1	06/08/2024 21:58	*Noise*	2	17.1	17.8	15.7	6.2	8821	16	NaN	51.91512	-8.39126
50500116_2	06/08/2024 21:58	*Noise*	1	25	25.9	24.4	7.2	0	16	NaN	51.91512	-8.39126
50500116_3	06/08/2024 21:58	*Noise*	1	29	29.9	28.7	7.9	0	16	NaN	51.91512	-8.39126
50500117	06/08/2024 21:58	*Noise*	6	19.5	21.1	18.7	5.4	3278	16	NaN	51.91499	-8.39149
50500118	06/08/2024 21:58	*Noise*	5	20	21.5	17.8	6.8	4386	16	NaN	51.91495	-8.39124
50500119	06/08/2024 21:59	*Noise*	5	19.2	20.8	18.1	6.3	3971	16	NaN	51.91478	-8.3912

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500120_1	06/08/2024 21:59	*Noise*	1	17.7	20.1	16.2	3.9	0	16	NaN	51.91456	-8.39119
50500120_2	06/08/2024 21:59	*Noise*	1	29	32	25	5.9	0	16	NaN	51.91456	-8.39119
50500120_3	06/08/2024 21:59	*Noise*	1	32	32.9	32	6.6	0	16	NaN	51.91456	-8.39119
50500121_1	06/08/2024 22:00	*Noise*	5	23	23.8	22.1	5	3242	16	NaN	51.91445	-8.39123
50500121_2	06/08/2024 22:00	*Noise*	1	15.6	17.7	14.9	6.6	0	16	NaN	51.91445	-8.39123
50500122	06/08/2024 22:00	*Noise*	3	23.8	24.6	21.8	6.8	7166	16	NaN	51.91444	-8.39123
50500123	06/08/2024 22:00	*Noise*	3	21.9	23	21.2	10.5	1385	16	NaN	51.91419	-8.3915
50500124	06/08/2024 22:01	*Noise*	4	24.8	25.9	23.3	5.1	4833	16	NaN	51.91406	-8.39171
50500125	06/08/2024 22:01	*Noise*	6	17.6	19.2	17	6.6	2483	16	NaN	51.91385	-8.3918
50500126_1	06/08/2024 22:01	*Noise*	7	17.8	18.5	16.4	6	2895	16	NaN	51.91378	-8.39211

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500126_2	06/08/2024 22:01	*Noise*	1	26.2	28.1	25.3	3.3	0	16	NaN	51.91378	-8.39211
50500127	06/08/2024 22:02	*Noise*	1	18.6	18.9	16.8	7.9	0	16	NaN	51.91378	-8.39213
50500128	06/08/2024 22:02	*Pipistrellus pipistrellus*	0	0	0	0	0	0	16	NaN	51.91379	-8.39255
50500129	06/08/2024 22:03	*?*	0	0	0	0	0	0	16	NaN	51.91377	-8.39255
50500130	06/08/2024 22:03	*Noise*	2	17.1	18.5	16.5	4.3	1884	16	NaN	51.91378	-8.39257
50500131	06/08/2024 22:03	*Noise*	0	0	0	0	0	0	16	NaN	51.91378	-8.39252
50500132	06/08/2024 22:04	*Noise*	0	0	0	0	0	0	16	NaN	51.91379	-8.39251
50500133	06/08/2024 22:04	*Noise*	1	22.9	23.8	22.6	7.9	0	16	NaN	51.91379	-8.39252
50500134	06/08/2024 22:05	*Noise*	2	22.1	22.9	21.8	12.8	279	16	NaN	51.91379	-8.39251
50500135	06/08/2024 22:05	*Leisler's*	2	23.3	23.9	22.7	9.5	647	16	NaN	51.91379	-8.39252

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500136	06/08/2024 22:05	*Leisler's*	5	23.8	25.3	23.3	8.9	1309	16	NaN	51.91377	-8.39251
50500137_1	06/08/2024 22:06	*Noise*	1	21.4	22.3	21	13.8	0	16	NaN	51.91377	-8.39251
50500137_2	06/08/2024 22:06	*Noise*	1	37.8	40.6	32.9	2.6	0	16	NaN	51.91377	-8.39251
50500138	06/08/2024 22:06	*Noise*	3	23.8	24.9	22.5	15.9	463	16	NaN	51.91376	-8.3925
50500139_1	06/08/2024 22:07	*Noise*	2	16.6	18.9	15.7	5.2	5623	16	NaN	51.91376	-8.39249
50500139_2	06/08/2024 22:07	*Noise*	1	24.4	25.9	22.9	4.6	0	16	NaN	51.91376	-8.39249
50500140	06/08/2024 22:07	*Noise*	3	17.6	18.1	16.4	8.7	3761	16	NaN	51.91382	-8.39245
50500141	06/08/2024 22:07	*Noise*	10	18.8	19.9	17.8	5	1503	16	NaN	51.91406	-8.39243
50500142_1	06/08/2024 22:08	*Noise*	1	18.3	18.9	15.9	6.6	0	16	NaN	51.91429	-8.39233
50500142_2	06/08/2024 22:08	*Noise*	1	23.5	24.1	22.9	4.6	0	16	NaN	51.91429	-8.39233

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500143	06/08/2024 22:08	*Noise*	6	17.8	19	17	5	3190	16	NaN	51.91443	-8.39218
50500144_1	06/08/2024 22:08	*Noise*	9	21.1	22.8	18.3	5.5	1833	16	NaN	51.9146	-8.39211
50500144_2	06/08/2024 22:08	*Noise*	1	37.2	37.5	36.6	7.2	0	16	NaN	51.9146	-8.39211
50500145_1	06/08/2024 22:09	*Noise*	4	17.4	18.4	16.2	5	5849	16	NaN	51.91461	-8.39211
50500145_2	06/08/2024 22:09	*Noise*	1	22	22	21	6.6	0	16	NaN	51.91461	-8.39211
50500146_1	06/08/2024 22:09	*Noise*	3	17.3	17.7	16.8	5.5	1363	16	NaN	51.91494	-8.39201
50500146_2	06/08/2024 22:09	*Noise*	2	25.8	26.7	25.2	5.9	14421	16	NaN	51.91494	-8.39201
50500147	06/08/2024 22:10	*Noise*	3	23.9	25.2	23	4.4	3295	16	NaN	51.91511	-8.39213
50500148	06/08/2024 22:10	*Noise*	4	17.6	18.5	15.8	5.9	6480	16	NaN	51.91535	-8.39214
50500149_1	06/08/2024 22:10	*Noise*	4	17.8	18.8	16.8	7.2	4233	16	NaN	51.91557	-8.39215

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500149_2	06/08/2024 22:10	*Noise*	1	22.9	24.4	22	7.2	0	16	NaN	51.91557	-8.39215
50500150_1	06/08/2024 22:11	*Leisler's*	3	17.4	18.8	15.7	7.9	2507	16	NaN	51.91577	-8.39217
50500150_2	06/08/2024 22:11	*Leisler's*	1	21.7	23.2	21	18.4	0	16	NaN	51.91577	-8.39217
50500150_3	06/08/2024 22:11	*Leisler's*	1	25	25.3	24.4	4.6	0	16	NaN	51.91577	-8.39217
50500151_1	06/08/2024 22:11	*Noise*	3	21.9	23.6	20.7	5.7	5357	16	NaN	51.91597	-8.39222
50500151_2	06/08/2024 22:11	*Noise*	2	26.7	27.6	26.2	4.9	4299	16	NaN	51.91597	-8.39222
50500151_3	06/08/2024 22:11	*Noise*	1	16.8	18.9	15.6	2.6	0	16	NaN	51.91597	-8.39222
50500151_4	06/08/2024 22:11	*Noise*	1	33.6	34.5	33.2	4.6	0	16	NaN	51.91597	-8.39222
50500152	06/08/2024 22:12	*Noise*	4	28.2	28.8	25.9	4.9	2839	16	NaN	51.91599	-8.39224
50500153	06/08/2024 22:12	*Noise*	1	21	21.7	20.7	4.6	0	16	NaN	51.91579	-8.39245

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500154_1	06/08/2024 22:12	*Noise*	1	19.2	20.1	16.5	4.6	0	16	NaN	51.91557	-8.39247
50500154_2	06/08/2024 22:12	*Noise*	1	26.8	27.8	26.5	4.6	0	16	NaN	51.91557	-8.39247
50500155_1	06/08/2024 22:13	*Noise*	4	37.2	37.4	36.1	12.3	3760	16	NaN	51.91535	-8.39246
50500155_2	06/08/2024 22:13	*Noise*	2	19.2	19.7	17.4	3.9	14485	16	NaN	51.91535	-8.39246
50500156_1	06/08/2024 22:13	*Noise*	2	37.2	37.4	33.6	16.1	1330	16	NaN	51.91513	-8.3926
50500156_2	06/08/2024 22:13	*Noise*	1	16.5	17.4	16.2	6.6	0	16	NaN	51.91513	-8.3926
50500156_3	06/08/2024 22:13	*Noise*	1	22	22.9	20.1	3.9	0	16	NaN	51.91513	-8.3926
50500156_4	06/08/2024 22:13	*Noise*	1	25.9	29	25.6	3.9	0	16	NaN	51.91513	-8.3926
50500157	06/08/2024 22:14	*Noise*	2	17.2	17.5	16.5	5.6	2398	16	NaN	51.915	-8.39277
50500158_1	06/08/2024 22:14	*Noise*	2	21.7	22.6	20.4	4.3	8435	16	NaN	51.91503	-8.393

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500158_2	06/08/2024 22:14	*Noise*	2	37.2	37.8	33.2	7.2	1207	16	NaN	51.91503	-8.393
50500159_1	06/08/2024 22:14	*Noise*	3	16	17.8	15.1	8.1	8833	16	NaN	51.91502	-8.39304
50500159_2	06/08/2024 22:14	*Noise*	3	37.1	37.4	36.7	5.7	6562	16	NaN	51.91502	-8.39304
50500159_3	06/08/2024 22:14	*Noise*	2	28.7	30.7	27.5	5.9	501	16	NaN	51.91502	-8.39304
50500160	06/08/2024 22:15	*Noise*	0	0	0	0	0	0	16	NaN	51.91474	-8.39332
50500161	06/08/2024 22:15	*Soprano Pip*	2	16.2	17.2	15.3	5.9	8591	16	NaN	51.91462	-8.39306
50500162	06/08/2024 22:16	*Noise*	0	0	0	0	0	0	16	NaN	51.91464	-8.39319
50500163	06/08/2024 22:16	*Noise*	0	0	0	0	0	0	16	NaN	51.91463	-8.39327
50500164	06/08/2024 22:16	*Noise*	0	0	0	0	0	0	16	NaN	51.91463	-8.39333
50500165	06/08/2024 22:17	*Noise*	0	0	0	0	0	0	16	NaN	51.91462	-8.39343

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500166	06/08/2024 22:17	*Noise*	1	26.5	27.1	22.9	2.6	0	16	NaN	51.91462	-8.39343
50500167	06/08/2024 22:17	?	10	31	34.6	28.9	3	110	16	NaN	51.91459	-8.39363
50500168	06/08/2024 22:18	*Noise*	0	0	0	0	0	0	16	NaN	51.91459	-8.39367
50500169	06/08/2024 22:18	*Noise*	0	0	0	0	0	0	16	NaN	51.9146	-8.39363
50500170	06/08/2024 22:19	*Noise*	1	26.5	26.8	26.2	5.9	0	16	NaN	51.9146	-8.39355
50500171	06/08/2024 22:19	*Noise*	0	0	0	0	0	0	16	NaN	51.91459	-8.39351
50500172	06/08/2024 22:19	*Noise*	0	0	0	0	0	0	16	NaN	51.91456	-8.39332
50500173	06/08/2024 22:20	*Noise*	0	0	0	0	0	0	16	NaN	51.91459	-8.39338
50500174_1	06/08/2024 22:20	*Noise*	2	16.3	20.3	15.1	5.9	6824	16	NaN	51.91459	-8.39333
50500174_2	06/08/2024 22:20	*Noise*	1	23.8	24.4	21.7	7.2	0	16	NaN	51.91459	-8.39333

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500174_3	06/08/2024 22:20	*Noise*	1	29	29.3	28.1	4.6	0	16	NaN	51.91459	-8.39333
50500175_1	06/08/2024 22:21	*Noise*	3	15.9	17.2	15	4.6	3036	16	NaN	51.91445	-8.39354
50500175_2	06/08/2024 22:21	*Noise*	1	25	25.9	23.8	4.6	0	16	NaN	51.91445	-8.39354
50500175_3	06/08/2024 22:21	*Noise*	1	30.8	31.4	29.6	2	0	16	NaN	51.91445	-8.39354
50500176	06/08/2024 22:21	*Noise*	2	23.6	24.2	22.9	4.6	15569	16	NaN	51.91423	-8.3939
50500177_1	06/08/2024 22:21	*Noise*	2	22.7	27.6	19.7	5.2	6427	16	NaN	51.91401	-8.39412
50500177_2	06/08/2024 22:21	*Noise*	1	15.9	16.5	14.9	5.9	0	16	NaN	51.91401	-8.39412
50500178_1	06/08/2024 22:22	*Pipistrellus pipistrellus*	4	47.1	55.1	46.6	3	678	16	NaN	51.91386	-8.39439
50500178_2	06/08/2024 22:22	*Pipistrellus pipistrellus*	2	16.6	17.4	16.2	4.6	9625	16	NaN	51.91386	-8.39439

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500178_3	06/08/2024 22:22	*Pipistrellus pipistrellus*	2	27.6	29.4	25.8	4.6	2762	16	NaN	51.91386	-8.39439
50500179	06/08/2024 22:22	*Noise*	3	16.8	18.3	15.6	4.4	7504	16	NaN	51.91387	-8.3949
50500180	06/08/2024 22:23	*Pipistrellus pipistrellus*	14	46.4	61	45.8	5	95	16	NaN	51.91388	-8.39534
50500181_1	06/08/2024 22:23	*Noise*	3	17.4	21.4	17	4.4	6631	16	NaN	51.91397	-8.39578
50500181_2	06/08/2024 22:23	*Noise*	1	22	22.6	21.4	4.6	0	16	NaN	51.91397	-8.39578
50500181_3	06/08/2024 22:23	*Noise*	1	29	29.6	28.4	5.2	0	16	NaN	51.91397	-8.39578
50500182	06/08/2024 22:23	*Noise*	1	15.3	15.6	14.9	4.6	0	16	NaN	51.91398	-8.39582
50500183_1	06/08/2024 22:24	*Myotis spec.*	1	23.2	25.6	22.6	10.5	0	16	NaN	51.91404	-8.39621
50500183_2	06/08/2024 22:24	*?*	1	37.2	37.5	36.9	12.5	0	16	NaN	51.91404	-8.39621

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500184_1	06/08/2024 22:24	*Pipistrellus pipistrellus*	37	48.1	71.8	47.4	5	90	16	NaN	51.91402	-8.39622
50500184_2	06/08/2024 22:24	*Pipistrellus pipistrellus*	3	28.9	47.9	24.3	4	125	16	NaN	51.91402	-8.39622
50500185	06/08/2024 22:25	*Myotis spec.*	0	0	0	0	0	0	16	NaN	51.91402	-8.39623
50500186	06/08/2024 22:25	*Myotis spec.*	7	24.7	25.9	23.7	10.4	400	16	NaN	51.91401	-8.39622
50500187_1	06/08/2024 22:25	*Myotis spec.*	1	14.9	16.2	14.9	12.5	0	16	NaN	51.914	-8.3962
50500187_2	06/08/2024 22:25	*Myotis spec.*	1	23.2	23.8	22.6	13.8	0	16	NaN	51.914	-8.3962
50500187_3	06/08/2024 22:25	*Myotis spec.*	1	29.6	30.2	27.5	5.2	0	16	NaN	51.914	-8.3962
50500188	06/08/2024 22:26	*Myotis spec.*	1	14.9	16.8	14.9	5.2	0	16	NaN	51.914	-8.39617
50500189	06/08/2024 22:26	*?*	1	33.2	33.6	31.4	2	0	16	NaN	51.91401	-8.39622

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500190	06/08/2024 22:26	*Myotis spec.*	0	0	0	0	0	0	17	NaN	51.91402	-8.39623
50500191_1	06/08/2024 22:27	*Myotis spec.*	6	21.8	22.2	21.2	10	1516	17	NaN	51.91402	-8.39623
50500191_2	06/08/2024 22:27	*Myotis spec.*	1	37.8	41.5	32.3	2.6	0	17	NaN	51.91402	-8.39623
50500192	06/08/2024 22:27	*Myotis spec.*	0	0	0	0	0	0	17	NaN	51.91403	-8.39626
50500193	06/08/2024 22:28	*Myotis spec.*	5	52.5	55.1	51.5	8	233	16	NaN	51.91403	-8.39625
50500194	06/08/2024 22:28	*Myotis spec.*	7	22	22.8	21.2	10.5	847	16	NaN	51.91404	-8.39623
50500195	06/08/2024 22:28	*Noise*	1	17.4	18.3	17.1	5.9	0	16	NaN	51.91405	-8.39623
50500196_1	06/08/2024 22:29	*Noise*	3	47.5	56.3	47	4.4	166	16	NaN	51.91406	-8.39656
50500196_2	06/08/2024 22:29	*Noise*	2	27.3	27.8	26.2	4.6	5507	16	NaN	51.91406	-8.39656
50500196_3	06/08/2024 22:29	*Noise*	1	16.5	19.8	15.6	3.9	0	16	NaN	51.91406	-8.39656

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500197_1	06/08/2024 22:29	*Noise*	6	20.3	21.2	18.9	5	1912	16	NaN	51.91392	-8.39687
50500197_2	06/08/2024 22:29	*Noise*	1	28.1	28.4	27.8	6.6	0	16	NaN	51.91392	-8.39687
50500198_1	06/08/2024 22:30	*Noise*	3	18.5	19.9	17	5.7	6255	16	NaN	51.91395	-8.39723
50500198_2	06/08/2024 22:30	*Noise*	1	30.2	30.5	28.7	5.9	0	16	NaN	51.91395	-8.39723
50500199_1	06/08/2024 22:30	*Noise*	3	17.6	19	16.7	6.1	4788	16	NaN	51.91398	-8.39762
50500199_2	06/08/2024 22:30	*Noise*	2	22.9	23.3	22.3	4.9	6871	16	NaN	51.91398	-8.39762
50500199_3	06/08/2024 22:30	*Noise*	1	28.4	28.7	27.1	7.9	0	16	NaN	51.91398	-8.39762
50500200_1	06/08/2024 22:30	*Noise*	5	19.3	20.3	18.5	5	3549	16	NaN	51.91399	-8.39766
50500200_2	06/08/2024 22:30	*Noise*	3	27.1	28.1	25.5	6.8	3938	16	NaN	51.91399	-8.39766
50500201_1	06/08/2024 22:31	*Noise*	3	23.9	24.7	23.1	5.7	4229	16	NaN	51.91401	-8.39841

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500201_2	06/08/2024 22:31	*Noise*	2	18	21.5	17.7	9.5	5548	16	NaN	51.91401	-8.39841
50500202_1	06/08/2024 22:31	*Noise*	3	20.5	22.3	19.5	5.5	2456	16	NaN	51.91403	-8.39884
50500202_2	06/08/2024 22:31	*Noise*	1	15.3	16.5	14.9	4.6	0	16	NaN	51.91403	-8.39884
50500203_1	06/08/2024 22:32	*Noise*	4	24.9	25.7	23.9	5	890	16	NaN	51.91402	-8.39887
50500203_2	06/08/2024 22:32	*Noise*	2	17.1	17.5	16.6	4.6	2371	16	NaN	51.91402	-8.39887
50500204	06/08/2024 22:32	*Noise*	0	0	0	0	0	0	16	NaN	51.91403	-8.39933
50500205	06/08/2024 22:32	*Noise*	1	24.1	24.4	22.9	4.6	0	16	NaN	51.91404	-8.39942
50500206	06/08/2024 22:33	*?*	1	28.7	31.1	28.1	3.3	0	16	NaN	51.91401	-8.39948
50500207	06/08/2024 22:33	*Noise*	1	20.7	21.4	20.4	4.6	0	16	NaN	51.914	-8.39942
50500208_1	06/08/2024 22:34	*Noise*	4	57.2	61.2	56.4	3.9	1200	16	NaN	51.91399	-8.39939

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500208_2	06/08/2024 22:34	*Noise*	1	15.9	18.9	14.9	3.3	0	16	NaN	51.91399	-8.39939
50500209_1	06/08/2024 22:34	*Noise*	2	17.8	18.3	16.3	5.9	6849	16	NaN	51.91399	-8.39938
50500209_2	06/08/2024 22:34	*Noise*	2	29	36.4	26.4	3.6	18055	16	NaN	51.91399	-8.39938
50500210	06/08/2024 22:34	*Soprano Pip*	6	57.6	68.4	56.7	5	70	16	NaN	51.91405	-8.39929
50500211	06/08/2024 22:35	*Noise*	1	16.2	16.5	14.9	5.2	0	16	NaN	51.91411	-8.39934
50500212	06/08/2024 22:35	*Noise*	1	15.3	15.6	14.9	5.2	0	16	NaN	51.91404	-8.39934
50500213	06/08/2024 22:35	*Noise*	1	18	26.2	14.9	2.6	0	16	NaN	51.91404	-8.39933
50500214	06/08/2024 22:36	*Noise*	1	28.7	33.9	24.4	2.6	0	16	NaN	51.91403	-8.39933
50500215	06/08/2024 22:36	*Noise*	0	0	0	0	0	0	16	NaN	51.91407	-8.39938
50500216	06/08/2024 22:37	*Noise*	0	0	0	0	0	0	16	NaN	51.91403	-8.39936

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500217_1	06/08/2024 22:37	*Noise*	3	27.1	28.3	26.6	4.4	3760	16	NaN	51.91403	-8.39934
50500217_2	06/08/2024 22:37	*Noise*	2	16.6	17.4	16.2	5.2	545	16	NaN	51.91403	-8.39934
50500217_3	06/08/2024 22:37	*Noise*	2	21.7	22.1	19.1	4.9	147	16	NaN	51.91403	-8.39934
50500218_1	06/08/2024 22:37	*Noise*	5	18	18.9	17.3	5	4694	16	NaN	51.91392	-8.39938
50500218_2	06/08/2024 22:37	*Noise*	1	23.8	24.7	23.5	4.6	0	16	NaN	51.91392	-8.39938
50500219_1	06/08/2024 22:38	*Noise*	4	16.9	18.1	15.3	7.2	4589	16	NaN	51.91373	-8.39932
50500219_2	06/08/2024 22:38	*Noise*	1	21	23.5	18.6	8.5	0	16	NaN	51.91373	-8.39932
50500219_3	06/08/2024 22:38	*Noise*	1	30.2	31.1	25.9	4.6	0	16	NaN	51.91373	-8.39932
50500220_1	06/08/2024 22:38	*Noise*	6	16.2	17.4	15.4	5	2035	16	NaN	51.91355	-8.39929
50500220_2	06/08/2024 22:38	*Noise*	2	24.1	24.7	23.5	4.9	11257	16	NaN	51.91355	-8.39929

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500221_1	06/08/2024 22:39	*Noise*	4	19.4	20.5	17.5	5.9	5939	16	NaN	51.91346	-8.39937
50500221_2	06/08/2024 22:39	*Noise*	2	30.2	31.7	29.4	4.3	12702	16	NaN	51.91346	-8.39937
50500221_3	06/08/2024 22:39	*Noise*	1	24.1	25.3	23.2	9.8	0	16	NaN	51.91346	-8.39937
50500222	06/08/2024 22:39	*Noise*	4	21	22	20.7	5	2948	16	NaN	51.91326	-8.39929
50500223_1	06/08/2024 22:39	*Noise*	4	22.3	23.3	20	5.7	4094	16	NaN	51.91312	-8.39944
50500223_2	06/08/2024 22:39	*Noise*	2	29.3	31	28.1	4.3	60	16	NaN	51.91312	-8.39944
50500223_3	06/08/2024 22:39	*Noise*	1	33.2	33.6	32	7.9	0	16	NaN	51.91312	-8.39944
50500224_1	06/08/2024 22:40	*Noise*	5	24.9	26.7	23.7	4.7	2398	16	NaN	51.91309	-8.39947
50500224_2	06/08/2024 22:40	*Noise*	2	18.3	18.6	16.8	4.3	4211	16	NaN	51.91309	-8.39947
50500224_3	06/08/2024 22:40	*Noise*	1	31.4	32.6	30.5	2	0	16	NaN	51.91309	-8.39947

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500225_1	06/08/2024 22:40	*Noise*	6	55.1	58.3	53.8	5	1611	16	NaN	51.91276	-8.39973
50500225_2	06/08/2024 22:40	*Noise*	2	25.5	26.8	25	4.9	1749	16	NaN	51.91276	-8.39973
50500225_3	06/08/2024 22:40	*Noise*	1	21.4	22.6	21	5.2	0	16	NaN	51.91276	-8.39973
50500226_1	06/08/2024 22:41	*Soprano Pip*	4	54.4	55.7	53.3	5.9	379	16	NaN	51.91253	-8.39975
50500226_2	06/08/2024 22:41	*Soprano Pip*	3	19.1	19.9	17.9	5.5	627	16	NaN	51.91253	-8.39975
50500227	06/08/2024 22:41	*Noise*	0	0	0	0	0	0	16	NaN	51.91233	-8.39966
50500228	06/08/2024 22:41	*Noise*	1	15.9	16.2	14.9	9.2	0	16	NaN	51.91228	-8.39962
50500229	06/08/2024 22:42	*Noise*	0	0	0	0	0	0	16	NaN	51.91227	-8.39963
50500230_1	06/08/2024 22:42	*?*	3	16.7	18.2	16.5	6.8	6666	16	NaN	51.91225	-8.39961
50500230_2	06/08/2024 22:42	*?*	2	54.6	57.3	54.1	3.9	19046	16	NaN	51.91225	-8.39961

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500231	06/08/2024 22:43	*Noise*	0	0	0	0	0	0	16	NaN	51.91225	-8.39961
50500232_1	06/08/2024 22:43	*Noise*	1	15.9	16.2	14.9	4.6	0	16	NaN	51.91225	-8.39961
50500232_2	06/08/2024 22:43	*Noise*	1	23.8	25.9	21.7	4.6	0	16	NaN	51.91225	-8.39961
50500233_1	06/08/2024 22:43	*Noise*	1	18	18.6	17.1	15.7	0	16	NaN	51.91225	-8.39961
50500233_2	06/08/2024 22:43	*Noise*	1	32.6	33.6	28.7	1.3	0	16	NaN	51.91225	-8.39961
50500234	06/08/2024 22:44	*Pipistrellus pipistrellus*	20	46.7	54.8	46	5	100	16	NaN	51.91224	-8.39951
50500235	06/08/2024 22:44	*Noise*	1	18.3	18.6	17.4	9.8	0	16	NaN	51.91224	-8.39952
50500236	06/08/2024 22:44	*?*	1	21.7	22.6	21.4	4.6	0	17	NaN	51.91224	-8.3995
50500237	06/08/2024 22:45	*Noise*	0	0	0	0	0	0	17	NaN	51.91224	-8.39951
50500238	06/08/2024 22:45	*Noise*	0	0	0	0	0	0	17	NaN	51.91224	-8.39953

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500239_1	06/08/2024 22:46	*Noise*	7	55.5	57.7	55.1	5.1	334	17	NaN	51.91225	-8.39953
50500239_2	06/08/2024 22:46	*Noise*	1	20.4	20.7	19.8	4.6	0	17	NaN	51.91225	-8.39953
50500240_1	06/08/2024 22:46	*Noise*	5	18.3	19.2	17.1	5	2493	17	NaN	51.91225	-8.39953
50500240_2	06/08/2024 22:46	*Noise*	1	25.3	25.6	25	4.6	0	17	NaN	51.91225	-8.39953
50500241_1	06/08/2024 22:46	*Noise*	5	27.3	28.2	26.6	5	4190	17	NaN	51.91227	-8.3993
50500241_2	06/08/2024 22:46	*Noise*	1	20.7	20.7	19.5	5.2	0	17	NaN	51.91227	-8.3993
50500242_1	06/08/2024 22:47	*Noise*	3	30.3	31.2	29.1	4.4	6368	16	NaN	51.91231	-8.39884
50500242_2	06/08/2024 22:47	*Noise*	1	18	18.9	17.7	7.2	0	16	NaN	51.91231	-8.39884
50500242_3	06/08/2024 22:47	*Noise*	1	24.7	25.3	21.4	7.9	0	16	NaN	51.91231	-8.39884
50500243_1	06/08/2024 22:47	*Noise*	4	24.8	25.8	23.7	6.1	6595	16	NaN	51.91228	-8.39838

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500243_2	06/08/2024 22:47	*Noise*	1	17.4	18.6	14.9	6.6	0	16	NaN	51.91228	-8.39838
50500244	06/08/2024 22:48	*Noise*	9	20.6	22.1	19.5	5	2044	16	NaN	51.91228	-8.39788
50500245	06/08/2024 22:48	*Noise*	5	25.9	26.8	24.8	5	4043	16	NaN	51.91227	-8.39743
50500246_1	06/08/2024 22:48	*Noise*	2	20.7	22	20	5.6	12009	16	NaN	51.91223	-8.39702
50500246_2	06/08/2024 22:48	*Noise*	1	26.2	27.5	25.9	7.9	0	16	NaN	51.91223	-8.39702
50500247_1	06/08/2024 22:49	*Noise*	3	25.9	27.7	24.6	6.6	2735	16	NaN	51.91215	-8.3972
50500247_2	06/08/2024 22:49	*Noise*	1	17.4	18.3	17.1	4.6	0	16	NaN	51.91215	-8.3972
50500248_1	06/08/2024 22:49	*Noise*	2	22.9	24.1	22.3	5.6	2585	16	NaN	51.91211	-8.39752
50500248_2	06/08/2024 22:49	*Noise*	2	31.6	32.2	30.7	4.6	1285	16	NaN	51.91211	-8.39752
50500248_3	06/08/2024 22:49	*Noise*	1	16.5	16.8	15.9	4.6	0	16	NaN	51.91211	-8.39752

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500248_4	06/08/2024 22:49	*Noise*	1	27.5	27.8	26.2	6.6	0	16	NaN	51.91211	-8.39752
50500249_1	06/08/2024 22:50	*Noise*	6	23.1	24.2	21.6	6	1612	16	NaN	51.91209	-8.39789
50500249_2	06/08/2024 22:50	*Noise*	1	30.5	30.8	28.7	5.2	0	16	NaN	51.91209	-8.39789
50500250	06/08/2024 22:50	*Noise*	1	22.3	22.9	21.7	7.2	0	16	NaN	51.91208	-8.39833
50500251	06/08/2024 22:50	*Noise*	4	20.7	21.8	19.1	5.6	5616	16	NaN	51.91209	-8.39875
50500252_1	06/08/2024 22:51	*Noise*	3	19.8	21.8	19	3.9	4705	16	NaN	51.91207	-8.39922
50500252_2	06/08/2024 22:51	*Noise*	3	24	25.1	23.1	5.9	5334	16	NaN	51.91207	-8.39922
50500252_3	06/08/2024 22:51	*Noise*	1	30.5	31.4	30.2	5.9	0	16	NaN	51.91207	-8.39922
50500253_1	06/08/2024 22:51	*Noise*	2	16.6	17.7	15.9	5.9	5839	16	NaN	51.91191	-8.39935
50500253_2	06/08/2024 22:51	*Noise*	2	22.6	24.6	21.2	4.9	9614	16	NaN	51.91191	-8.39935

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500253_3	06/08/2024 22:51	*Noise*	1	31.1	32.3	29.9	4.6	0	16	NaN	51.91191	-8.39935
50500254_1	06/08/2024 22:52	*Noise*	4	19.9	21.2	19.1	4.3	3705	16	NaN	51.91171	-8.39911
50500254_2	06/08/2024 22:52	*Noise*	2	24.6	25.6	23.6	7.5	12928	16	NaN	51.91171	-8.39911
50500254_3	06/08/2024 22:52	*Noise*	1	28.1	29	27.8	4.6	0	16	NaN	51.91171	-8.39911
50500255	06/08/2024 22:52	*Noise*	3	16.9	18.4	16.1	7.4	8681	16	NaN	51.9115	-8.39884
50500256_1	06/08/2024 22:52	*Noise*	1	18	18.9	17.1	5.9	0	16	NaN	51.91148	-8.39882
50500256_2	06/08/2024 22:52	*Noise*	1	24.1	25.3	22.6	6.6	0	16	NaN	51.91148	-8.39882
50500257_1	06/08/2024 22:53	*Noise*	8	53	63.6	52.5	5	80	16	NaN	51.9111	-8.39832
50500257_2	06/08/2024 22:53	*Soprano Pip*	1	15.3	16.8	14.9	5.9	0	16	NaN	51.9111	-8.39832
50500258	06/08/2024 22:53	*Soprano Pip*	41	53.1	65.4	52.6	5	85	16	NaN	51.91108	-8.39831

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500259	06/08/2024 22:53	*Noise*	0	0	0	0	0	0	16	NaN	51.91086	-8.39814
50500260	06/08/2024 22:54	*Noise*	0	0	0	0	0	0	16	NaN	51.91085	-8.39816
50500261_1	06/08/2024 22:54	*Noise*	1	18.3	23.8	16.5	2.6	0	16	NaN	51.91084	-8.39815
50500261_2	06/08/2024 22:54	*Noise*	1	23.8	24.7	23.5	4.6	0	16	NaN	51.91084	-8.39815
50500262_1	06/08/2024 22:55	*Noise*	1	18.6	20.4	18	6.6	0	16	NaN	51.91086	-8.39814
50500262_2	06/08/2024 22:55	*Noise*	1	22.3	23.2	22	4.6	0	16	NaN	51.91086	-8.39814
50500263	06/08/2024 22:55	*Noise*	1	23.5	24.4	19.5	3.3	0	16	NaN	51.91083	-8.39812
50500264	06/08/2024 22:55	*Noise*	0	0	0	0	0	0	17	NaN	51.91085	-8.39812
50500265_1	06/08/2024 22:56	*?*	1	16.8	18.3	15.9	4.6	0	17	NaN	51.91084	-8.39812
50500265_2	06/08/2024 22:56	*?*	1	21	22	20.4	24.2	0	17	NaN	51.91084	-8.39812

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500265_3	06/08/2024 22:56	?	1	28.4	31.1	23.5	3.3	0	17	NaN	51.91084	-8.39812
50500266	06/08/2024 22:56	?	0	0	0	0	0	0	17	NaN	51.91087	-8.39812
50500267	06/08/2024 22:57	*Noise*	1	24.1	24.7	23.5	4.6	0	17	NaN	51.91087	-8.39812
50500268	06/08/2024 22:57	*Noise*	0	0	0	0	0	0	17	NaN	51.91088	-8.39812
50500269	06/08/2024 22:57	*Noise*	0	0	0	0	0	0	17	NaN	51.91087	-8.39813
50500270_1	06/08/2024 22:58	*Noise*	3	27	28.4	24.6	5.2	7325	17	NaN	51.91085	-8.39812
50500270_2	06/08/2024 22:58	*Noise*	1	17.7	18.9	17.1	4.6	0	17	NaN	51.91085	-8.39812
50500270_3	06/08/2024 22:58	*Noise*	1	34.2	35.1	32.3	5.9	0	17	NaN	51.91085	-8.39812
50500271_1	06/08/2024 22:58	*Noise*	3	19	20.2	18	8.7	4680	16	NaN	51.91088	-8.39785
50500271_2	06/08/2024 22:58	*Noise*	1	25.3	25.9	24.7	7.9	0	16	NaN	51.91088	-8.39785

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500271_3	06/08/2024 22:58	*Noise*	1	28.4	29.3	28.1	4.6	0	16	NaN	51.91088	-8.39785
50500271_4	06/08/2024 22:58	*Noise*	1	33.2	33.9	31.7	7.2	0	16	NaN	51.91088	-8.39785
50500272_1	06/08/2024 22:59	*Noise*	3	27.7	28.2	26	5	6657	16	NaN	51.91092	-8.3974
50500272_2	06/08/2024 22:59	*Noise*	1	19.5	20.1	18.6	6.6	0	16	NaN	51.91092	-8.3974
50500273	06/08/2024 22:59	*Noise*	4	26.4	27.5	25.6	6.1	5480	16	NaN	51.91097	-8.39699
50500274_1	06/08/2024 22:59	*Noise*	1	17.7	19.5	17.1	3.9	0	16	NaN	51.91099	-8.39658
50500274_2	06/08/2024 22:59	*Noise*	1	31.1	31.7	29.6	5.2	0	16	NaN	51.91099	-8.39658
50500275_1	06/08/2024 23:00	*Pipistrellus pipistrellus*	8	46.2	49.9	45.6	6	314	16	NaN	51.91105	-8.39619
50500275_2	06/08/2024 23:00	*Pipistrellus pipistrellus*	2	19.2	19.7	17.2	6.9	15816	16	NaN	51.91105	-8.39619

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500275_3	06/08/2024 23:00	*Pipistrellus pipistrellus*	2	25.3	25.9	24.4	4.9	10242	16	NaN	51.91105	-8.39619
50500276	06/08/2024 23:00	*Noise*	1	18	19.2	17.7	5.2	0	16	NaN	51.9111	-8.39577
50500277_1	06/08/2024 23:01	*Noise*	5	37.1	37.6	36.6	7	2866	16	NaN	51.9112	-8.39553
50500277_2	06/08/2024 23:01	*?*	4	21.5	22.3	20.1	7	1805	16	NaN	51.9112	-8.39553
50500277_3	06/08/2024 23:01	*Noise*	1	16.2	16.2	14.9	7.2	0	16	NaN	51.9112	-8.39553
50500277_4	06/08/2024 23:01	*Noise*	1	28.4	29.9	28.1	4.6	0	16	NaN	51.9112	-8.39553
50500277_5	06/08/2024 23:01	*Noise*	1	50.3	50.6	49.7	15.7	0	16	NaN	51.9112	-8.39553
50500278_1	06/08/2024 23:01	*Noise*	4	22.9	24.4	22	6.7	4887	16	NaN	51.9115	-8.39551
50500278_2	06/08/2024 23:01	*Noise*	1	29.9	30.8	29.3	6.6	0	16	NaN	51.9115	-8.39551
50500279_1	06/08/2024 23:01	*Pipistrellus*	72	46.7	61.7	45.8	5	90	16	NaN	51.9118	-8.39546

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pipistrellus										
50500279_2	06/08/2024 23:01	*Pipistrellus pipistrellus*	1	33.2	34.8	32.9	2	0	16	NaN	51.9118	-8.39546
50500279_3	06/08/2024 23:01	*Pipistrellus pipistrellus*	1	54.9	64.1	47	2	0	16	NaN	51.9118	-8.39546
50500280	06/08/2024 23:02	*Noise*	0	0	0	0	0	0	16	NaN	51.91194	-8.39545
50500281_1	06/08/2024 23:02	*Noise*	1	17.1	17.4	16.8	4.6	0	16	NaN	51.91196	-8.39544
50500281_2	06/08/2024 23:02	*Noise*	1	23.2	24.4	19.2	3.9	0	16	NaN	51.91196	-8.39544
50500282	06/08/2024 23:03	*Noise*	0	0	0	0	0	0	16	NaN	51.91196	-8.39543
50500283	06/08/2024 23:03	*Noise*	1	15.3	25	14.9	2.6	0	16	NaN	51.91196	-8.39542
50500284	06/08/2024 23:03	*Noise*	0	0	0	0	0	0	16	NaN	51.91197	-8.39541
50500285	06/08/2024 23:04	*?*	0	0	0	0	0	0	16	NaN	51.91197	-8.39542

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500286	06/08/2024 23:04	*Noise*	0	0	0	0	0	0	16	NaN	51.91195	-8.39544
50500287	06/08/2024 23:04	?	0	0	0	0	0	0	16	NaN	51.91194	-8.39544
50500288	06/08/2024 23:05	*Noise*	1	15.3	15.6	14.9	5.2	0	16	NaN	51.91195	-8.39546
50500289	06/08/2024 23:05	*Noise*	1	26.5	27.8	25	2.6	0	16	NaN	51.91195	-8.39546
50500290	06/08/2024 23:06	*Noise*	3	17	18.1	15.6	4.4	327	16	NaN	51.91195	-8.39546
50500291_1	06/08/2024 23:06	*Noise*	4	37.2	37.6	36.6	8.2	4793	16	NaN	51.91195	-8.39546
50500291_2	06/08/2024 23:06	*Noise*	2	17.7	19.4	15.7	5.2	907	16	NaN	51.91195	-8.39546
50500291_3	06/08/2024 23:06	*Noise*	2	25	26.1	23	7.5	4091	16	NaN	51.91195	-8.39546
50500292_1	06/08/2024 23:06	*Noise*	7	37.1	37.4	36.3	5	2599	16	NaN	51.9116	-8.39542
50500292_2	06/08/2024 23:06	*Noise*	3	18.2	19.5	17.1	7	5108	16	NaN	51.9116	-8.39542

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500293_1	06/08/2024 23:07	*Noise*	4	17.9	18.5	17.3	7.4	3738	16	NaN	51.91135	-8.39544
50500293_2	06/08/2024 23:07	*Noise*	3	37	37.4	35.7	9.4	1741	16	NaN	51.91135	-8.39544
50500294_1	06/08/2024 23:07	*Noise*	12	37.1	37.4	35.3	20	1348	16	NaN	51.91108	-8.39529
50500294_2	06/08/2024 23:07	*?*	1	16.2	16.5	14.9	8.5	0	16	NaN	51.91108	-8.39529
50500295_1	06/08/2024 23:08	*Noise*	2	37.2	38	34.9	25.2	3473	16	NaN	51.91099	-8.3955
50500295_2	06/08/2024 23:08	*Noise*	1	15.9	16.2	15.3	6.6	0	16	NaN	51.91099	-8.3955
50500295_3	06/08/2024 23:08	*Noise*	1	22.6	23.2	22.3	5.9	0	16	NaN	51.91099	-8.3955
50500295_4	06/08/2024 23:08	*Noise*	1	31.7	32.6	31.1	4.6	0	16	NaN	51.91099	-8.3955
50500296	06/08/2024 23:08	*Noise*	4	18.3	21.6	16.4	3.9	3941	16	NaN	51.91093	-8.39592
50500297_1	06/08/2024 23:08	*Noise*	8	37.1	37.6	35.5	11.4	1828	16	NaN	51.91091	-8.39626

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500297_2	06/08/2024 23:08	*Noise*	1	16.2	16.5	14.9	22.3	0	16	NaN	51.91091	-8.39626
50500297_3	06/08/2024 23:08	?	1	29	29.6	26.8	9.8	0	16	NaN	51.91091	-8.39626
50500298_1	06/08/2024 23:09	*Noise*	2	20.7	22.9	19.1	5.9	8863	16	NaN	51.91087	-8.39666
50500298_2	06/08/2024 23:09	*Noise*	1	31.1	33.2	30.5	2	0	16	NaN	51.91087	-8.39666
50500298_3	06/08/2024 23:09	*Noise*	1	36.3	36.6	35.1	6.6	0	16	NaN	51.91087	-8.39666
50500299	06/08/2024 23:09	*Noise*	1	37.2	37.8	28.1	21	0	16	NaN	51.91085	-8.39699
50500300_1	06/08/2024 23:10	*Noise*	4	17.3	18.8	16.2	5	3024	16	NaN	51.91083	-8.39712
50500300_2	06/08/2024 23:10	*Noise*	1	22.3	23.8	21.7	9.8	0	16	NaN	51.91083	-8.39712
50500301_1	06/08/2024 23:10	*Noise*	2	31.4	34.6	29.6	1.6	2874	16	NaN	51.91081	-8.39736
50500301_2	06/08/2024 23:10	*Noise*	1	15.3	16.5	14.9	6.6	0	16	NaN	51.91081	-8.39736

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500301_3	06/08/2024 23:10	*Noise*	1	26.5	27.8	25.3	6.6	0	16	NaN	51.91081	-8.39736
50500302_1	06/08/2024 23:10	*Pipistrellus pipistrellus*	6	45.6	50.9	44.4	3	402	16	NaN	51.9108	-8.39739
50500302_2	06/08/2024 23:10	*Pipistrellus pipistrellus*	1	27.8	29	23.5	2.6	0	16	NaN	51.9108	-8.39739
50500302_3	06/08/2024 23:10	*Pipistrellus pipistrellus*	1	31.1	33.6	29.3	2	0	16	NaN	51.9108	-8.39739
50500303_1	06/08/2024 23:11	*Noise*	4	44.5	48	43.9	4.4	1866	16	NaN	51.91071	-8.39766
50500303_2	06/08/2024 23:11	*Noise*	3	17.2	18.8	16	7	2165	16	NaN	51.91071	-8.39766
50500303_3	06/08/2024 23:11	*Noise*	1	54.3	57.3	54	3.9	0	16	NaN	51.91071	-8.39766
50500304_1	06/08/2024 23:11	*?*	4	19.7	21.4	17.2	3	1696	16	NaN	51.91055	-8.39779
50500304_2	06/08/2024 23:11	*Noise*	1	37.2	44.2	30.5	3.3	0	16	NaN	51.91055	-8.39779

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50500305	06/08/2024 23:12	?	1	21	21.7	19.8	6.6	0	16	NaN	51.91052	-8.39779
50500306	06/08/2024 23:12	*Noise*	1	26.2	33.6	17.4	2	0	16	NaN	51.91049	-8.39776
50500307_1	06/08/2024 23:12	*Noise*	2	18.6	20.4	17.4	4.9	5180	16	NaN	51.9105	-8.39776
50500307_2	06/08/2024 23:12	*Noise*	1	55.2	63.7	54.3	5.9	0	16	NaN	51.9105	-8.39776
50500308	06/08/2024 23:13	*Noise*	0	0	0	0	0	0	17	NaN	51.91051	-8.39776
50500309	06/08/2024 23:13	*Noise*	1	16.5	17.7	15.3	5.9	0	17	NaN	51.91049	-8.39776
50500310	06/08/2024 23:13	*Noise*	1	14.9	15.9	14.9	4.6	0	17	NaN	51.9105	-8.39775
50500311	06/08/2024 23:14	*Noise*	1	16.8	17.7	16.2	5.9	0	17	NaN	51.91051	-8.39775
50500313_1	06/08/2024 23:15	*Noise*	2	15.3	16	14.9	5.2	681	17	NaN	51.91051	-8.39775
50500313_2	06/08/2024 23:15	*Noise*	1	30.8	31.4	30.2	6.6	0	17	NaN	51.91051	-8.39775

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520330_2	21/08/2024 23:04	?	1	26.2	26.5	22.9	4.6	0	19	NaN	51.91411	-8.39696
50520001	21/08/2024 20:55	*Pipistrellus pygmaeus*	18	59.4	71.8	58.5	4	85	16	NaN		
50520002_1	21/08/2024 20:55	*Pipistrellus pygmaeus*	9	53.8	57.2	53.3	5	2314	16	NaN		
50520002_2	21/08/2024 20:55	*Soprano Pipistrelle*	1	14.9	18.6	14.9	3.3	0	16	NaN		
50520003_1	21/08/2024 20:56	*Soprano Pipistrelle*	6	53.9	56.4	53.2	5.6	1148	16	NaN		
50520003_2	21/08/2024 20:56	*Soprano Pipistrelle*	1	15.6	16.5	14.9	5.9	0	16	NaN		
50520004	21/08/2024 20:56	*Soprano Pipistrelle*	14	53.7	57.9	53.3	4	1244	16	NaN		
50520005_1	21/08/2024 20:56	*Soprano Pipistrelle*	74	55.7	65.3	54.9	5	80	16	NaN		
50520005_2	21/08/2024 20:56	*Soprano Pipistrelle*	1	24.1	40.6	22.3	5.9	0	16	NaN		

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520006_1	21/08/2024 20:57	*Pipistrellus pygmaeus*	166	55.9	69.9	54.9	7	80	16	NaN		
50520006_2	21/08/2024 20:57	*Soprano Pipistrelle*	3	22.4	39.3	19.2	6.6	1965	16	NaN		
50520007	21/08/2024 20:57	*Pipistrellus pygmaeus*	34	55.6	64.7	54.8	5	80	16	NaN		
50520008	21/08/2024 20:58	*Pipistrellus pygmaeus*	80	55.4	65.5	54.4	7	80	17	NaN		
50520009	21/08/2024 20:58	*Pipistrellus pygmaeus*	45	55.8	65.1	54.6	5	74	17	NaN		
50520010	21/08/2024 20:58	*Pipistrellus pygmaeus*	16	55.5	61	54.7	5	80	17	NaN		
50520011	21/08/2024 20:59	*Pipistrellus pygmaeus*	40	55.1	67	54.5	3	85	17	NaN	51.91006	-8.39042
50520012_1	21/08/2024 20:59	*Pipistrellus pygmaeus*	19	55.3	71.5	54.6	5	80	17	NaN	51.91008	-8.39045

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520012_2	21/08/2024 20:59	*Myotis spec.*	1	25.9	44.5	19.8	2	0	17	NaN	51.91008	-8.39045
50520013	21/08/2024 21:00	*Noise*	3	18.9	20.5	17.5	5.9	2858	17	NaN	51.91007	-8.39034
50520014	21/08/2024 21:00	*Noise*	1	19.5	23.8	18	3.9	0	17	NaN	51.91033	-8.3904
50520015_1	21/08/2024 21:01	*Noise*	2	30.5	31.3	30	5.6	7258	17	NaN	51.91059	-8.39051
50520015_2	21/08/2024 21:01	*Noise*	1	23.8	25.9	22.9	3.3	0	17	NaN	51.91059	-8.39051
50520016	21/08/2024 21:01	*Pipistrellus pipistrellus*	11	46.1	52.5	45.3	7	70	17	NaN	51.91088	-8.39062
50520017	21/08/2024 21:01	*Noise*	4	22.2	24.6	20.4	4.6	6218	17	NaN	51.91111	-8.39058
50520018_1	21/08/2024 21:02	*Noise*	1	18.3	20.4	17.4	2.6	0	17	NaN	51.91135	-8.39072
50520018_2	21/08/2024 21:02	*Noise*	1	28.1	28.4	26.8	4.6	0	17	NaN	51.91135	-8.39072
50520019	21/08/2024 21:02	*Noise*	1	16.5	17.7	16.2	5.2	0	17	NaN	51.91144	-8.39102

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520020	21/08/2024 21:03	*Noise*	1	21	22.6	19.8	5.2	0	17	NaN	51.91139	-8.39144
50520021_1	21/08/2024 21:03	*Noise*	2	17.4	18.3	15.9	5.2	4277	17	NaN	51.91132	-8.3919
50520021_2	21/08/2024 21:03	*Noise*	1	27.5	31.7	23.2	8.5	0	17	NaN	51.91132	-8.3919
50520022	21/08/2024 21:03	*Noise*	10	26.4	27.4	25	5	1841	17	NaN	51.91131	-8.39227
50520023_1	21/08/2024 21:04	*Noise*	2	16.9	18	15.7	4.6	4207	17	NaN	51.91126	-8.39266
50520023_2	21/08/2024 21:04	*Noise*	1	23.5	23.8	22.9	7.2	0	17	NaN	51.91126	-8.39266
50520024	21/08/2024 21:04	*Noise*	0	0	0	0	0	0	17	NaN	51.91121	-8.39278
50520025	21/08/2024 21:05	*Pipistrellus pygmaeus*	32	54.7	66.4	53.9	7	90	17	NaN	51.91121	-8.39277
50520026	21/08/2024 21:05	*Soprano Pipistrelle*	29	55.2	68	54	7	80	17	NaN	51.9112	-8.39272
50520027_1	21/08/2024 21:05	*Pipistrellus*	45	55.5	68.5	54.5	5	80	17	NaN	51.9112	-8.39272

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pygmaeus										
50520027_2	21/08/2024 21:05	*Soprano Pipistrelle*	2	15.7	16.8	14.9	4.6	2171	17	NaN	51.9112	-8.39272
50520028	21/08/2024 21:06	*Soprano Pipistrelle*	40	55.6	67	54.6	4	74	17	NaN	51.9112	-8.39274
50520029_1	21/08/2024 21:06	*Soprano Pipistrelle*	122	55.2	68.4	54.2	5	80	17	NaN	51.91121	-8.39274
50520029_2	21/08/2024 21:06	*Soprano Pipistrelle*	1	29.6	29.9	28.1	11.1	0	17	NaN	51.91121	-8.39274
50520030	21/08/2024 21:07	*Soprano Pipistrelle*	116	55.4	68.4	54.3	5	80	17	NaN	51.91121	-8.39275
50520031	21/08/2024 21:07	*Soprano Pipistrelle*	148	54.8	68.4	53.8	5	80	17	NaN	51.91121	-8.39275
50520032_1	21/08/2024 21:07	*Soprano Pipistrelle*	3	55.2	58.5	54.6	3	5289	17	NaN	51.91121	-8.39275
50520032_2	21/08/2024 21:07	*Soprano Pipistrelle*	1	30.5	30.8	29	2	0	17	NaN	51.91121	-8.39275
50520033_1	21/08/2024 21:08	*Pipistrellus pygmaeus*	132	54.4	66.6	53.5	5	80	17	NaN	51.91121	-8.39275

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520033_2	21/08/2024 21:08	*Soprano Pipistrelle*	1	27.5	29	25.3	4.6	0	17	NaN	51.91121	-8.39275
50520034	21/08/2024 21:08	*Soprano Pipistrelle*	68	54.7	64.4	54	5	80	17	NaN	51.91119	-8.39277
50520035_1	21/08/2024 21:08	*Soprano Pipistrelle*	1	20.4	22.3	18.9	3.9	0	17	NaN	51.91108	-8.3928
50520035_2	21/08/2024 21:08	*Soprano Pipistrelle*	1	32.9	37.5	32	2	0	17	NaN	51.91108	-8.3928
50520035_3	21/08/2024 21:08	*Soprano Pipistrelle*	1	54.6	55.8	53.1	3.3	0	17	NaN	51.91108	-8.3928
50520036_1	21/08/2024 21:09	*Soprano Pipistrelle*	2	18.8	19.2	17.7	4.9	128	17	NaN	51.91105	-8.39292
50520036_2	21/08/2024 21:09	*Soprano Pipistrelle*	1	27.8	28.1	26.8	5.9	0	17	NaN	51.91105	-8.39292
50520037_1	21/08/2024 21:09	*Soprano Pipistrelle*	3	25.2	26.8	23	6.6	4498	17	NaN	51.91104	-8.39292
50520037_2	21/08/2024 21:09	*Noise*	1	15.9	17.7	14.9	4.6	0	17	NaN	51.91104	-8.39292
50520038_1	21/08/2024 21:10	*Noise*	2	23	24.7	22.3	4.3	3958	17	NaN	51.91074	-8.39284

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520038_2	21/08/2024 21:10	*Noise*	1	16.8	18	16.5	5.2	0	17	NaN	51.91074	-8.39284
50520039_1	21/08/2024 21:10	*Noise*	2	15.9	18	14.9	3.9	5757	17	NaN	51.91054	-8.39276
50520039_2	21/08/2024 21:10	*Noise*	1	26.5	27.1	23.2	5.9	0	17	NaN	51.91054	-8.39276
50520040	21/08/2024 21:10	*Noise*	5	19	19.8	17.6	5.8	2879	17	NaN	51.91034	-8.3927
50520041_1	21/08/2024 21:11	*Pipistrellus pipistrellus*	41	46.7	54.4	46.1	4	83	17	NaN	51.91011	-8.39264
50520041_2	21/08/2024 21:11	*Soprano Pipistrelle*	39	57	65.8	55.7	5	60	17	NaN	51.91011	-8.39264
50520041_3	21/08/2024 21:11	*Soprano Pipistrelle*	5	21.3	28.2	19.5	3	2551	17	NaN	51.91011	-8.39264
50520041_4	21/08/2024 21:11	*Soprano Pipistrelle*	1	29.6	29.9	27.5	11.1	0	17	NaN	51.91011	-8.39264
50520042_1	21/08/2024 21:11	*Pipistrellus pipistrellus*	85	46.6	59.2	45.9	3	80	17	NaN	51.90991	-8.39266

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520042_2	21/08/2024 21:11	*Myotis myotis*	68	55.8	67.7	54.7	5	74	17	NaN	51.90991	-8.39266
50520042_3	21/08/2024 21:11	*Myotis spec.*	1	20.7	26.2	20.1	3.3	0	17	NaN	51.90991	-8.39266
50520043_1	21/08/2024 21:12	*Myotis spec.*	136	52.2	64.1	51.2	5	60	17	NaN	51.90987	-8.39305
50520043_2	21/08/2024 21:12	*Nyctalus leisleri*	3	27.9	28.5	26.4	4.4	7860	17	NaN	51.90987	-8.39305
50520044_1	21/08/2024 21:12	*Pipistrellus pygmaeus*	79	56.5	68.8	55.5	3	60	17	NaN	51.90987	-8.3934
50520044_2	21/08/2024 21:12	*Pipistrellus pipistrellus*	19	45.8	59.2	45.3	5	76	17	NaN	51.90987	-8.3934
50520044_3	21/08/2024 21:12	*Soprano Pipistrelle*	1	25.9	27.8	25.3	3.3	0	17	NaN	51.90987	-8.3934
50520045_1	21/08/2024 21:12	*Pipistrellus pygmaeus*	86	54.3	68	53.5	4	70	17	NaN	51.90987	-8.39343
50520045_2	21/08/2024 21:12	*Pipistrellus pipistrellus*	9	46.2	56.6	45.7	3	211	17	NaN	51.90987	-8.39343

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520045_3	21/08/2024 21:12	*Pipistrellus pipistrellus*	3	15.9	17.7	14.9	6.1	4730	17	NaN	51.90987	-8.39343
50520045_4	21/08/2024 21:12	*Nyctalus leisleri*	1	25.3	27.1	23.5	6.6	0	17	NaN	51.90987	-8.39343
50520046_1	21/08/2024 21:13	*Leislers*	78	55.3	67.8	54.4	3	80	17	NaN	51.90988	-8.39423
50520046_2	21/08/2024 21:13	*Pipistrellus pipistrellus*	44	43.5	60.1	42.6	5	95	17	NaN	51.90988	-8.39423
50520046_3	21/08/2024 21:13	*?*	3	20	31.3	18.2	6.8	1854	17	NaN	51.90988	-8.39423
50520047_1	21/08/2024 21:13	*Pipistrellus pygmaeus*	71	54.6	65.4	53.6	5	75	17	NaN	51.90988	-8.39456
50520047_2	21/08/2024 21:13	*Soprano Pipistrelle*	1	14.9	15.3	14.9	5.9	0	17	NaN	51.90988	-8.39456
50520047_3	21/08/2024 21:13	*Soprano Pipistrelle*	1	29.3	36.9	25.3	3.3	0	17	NaN	51.90988	-8.39456
50520048_1	21/08/2024 21:14	*Pipistrellus pygmaeus*	60	53.7	59.2	52.9	5	80	17	NaN	51.90985	-8.39487

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520048_2	21/08/2024 21:14	*Soprano Pipistrelle*	1	32.6	34.8	29.6	2	0	17	NaN	51.90985	-8.39487
50520049_1	21/08/2024 21:14	*Pipistrellus pipistrellus*	56	44.7	60.3	44	5	90	17	NaN	51.90985	-8.39487
50520049_2	21/08/2024 21:14	*Myotis spec.*	8	53.9	62.6	53	5	392	17	NaN	51.90985	-8.39487
50520049_3	21/08/2024 21:14	*?*	1	21.4	29	17.7	7.2	0	17	NaN	51.90985	-8.39487
50520050_1	21/08/2024 21:14	*Soprano Pipistrelle*	35	54.1	61.7	53.2	5	80	17	NaN	51.90984	-8.39484
50520050_2	21/08/2024 21:14	*Soprano Pipistrelle*	1	15.6	17.7	14.9	5.9	0	17	NaN	51.90984	-8.39484
50520050_3	21/08/2024 21:14	*Myotis spec.*	1	21	32.6	20.1	7.2	0	17	NaN	51.90984	-8.39484
50520051_1	21/08/2024 21:15	*Pipistrellus pipistrellus*	31	46.2	62.4	45.5	5	93	18	NaN	51.90985	-8.39486
50520051_2	21/08/2024 21:15	*Pipistrellus pygmaeus*	4	54.5	62.7	54	4.1	3570	18	NaN	51.90985	-8.39486

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520052_1	21/08/2024 21:15	*Pipistrellus pipistrellus*	14	45.4	55.9	44.8	5	180	17	NaN	51.90986	-8.39487
50520052_2	21/08/2024 21:15	*Soprano Pipistrelle*	6	53.4	61.2	52.8	4.4	430	17	NaN	51.90986	-8.39487
50520052_3	21/08/2024 21:15	*Soprano Pipistrelle*	1	21	29.6	20.4	7.2	0	17	NaN	51.90986	-8.39487
50520053_1	21/08/2024 21:15	*Pipistrellus pipistrellus*	52	45.5	58.6	44.5	6	80	17	NaN	51.90986	-8.39488
50520053_2	21/08/2024 21:15	*Soprano Pipistrelle*	23	54.8	63.5	53.2	4	90	17	NaN	51.90986	-8.39488
50520053_3	21/08/2024 21:15	*Soprano Pipistrelle*	2	21	40	19.5	6.2	5733	17	NaN	51.90986	-8.39488
50520054_1	21/08/2024 21:16	*Pipistrellus pygmaeus*	60	55.1	66.3	53.8	5	80	17	NaN	51.90986	-8.39489
50520054_2	21/08/2024 21:16	*Soprano Pipistrelle*	1	22	43	21	9.2	0	17	NaN	51.90986	-8.39489
50520055_1	21/08/2024 21:16	*Soprano Pipistrelle*	36	54.9	64.4	53.6	5	84	17	NaN	51.90986	-8.39488

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520055_2	21/08/2024 21:16	?	2	22.1	28.2	16	5.6	6786	17	NaN	51.90986	-8.39488
50520056_1	21/08/2024 21:17	*Pipistrellus pipistrellus*	24	43.5	51.5	42.8	4	93	17	NaN	51.90987	-8.39488
50520056_2	21/08/2024 21:17	*Pipistrellus pipistrellus*	6	53.7	60.1	52.9	5	194	17	NaN	51.90987	-8.39488
50520056_3	21/08/2024 21:17	*Pipistrellus pipistrellus*	1	15.6	17.4	15.3	5.2	0	17	NaN	51.90987	-8.39488
50520056_4	21/08/2024 21:17	*Pipistrellus pipistrellus*	1	21.7	35.1	20.7	6.6	0	17	NaN	51.90987	-8.39488
50520057_1	21/08/2024 21:17	*Pipistrellus pygmaeus*	37	54	61.5	53.1	5	86	17	NaN	51.90987	-8.39488
50520057_2	21/08/2024 21:17	*Soprano Pipistrelle*	1	21.4	34.5	21	6.6	0	17	NaN	51.90987	-8.39488
50520058_1	21/08/2024 21:17	*Myotis myotis*	61	54.1	60.2	53.2	5	80	17	NaN	51.90986	-8.39487

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520058_2	21/08/2024 21:17	*Myotis nattereri*	4	19.8	22.6	18.1	5.6	2890	17	NaN	51.90986	-8.39487
50520059	21/08/2024 21:18	*Pipistrellus pygmaeus*	7	51.9	62	50.9	5	208	17	NaN	51.91003	-8.39504
50520060_1	21/08/2024 21:18	*Myotis nattereri*	5	17.2	18.4	15.9	6.9	4326	17	NaN	51.91028	-8.39517
50520060_2	21/08/2024 21:18	*Noise*	3	28.6	32.3	24.4	5	5785	17	NaN	51.91028	-8.39517
50520061_1	21/08/2024 21:19	*Noise*	2	25.2	25.8	23.2	3.9	4080	17	NaN	51.91055	-8.39517
50520061_2	21/08/2024 21:19	*Noise*	1	18.9	19.2	18.3	7.2	0	17	NaN	51.91055	-8.39517
50520061_3	21/08/2024 21:19	*Noise*	1	31.7	33.2	31.7	4.6	0	17	NaN	51.91055	-8.39517
50520062	21/08/2024 21:19	*Noise*	0	0	0	0	0	0	17	NaN	51.91081	-8.39522
50520063	21/08/2024 21:19	*Noise*	1	15.6	16.5	14.9	11.8	0	17	NaN	51.91092	-8.39534
50520064_1	21/08/2024 21:20	*Myotis spec.*	2	55.5	59	55.1	2.9	173	17	NaN	51.91093	-8.39542

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520064_2	21/08/2024 21:20	*?*	1	17.7	18	17.4	6.6	0	17	NaN	51.91093	-8.39542
50520065	21/08/2024 21:20	*Noise*	0	0	0	0	0	0	17	NaN	51.9109	-8.39549
50520066	21/08/2024 21:21	*Noise*	1	22.6	23.5	21.4	7.2	0	17	NaN	51.91091	-8.39552
50520067_1	21/08/2024 21:21	*Noise*	2	46.2	51.4	45.8	4.6	177	17	NaN	51.91091	-8.39553
50520067_2	21/08/2024 21:21	*Nyctalus leisleri*	1	23.5	25.3	23.2	5.9	0	17	NaN	51.91091	-8.39553
50520067_3	21/08/2024 21:21	*Noise*	1	33.6	35.4	33.2	2	0	17	NaN	51.91091	-8.39553
50520068	21/08/2024 21:21	*Pipistrellus pipistrellus*	14	46.3	51.4	45.6	3	100	17	NaN	51.91046	-8.39558
50520069_1	21/08/2024 21:22	*Pipistrellus pipistrellus*	118	46.5	62.4	45.6	5	90	17	NaN	51.91017	-8.39555
50520069_2	21/08/2024 21:22	*Soprano Pipistrelle*	2	27.5	29.7	26.8	3.6	7426	17	NaN	51.91017	-8.39555

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520070_1	21/08/2024 21:22	*Pipistrellus pygmaeus*	58	54.3	66	53.1	5	84	17	NaN	51.91001	-8.39576
50520070_2	21/08/2024 21:22	*Pipistrellus pipistrellus*	47	43.8	54.8	42.7	5	100	17	NaN	51.91001	-8.39576
50520071_1	21/08/2024 21:23	*Pipistrellus pygmaeus*	68	53.8	65.7	52.9	5	85	17	NaN	51.90995	-8.39609
50520071_2	21/08/2024 21:23	*Soprano Pipistrelle*	19	46.9	63	46.2	3	152	17	NaN	51.90995	-8.39609
50520071_3	21/08/2024 21:23	*Soprano Pipistrelle*	2	20.3	22	19.8	4.6	15670	17	NaN	51.90995	-8.39609
50520071_4	21/08/2024 21:23	*Soprano Pipistrelle*	1	14.9	16.2	14.9	5.2	0	17	NaN	51.90995	-8.39609
50520072_1	21/08/2024 21:23	*Soprano Pipistrelle*	59	53.2	64.1	52.6	7	90	17	NaN	51.9099	-8.39629
50520072_2	21/08/2024 21:23	*Soprano Pipistrelle*	1	14.9	15.6	14.9	4.6	0	17	NaN	51.9099	-8.39629
50520073_1	21/08/2024 21:23	*Pipistrellus pygmaeus*	15	55.5	64.6	54.4	4	178	17	NaN	51.90988	-8.39656

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520073_2	21/08/2024 21:23	*Soprano Pipistrelle*	3	46	48.7	45.1	4.2	437	17	NaN	51.90988	-8.39656
50520074_1	21/08/2024 21:24	*Pipistrellus pipistrellus*	10	46.9	53.3	45.8	8	214	17	NaN	51.9099	-8.39685
50520074_2	21/08/2024 21:24	*Pipistrellus pipistrellus*	1	24.1	26.5	19.8	2.6	0	17	NaN	51.9099	-8.39685
50520075_1	21/08/2024 21:24	*Pipistrellus pygmaeus*	27	54.8	63.7	53.7	5	170	17	NaN	51.9099	-8.39715
50520075_2	21/08/2024 21:24	*Soprano Pipistrelle*	4	18.9	27.7	17.2	6.4	2722	17	NaN	51.9099	-8.39715
50520075_3	21/08/2024 21:24	*Soprano Pipistrelle*	1	26.2	26.5	25	5.2	0	17	NaN	51.9099	-8.39715
50520075_4	21/08/2024 21:24	*Soprano Pipistrelle*	1	47	52.5	45.8	5.2	0	17	NaN	51.9099	-8.39715
50520076	21/08/2024 21:24	*Noise*	3	17.1	17.8	15.9	5.7	4585	18	NaN	51.90991	-8.39717
50520077_1	21/08/2024 21:25	*Noise*	1	22.3	22.6	22	6.6	0	18	NaN	51.91036	-8.39748

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520077_2	21/08/2024 21:25	*Noise*	1	29.6	29.9	29.3	6.6	0	18	NaN	51.91036	-8.39748
50520078	21/08/2024 21:25	*Soprano Pipistrelle*	0	0	0	0	0	0	18	NaN	51.91045	-8.39751
50520079	21/08/2024 21:26	*Soprano Pipistrelle*	0	0	0	0	0	0	18	NaN	51.91043	-8.39749
50520080	21/08/2024 21:26	*Noise*	0	0	0	0	0	0	18	NaN	51.91047	-8.39745
50520081	21/08/2024 21:26	*Noise*	2	15.7	16.3	15.1	7.5	4825	18	NaN	51.91047	-8.39744
50520082	21/08/2024 21:27	*Nyctalus leisleri*	1	27.1	27.8	26.2	4.6	0	18	NaN	51.91049	-8.39743
50520083	21/08/2024 21:27	*?*	1	33.9	35.7	33.6	2	0	18	NaN	51.91045	-8.39748
50520084	21/08/2024 21:28	*?*	0	0	0	0	0	0	18	NaN	51.91045	-8.39751
50520085	21/08/2024 21:28	*Noise*	0	0	0	0	0	0	18	NaN	51.91039	-8.39755
50520086	21/08/2024 21:28	*?*	0	0	0	0	0	0	18	NaN	51.91045	-8.39751

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520087_1	21/08/2024 21:29	*Myotis myotis*	28	47.5	55.6	46.7	4	90	18	NaN	51.91046	-8.3975
50520087_2	21/08/2024 21:29	*Pipistrellus pipistrellus*	3	16.4	20.8	15.6	4.6	4252	18	NaN	51.91046	-8.3975
50520088	21/08/2024 21:29	*Pipistrellus pipistrellus*	119	47.5	58.9	46.7	5	90	18	NaN	51.9105	-8.39748
50520089_1	21/08/2024 21:30	*Pipistrellus pipistrellus*	43	47.9	59.3	47.3	5	95	18	NaN	51.9105	-8.39748
50520089_2	21/08/2024 21:30	*Pipistrellus pipistrellus*	1	15.6	16.5	14.9	5.9	0	18	NaN	51.9105	-8.39748
50520089_3	21/08/2024 21:30	*Pipistrellus pipistrellus*	1	30.5	32.3	28.7	4.6	0	18	NaN	51.9105	-8.39748
50520090_1	21/08/2024 21:30	*Pipistrellus pipistrellus*	4	18.5	19.3	17.3	5.1	5857	18	NaN	51.91055	-8.39751
50520096_1	21/08/2024 21:32	*Pipistrellus pipistrellus*	9	46.3	54	45.7	5	90	17	NaN	51.91091	-8.39566

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520096_2	21/08/2024 21:32	*Pipistrellus pipistrellus*	1	34.5	37.2	33.9	2	0	17	NaN	51.91091	-8.39566
50520107	21/08/2024 21:37	*?*	0	0	0	0	0	0	17	NaN	51.91203	-8.39536
50520108	21/08/2024 21:37	*?*	0	0	0	0	0	0	17	NaN	51.91205	-8.39534
50520109	21/08/2024 21:37	*?*	1	14.9	17.1	14.9	7.9	0	17	NaN	51.91205	-8.3953
50520114_1	21/08/2024 21:39	*Noise*	2	29	29.7	27.6	4.3	12804	17	NaN	51.91121	-8.39569
50520114_2	21/08/2024 21:39	*Noise*	1	46.4	48.5	45.8	2.6	0	17	NaN	51.91121	-8.39569
50520115_1	21/08/2024 21:40	*Pipistrellus pipistrellus*	28	46	58.5	45.4	5	90	17	NaN	51.91114	-8.39607
50520115_2	21/08/2024 21:40	*Pipistrellus pipistrellus*	2	55.4	62.5	54.7	3.9	2290	17	NaN	51.91114	-8.39607
50520115_3	21/08/2024 21:40	*Pipistrellus pipistrellus*	1	26.8	30.8	26.5	5.9	0	17	NaN	51.91114	-8.39607

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520116_1	21/08/2024 21:40	*Pipistrellus pipistrellus*	8	48.8	54.7	48.3	3	90	17	NaN	51.9111	-8.39639
50520116_2	21/08/2024 21:40	*Pipistrellus pipistrellus*	4	24.8	25.5	23.9	5	6112	17	NaN	51.9111	-8.39639
50520116_3	21/08/2024 21:40	*Pipistrellus pipistrellus*	1	17.1	18	16.5	4.6	0	17	NaN	51.9111	-8.39639
50520117_1	21/08/2024 21:40	*Pipistrellus pipistrellus*	35	47.3	53.2	46.6	6	115	17	NaN	51.91106	-8.3968
50520117_2	21/08/2024 21:40	*Pipistrellus pipistrellus*	1	19.8	20.1	18	4.6	0	17	NaN	51.91106	-8.3968
50520117_3	21/08/2024 21:40	*Pipistrellus pipistrellus*	1	26.5	27.1	25.9	5.2	0	17	NaN	51.91106	-8.3968
50520117_4	21/08/2024 21:40	*Pipistrellus pipistrellus*	1	32	33.2	30.5	2.6	0	17	NaN	51.91106	-8.3968
50520118	21/08/2024 21:41	*Pipistrellus pipistrellus*	39	47	55.4	46.3	5	90	17	NaN	51.91096	-8.39723

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520119_1	21/08/2024 21:41	*Pipistrellus pipistrellus*	17	47.4	53.2	46.6	4	80	17	NaN	51.91088	-8.39776
50520119_2	21/08/2024 21:41	*Pipistrellus pipistrellus*	7	54.4	60.6	54	5	411	17	NaN	51.91088	-8.39776
50520119_3	21/08/2024 21:41	*Soprano Pipistrelle*	1	15.9	19.2	14.9	3.3	0	17	NaN	51.91088	-8.39776
50520119_4	21/08/2024 21:41	*Soprano Pipistrelle*	1	19.2	20.4	18.6	4.6	0	17	NaN	51.91088	-8.39776
50520120	21/08/2024 21:42	*Pipistrellus pygmaeus*	78	53.6	63.3	52.9	5	170	17	NaN	51.91083	-8.39827
50520121_1	21/08/2024 21:42	*Soprano Pipistrelle*	40	54.2	62.2	53.4	5	80	17	NaN	51.91086	-8.39823
50520121_2	21/08/2024 21:42	*Soprano Pipistrelle*	1	19.8	37.2	16.5	9.2	0	17	NaN	51.91086	-8.39823
50520121_3	21/08/2024 21:42	*Soprano Pipistrelle*	1	24.4	25.3	24.4	4.6	0	17	NaN	51.91086	-8.39823
50520121_4	21/08/2024 21:42	*Soprano Pipistrelle*	1	47.9	50.6	46.7	3.9	0	17	NaN	51.91086	-8.39823

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520122_1	21/08/2024 21:42	*Pipistrellus pygmaeus*	38	54.7	63.9	54.1	5	84	17	NaN	51.91086	-8.39819
50520122_2	21/08/2024 21:42	*Soprano Pipistrelle*	3	47.5	52.5	46.5	5	296	17	NaN	51.91086	-8.39819
50520122_3	21/08/2024 21:42	*Soprano Pipistrelle*	2	17.8	35.4	16.5	6.2	301	17	NaN	51.91086	-8.39819
50520123	21/08/2024 21:43	*Soprano Pipistrelle*	58	54.1	65.1	53.5	5	84	17	NaN	51.91086	-8.3982
50520124_1	21/08/2024 21:43	*Soprano Pipistrelle*	22	54.2	62.2	53.7	4	94	17	NaN	51.91085	-8.39815
50520124_2	21/08/2024 21:43	*Soprano Pipistrelle*	1	24.4	25.9	22.6	2.6	0	17	NaN	51.91085	-8.39815
50520125_1	21/08/2024 21:44	*Soprano Pipistrelle*	23	53.9	61.2	53.4	4	190	17	NaN	51.91084	-8.39815
50520125_2	21/08/2024 21:44	*Soprano Pipistrelle*	1	46.7	51.9	46.4	5.9	0	17	NaN	51.91084	-8.39815
50520126	21/08/2024 21:44	*Soprano Pipistrelle*	77	51.7	62.2	51.1	5	90	17	NaN	51.91085	-8.39814
50520127	21/08/2024 21:44	*Pipistrellus*	46	53.9	63.4	53.3	5	90	17	NaN	51.91082	-8.39809

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
		pygmaeus										
50520128_1	21/08/2024 21:45	*Soprano Pipistrelle*	19	55.2	63.5	54.3	4	50	17	NaN	51.91083	-8.39814
50520128_2	21/08/2024 21:45	*Soprano Pipistrelle*	4	47.4	52.6	46.8	5	160	17	NaN	51.91083	-8.39814
50520128_3	21/08/2024 21:45	*Soprano Pipistrelle*	2	20.6	30.5	19.4	4.9	480	17	NaN	51.91083	-8.39814
50520129_1	21/08/2024 21:45	*Soprano Pipistrelle*	49	54	61.9	53.4	5	180	18	NaN	51.91085	-8.39816
50520129_2	21/08/2024 21:45	*?*	2	25.9	36.6	17.1	8.2	651	18	NaN	51.91085	-8.39816
50520130_1	21/08/2024 21:46	*Myotis spec.*	24	54.1	62.1	53.6	5	427	18	NaN	51.91085	-8.39815
50520130_2	21/08/2024 21:46	*Myotis spec.*	1	24.7	26.5	24.1	6.6	0	18	NaN	51.91085	-8.39815
50520130_3	21/08/2024 21:46	*?*	1	30.2	31.1	28.1	6.6	0	18	NaN	51.91085	-8.39815
50520131_1	21/08/2024 21:46	*Nyctalus leisleri*	4	25.6	26.5	23.9	5	3446	18	NaN	51.91091	-8.39824

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520131_2	21/08/2024 21:46	*Leislers*	1	17.7	18.6	14.9	6.6	0	18	NaN	51.91091	-8.39824
50520134_2	21/08/2024 21:47	*Leislers*	3	28.2	31.2	26.9	5	2269	18	NaN	51.91162	-8.39903
50520134_3	21/08/2024 21:47	*Leislers*	1	18.3	18.6	17.1	4.6	0	18	NaN	51.91162	-8.39903
50520135_1	21/08/2024 21:48	*Noise*	4	29	30.7	28.2	4.3	5789	18	NaN	51.91185	-8.39933
50520141	21/08/2024 21:50	*?*	1	21	21.7	20.4	4.6	0	17	NaN	51.9121	-8.397
50520142	21/08/2024 21:50	*Noise*	0	0	0	0	0	0	17	NaN	51.91209	-8.39697
50520147_1	21/08/2024 21:52	*?*	1	23.8	25	23.2	5.2	0	17	NaN	51.9123	-8.39927
50520150	21/08/2024 21:53	*Leislers*	2	16	21.2	14.9	4.9	10545	18	NaN	51.91234	-8.39957
50520151	21/08/2024 21:54	*Noise*	0	0	0	0	0	0	18	NaN	51.91232	-8.39957
50520152	21/08/2024 21:54	*Noise*	1	15.6	17.4	14.9	6.6	0	18	NaN	51.91231	-8.39957

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520153	21/08/2024 21:55	*Leislers*	1	21.7	22	20.1	5.2	0	18	NaN	51.9123	-8.39955
50520154	21/08/2024 21:55	*Noise*	0	0	0	0	0	0	18	NaN	51.9123	-8.39955
50520155	21/08/2024 21:55	*Noise*	1	18	18.6	17.1	5.2	0	18	NaN	51.91231	-8.39953
50520156	21/08/2024 21:56	*Noise*	1	15.3	16.2	14.9	6.6	0	18	NaN	51.91228	-8.39953
50520157	21/08/2024 21:56	*?*	1	15.6	17.1	14.9	7.2	0	18	NaN	51.91232	-8.39954
50520167_3	21/08/2024 22:00	*Pipistrellus pipistrellus*	1	47.3	50.3	47	3.3	0	18	NaN	51.91396	-8.39933
50520168_1	21/08/2024 22:00	*Noise*	1	15.9	17.4	14.9	6.6	0	18	NaN	51.91396	-8.39932
50520168_2	21/08/2024 22:00	*?*	1	19.8	20.4	19.5	5.2	0	18	NaN	51.91396	-8.39932
50520169_1	21/08/2024 22:01	*Pipistrellus pipistrellus*	19	47.8	55.2	47.2	3	80	18	NaN	51.91396	-8.39929

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520169_2	21/08/2024 22:01	*Soprano Pipistrelle*	1	18	18.3	17.7	4.6	0	18	NaN	51.91396	-8.39929
50520170	21/08/2024 22:01	*Noise*	0	0	0	0	0	0	17	NaN	51.91396	-8.39927
50520171	21/08/2024 22:02	*Nyctalus leisleri*	1	22.6	23.2	22	4.6	0	17	NaN	51.91396	-8.39929
50520172	21/08/2024 22:02	*?*	1	18.3	19.5	17.7	5.2	0	17	NaN	51.91396	-8.39929
50520173_1	21/08/2024 22:02	*?*	3	18	19.1	16.9	5.2	8861	17	NaN	51.91397	-8.39929
50520186_1	21/08/2024 22:07	*Noise*	1	17.1	17.7	16.8	5.2	0	18	NaN	51.914	-8.39593
50520186_2	21/08/2024 22:07	*Noise*	1	21.4	21.7	21	4.6	0	18	NaN	51.914	-8.39593
50520187	21/08/2024 22:08	*Myotis nattereri*	5	16.5	17	16	5	4296	19	NaN	51.91399	-8.39596
50520188	21/08/2024 22:08	*Myotis spec.*	2	20.4	21.2	19.7	11.1	3572	19	NaN	51.91384	-8.39627
50520189_1	21/08/2024 22:09	*?*	2	16.3	17.8	15.1	7.5	12752	19	NaN	51.91384	-8.39627

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520189_2	21/08/2024 22:09	*Noise*	1	35.1	36	34.5	7.2	0	19	NaN	51.91384	-8.39627
50520190	21/08/2024 22:09	*?*	0	0	0	0	0	0	19	NaN	51.91387	-8.39629
50520191	21/08/2024 22:09	*Noise*	0	0	0	0	0	0	19	NaN	51.91387	-8.39635
50520192_1	21/08/2024 22:10	*Noise*	2	19.2	20.4	18.5	4.3	5892	19	NaN	51.91391	-8.39597
50520192_2	21/08/2024 22:10	*Noise*	2	27.5	28.1	26.4	8.8	8342	19	NaN	51.91391	-8.39597
50520193_1	21/08/2024 22:10	*Noise*	2	18	21.5	16.6	9.2	1919	18	NaN	51.9139	-8.39554
50520193_2	21/08/2024 22:10	*Noise*	1	33.6	33.9	32	4.6	0	18	NaN	51.9139	-8.39554
50520194	21/08/2024 22:11	*Pipistrellus pygmaeus*	69	56	70.9	54.7	3	84	18	NaN	51.9139	-8.39549
50520195_1	21/08/2024 22:11	*Noise*	1	25.3	25.6	25	4.6	0	18	NaN	51.91393	-8.39456
50520195_2	21/08/2024 22:11	*Noise*	1	32.6	36.6	32.3	2	0	18	NaN	51.91393	-8.39456

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520196	21/08/2024 22:11	*Pipistrellus pipistrellus*	32	48	61.6	47.3	3	75	18	NaN	51.91409	-8.39421
50520197	21/08/2024 22:12	*Noise*	1	16.2	18	15.6	5.2	0	18	NaN	51.91425	-8.39389
50520198_1	21/08/2024 22:12	*Noise*	2	23.9	24.4	23.2	5.2	245	18	NaN	51.91438	-8.39376
50520198_2	21/08/2024 22:12	*Noise*	1	15.3	15.6	14.9	4.6	0	18	NaN	51.91438	-8.39376
50520198_3	21/08/2024 22:12	*?*	1	19.8	22.3	18	3.3	0	18	NaN	51.91438	-8.39376
50520199	21/08/2024 22:13	*?*	0	0	0	0	0	0	19	NaN	51.91442	-8.39372
50520200_1	21/08/2024 22:13	*?*	3	16.6	17.2	16.3	5.7	6071	20	NaN	51.91444	-8.39365
50520200_2	21/08/2024 22:13	*?*	1	24.4	24.7	23.8	6.6	0	20	NaN	51.91444	-8.39365
50520201	21/08/2024 22:13	*Noise*	0	0	0	0	0	0	20	NaN	51.91445	-8.39362
50520202_1	21/08/2024 22:14	*?*	2	15.7	16.3	15.1	5.2	4398	20	NaN	51.91445	-8.39366

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520202_2	21/08/2024 22:14	?	1	22.3	22.6	22	4.6	0	20	NaN	51.91445	-8.39366
50520203	21/08/2024 22:14	*Noise*	2	15.9	16.2	14.9	7.9	3465	21	NaN	51.91444	-8.39367
50520204	21/08/2024 22:14	?	0	0	0	0	0	0	21	NaN	51.91445	-8.39366
50520205_1	21/08/2024 22:15	?	2	17.7	18.3	16.9	4.9	9062	21	NaN	51.91446	-8.3937
50520205_2	21/08/2024 22:15	?	1	22.9	23.2	22	4.6	0	21	NaN	51.91446	-8.3937
50520206	21/08/2024 22:15	?	1	14.9	15.6	14.9	4.6	0	21	NaN	51.91444	-8.39375
50520207	21/08/2024 22:16	?	1	25	25.3	24.7	15.1	0	21	NaN	51.91441	-8.39367
50520208_1	21/08/2024 22:16	?	1	21	21.7	20.1	5.9	0	21	NaN	51.91458	-8.39351
50520208_2	21/08/2024 22:16	*Noise*	1	25.9	26.8	25.3	5.9	0	21	NaN	51.91458	-8.39351
50520209	21/08/2024 22:16	*Noise*	2	17.4	18.5	16.6	4.6	11046	21	NaN	51.91479	-8.39324

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520219_2	21/08/2024 22:20	*Leislers*	1	27.8	28.1	27.5	4.6	0	19	NaN	51.91525	-8.39225
50520219_3	21/08/2024 22:20	?	1	33.2	35.1	32.6	2	0	19	NaN	51.91525	-8.39225
50520220_1	21/08/2024 22:21	*Noise*	4	23.6	25	21.6	4.8	3217	19	NaN	51.91503	-8.39209
50520224	21/08/2024 22:22	*Nyctalus leisleri*	1	25.6	26.2	24.7	4.6	0	19	NaN	51.91408	-8.39219
50520225_1	21/08/2024 22:23	*Pipistrellus pygmaeus*	30	55.5	65.5	54.4	5	140	18	NaN	51.91382	-8.39225
50520225_2	21/08/2024 22:23	*Soprano Pipistrelle*	1	19.8	37.8	18.9	4.6	0	18	NaN	51.91382	-8.39225
50520226_1	21/08/2024 22:23	*Pipistrellus pygmaeus*	3	55	58.2	54.5	3.9	232	18	NaN	51.91377	-8.39227
50520226_2	21/08/2024 22:23	*Nyctalus leisleri*	2	23.5	26.7	21	6.2	3197	18	NaN	51.91377	-8.39227
50520226_3	21/08/2024 22:23	*Leislers*	1	29.9	32.6	29.6	4.6	0	18	NaN	51.91377	-8.39227

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520227	21/08/2024 22:23	*Pipistrellus pygmaeus*	15	54.9	64.6	54.2	5	209	18	NaN	51.91377	-8.39229
50520228_1	21/08/2024 22:24	*Soprano Pipistrelle*	24	55.8	63.6	54.7	5	80	18	NaN	51.91378	-8.39229
50520228_2	21/08/2024 22:24	*Soprano Pipistrelle*	1	15.6	15.9	15.3	5.9	0	18	NaN	51.91378	-8.39229
50520229	21/08/2024 22:24	*?*	0	0	0	0	0	0	18	NaN	51.91379	-8.39231
50520230_1	21/08/2024 22:25	*?*	3	54.7	58.3	54.1	5.5	869	18	NaN	51.91382	-8.3923
50520230_2	21/08/2024 22:25	*Nyctalus leisleri*	1	22.9	23.5	22.6	4.6	0	18	NaN	51.91382	-8.3923
50520231	21/08/2024 22:25	*Pipistrellus pygmaeus*	38	54.8	63	54	7	85	18	NaN	51.91382	-8.39229
50520232_1	21/08/2024 22:25	*Pipistrellus pygmaeus*	23	55.1	64.7	54.5	5	90	18	NaN	51.91381	-8.39229
50520232_2	21/08/2024 22:25	*?*	1	20.1	20.4	19.5	7.9	0	18	NaN	51.91381	-8.39229

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520233	21/08/2024 22:26	*Pipistrellus pygmaeus*	7	54.8	57.7	54.3	7	100	18	NaN	51.91383	-8.3923
50520234_1	21/08/2024 22:26	*Soprano Pipistrelle*	13	54.9	60.7	54.2	7	95	18	NaN	51.91385	-8.39229
50520234_2	21/08/2024 22:26	*Soprano Pipistrelle*	1	23.2	31.7	19.8	7.2	0	18	NaN	51.91385	-8.39229
50520235_1	21/08/2024 22:27	*Soprano Pipistrelle*	15	55	61.2	54.4	6	1444	18	NaN	51.91385	-8.39229
50520235_2	21/08/2024 22:27	*Soprano Pipistrelle*	6	21.8	22.5	20.6	5	1081	18	NaN	51.91385	-8.39229
50520236_1	21/08/2024 22:27	*Pipistrellus pygmaeus*	5	54.5	57.1	53.9	5.5	2065	17	NaN	51.91382	-8.39216
50520236_2	21/08/2024 22:27	*Soprano Pipistrelle*	3	20.6	21.7	19.3	6.3	2511	17	NaN	51.91382	-8.39216
50520237	21/08/2024 22:27	*Soprano Pipistrelle*	1	25	25.3	24.4	4.6	0	18	NaN	51.9139	-8.39185
50520238	21/08/2024 22:28	*Soprano Pipistrelle*	1	24.7	26.2	24.4	5.2	0	17	NaN	51.91409	-8.39175

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520239	21/08/2024 22:28	*Soprano Pipistrelle*	1	18.9	19.8	18	6.6	0	17	NaN	51.91421	-8.39156
50520240_1	21/08/2024 22:29	*Noise*	2	21.4	22.7	19.8	6.9	13233	17	NaN	51.91422	-8.39154
50520240_2	21/08/2024 22:29	*Noise*	1	16.2	16.5	14.9	4.6	0	17	NaN	51.91422	-8.39154
50520240_3	21/08/2024 22:29	*Noise*	1	30.2	30.5	29	5.2	0	17	NaN	51.91422	-8.39154
50520241_1	21/08/2024 22:29	*Soprano Pipistrelle*	4	26.8	28.5	25.7	5.2	3866	17	NaN	51.91455	-8.39132
50520241_2	21/08/2024 22:29	*?*	1	19.8	21.7	19.2	2.6	0	17	NaN	51.91455	-8.39132
50520242	21/08/2024 22:29	*Soprano Pipistrelle*	5	22.3	24.2	19.6	5.6	1507	17	NaN	51.91479	-8.39127
50520243_1	21/08/2024 22:30	*?*	1	20.7	21.4	19.5	8.5	0	17	NaN	51.91495	-8.39146
50520243_2	21/08/2024 22:30	*?*	1	28.7	29.3	28.4	5.2	0	17	NaN	51.91495	-8.39146
50520244	21/08/2024 22:30	*Leislers*	0	0	0	0	0	0	17	NaN	51.91509	-8.39144

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520245	21/08/2024 22:31	*?*	0	0	0	0	0	0	17	NaN	51.91512	-8.39135
50520246	21/08/2024 22:31	*?*	0	0	0	0	0	0	17	NaN	51.91514	-8.39129
50520247_1	21/08/2024 22:31	*Noise*	1	29.6	30.8	28.4	12.5	0	17	NaN	51.91513	-8.3913
50520247_2	21/08/2024 22:31	*Noise*	1	37.2	37.5	35.7	4.6	0	17	NaN	51.91513	-8.3913
50520252	21/08/2024 22:33	*Brown Long-eared*	1	17.1	17.7	16.5	5.9	0	17	NaN	51.91511	-8.39133
50520254_2	21/08/2024 22:34	*?*	1	15.3	15.6	14.9	7.2	0	17	NaN	51.91513	-8.39124
50520259_1	21/08/2024 22:36	*?*	1	26.5	29.6	25.3	3.9	0	17	NaN	51.91589	-8.39205
50520264	21/08/2024 22:38	*Nyctalus leisleri*	1	29.6	32.3	29.3	12.5	0	17	NaN	51.91607	-8.39244
50520265_1	21/08/2024 22:38	*?*	2	21.4	21.7	20.3	10.5	8240	17	NaN	51.91603	-8.39238
50520265_2	21/08/2024 22:38	*?*	1	14.9	15.6	14.9	6.6	0	17	NaN	51.91603	-8.39238

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520265_3	21/08/2024 22:38	*Noise*	1	35.7	44.2	28.1	6.6	0	17	NaN	51.91603	-8.39238
50520266_1	21/08/2024 22:39	?	1	14.9	16.2	14.9	4.6	0	17	NaN	51.91603	-8.39239
50520266_2	21/08/2024 22:39	?	1	18	18.3	16.2	8.5	0	17	NaN	51.91603	-8.39239
50520266_3	21/08/2024 22:39	*Pipistrellus nathusii*	1	35.1	40	33.6	2.6	0	17	NaN	51.91603	-8.39239
50520267	21/08/2024 22:39	?	0	0	0	0	0	0	17	NaN	51.91602	-8.39238
50520268_1	21/08/2024 22:40	?	1	16.8	17.4	16.2	5.2	0	17	NaN	51.91603	-8.39239
50520268_2	21/08/2024 22:40	*Leislers*	1	25.6	26.5	24.7	4.6	0	17	NaN	51.91603	-8.39239
50520269	21/08/2024 22:40	?	0	0	0	0	0	0	17	NaN	51.91602	-8.39233
50520270	21/08/2024 22:40	*Noise*	1	35.7	37.2	33.9	8.5	0	17	NaN	51.91601	-8.39237
50520271	21/08/2024 22:41	?	0	0	0	0	0	0	17	NaN	51.91601	-8.39255

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520272	21/08/2024 22:41	*Myotis spec.*	1	14.9	16.2	14.9	7.9	0	17	NaN	51.91603	-8.39258
50520283	21/08/2024 22:45	?	0	0	0	0	0	0	17	NaN	51.91642	-8.39503
50520284	21/08/2024 22:46	?	1	14.9	15.3	14.9	4.6	0	17	NaN	51.91642	-8.39504
50520285	21/08/2024 22:46	*Pipistrellus nathusii*	1	35.7	37.5	33.6	4.6	0	17	NaN	51.91642	-8.39504
50520286	21/08/2024 22:47	?	0	0	0	0	0	0	17	NaN	51.91645	-8.3951
50520287_1	21/08/2024 22:47	?	2	17.4	17.7	15.6	6.9	3531	18	NaN	51.91643	-8.39511
50520289_2	21/08/2024 22:48	?	1	22.9	23.2	22	6.6	0	18	NaN	51.91642	-8.39514
50520289_3	21/08/2024 22:48	*Noise*	1	26.2	27.1	25	5.9	0	18	NaN	51.91642	-8.39514
50520290	21/08/2024 22:48	*Noise*	1	28.7	29	27.8	4.6	0	18	NaN	51.91645	-8.39502
50520291_1	21/08/2024 22:49	*Noise*	1	16.8	18.9	16.5	5.9	0	18	NaN	51.91646	-8.39527

Recording	Timestamp	Species	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Humidity [%r.H.]	Latitude [WGS84]	Longitude [WGS84]
50520301	21/08/2024 22:52	*Nyctalus leisleri*	2	28.2	28.7	27.8	8.8	864	18	NaN	51.91622	-8.39779
50520302	21/08/2024 22:53	*Nyctalus leisleri*	1	23.2	25.3	22.6	5.2	0	18	NaN	51.91619	-8.39774
50520303	21/08/2024 22:53	*Noise*	2	15.7	16	15.1	5.2	1136	18	NaN	51.91615	-8.39777
50520304	21/08/2024 22:54	?	1	19.8	20.4	18.3	9.2	0	19	NaN	51.91613	-8.39773
50520305_1	21/08/2024 22:54	?	2	16.8	17.7	16.5	5.9	1252	19	NaN	51.91613	-8.39777
50520305_2	21/08/2024 22:54	?	2	30	30.8	29	6.2	678	19	NaN	51.91613	-8.39777
50520313	21/08/2024 22:57	?	3	15.8	17.4	15.1	5	1449	19	NaN	51.91605	-8.39938
50520314	21/08/2024 22:58	*Noise*	0	0	0	0	0	0	20	NaN	51.91605	-8.3994
50520315	21/08/2024 22:58	*Noise*	1	14.9	16.2	14.9	4.6	0	21	NaN	51.916	-8.39944
50520316	21/08/2024 22:58	*Noise*	0	0	0	0	0	0	22	NaN	51.91593	-8.39922

Recording	**Timestamp**	**Species**	**Calls [#]**	**Mean Peak Frequency [kHz]**	**Mean Max Frequency [kHz]**	**Mean Min Frequency [kHz]**	**Mean Call Length [ms]**	**Mean Call Distance [ms]**	**Temperature [°C]**	**Humidity [%r.H.]**	**Latitude [WGS84]**	**Longitude [WGS84]**
50520317	21/08/2024 22:59	*Soprano Pipistrelle*	1	16.2	16.8	15.9	9.2	0	22	NaN	51.91604	-8.39935
50520318	21/08/2024 22:59	?	0	0	0	0	0	0	22	NaN	51.91598	-8.3992
50520331_2	21/08/2024 23:04	*Nyctalus leisleri*	1	24.7	25	23.5	7.2	0	18	NaN	51.91381	-8.39676
50520332_1	21/08/2024 23:05	?	2	25.8	26.5	24.6	6.2	2593	18	NaN	51.91362	-8.39695
50520339	21/08/2024 23:07	?	1	19.8	21	18.9	7.2	0	19	NaN	51.91333	-8.39673
50520340	21/08/2024 23:08	*Noise*	1	15.3	15.6	14.9	5.2	0	19	NaN	51.91323	-8.39679
50520341	21/08/2024 23:08	?	1	32.6	40.9	30.5	2	0	19	NaN	51.91328	-8.39688

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Dunkettle EIAR

CHAPTER 12 Noise & Vibration

Appendix 12.1 Acoustic Design Statement
Appendix 12.2 Glossary of Acoustic Terminology

November 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Appendix 12.1 Acoustic Design Statement

November 2024

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CHARTERED PLANNING CONSULTANTS

Appendix 12.1 Acoustic Design Statement

12.1 Introduction – Operational Phase Acoustic Design Statement

The acoustic design statement (ADS) has been presented separately as it refers to the inward impact assessment of the residential properties within the development, rather than the outward impact assessment carried out in Section 12.8 of EIAR Chapter 12 Noise and Vibration. As discussed in Section 12.4.3 of EIAR Chapter 12 Noise and Vibration, an ADS is required for new residential developments as per the current Cork Noise Action Plan (NAP) 2024 – 2028.

This assessment relates to the residential units in LRD Phase 1. Once detailed design is available on LRD Phase 2 and Dunkettle House, if residential development is proposed, a further review of the inward impact assessment would be required.

12.2 Stage 1 – Noise Risk Assessment

12.2.1 Desk-based Study of Published Data

The key sources of available baseline data comprise published noise mapping studies undertaken by TII for road traffic noise which feed into the Cork Agglomeration NAP 2024 – 2028. The modelled noise maps are published on the EPA Geo Portal (EPA Maps) and include existing sources of major rail, road and aircraft noise within the Cork Agglomeration area. This information provides a useful strategic high-level overview of noise levels in the study area. The parameters presented in terms of the noise mapping are the L_{den} and L_{night} noise parameters which are both long-term noise indicators based on annual traffic and transport modes.

The Proposed Development (LRD Phase 1) site is within the noise mapping zone for road traffic noise, hence a review of published noise maps has been undertaken to establish the baseline road traffic noise across the development site.

Figure A12.1 and Figure A12.2 present the mapped existing noise levels across the development site for road noise traffic in terms of L_{den} and L_{night} respectively.

Making reference to the published noise maps, the Proposed Development lies within the < 55 to 65 dB L_{den} and <45 to 50 dB L_{night} noise contour zones. The majority of buildings proposed on the LRD Phase 1 development site are set back at least 60m from the road with traffic noise levels mapped at or below 55 dB L_{den} and <45 dB L_{night}. The mapped noise levels align with those measured at the unattended noise monitoring position UT1. The Duplex apartments and House Types Fb and G located between 10m to 60m from the Dunkettle Road to the east of the site are located within the 60 to 65 dB L_{den} and 45 to 50 dB L_{night} noise contour zones.

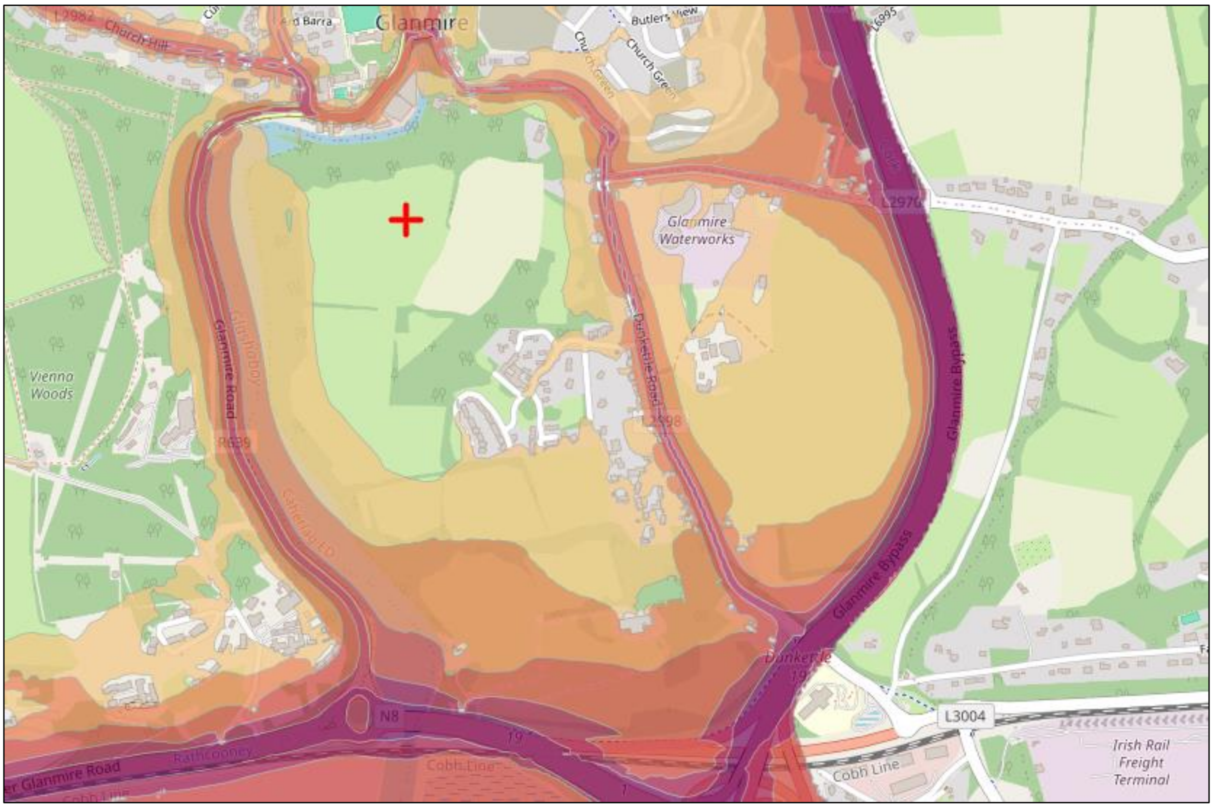


Figure A12.1: Road Traffic Noise L_{den} noise contours

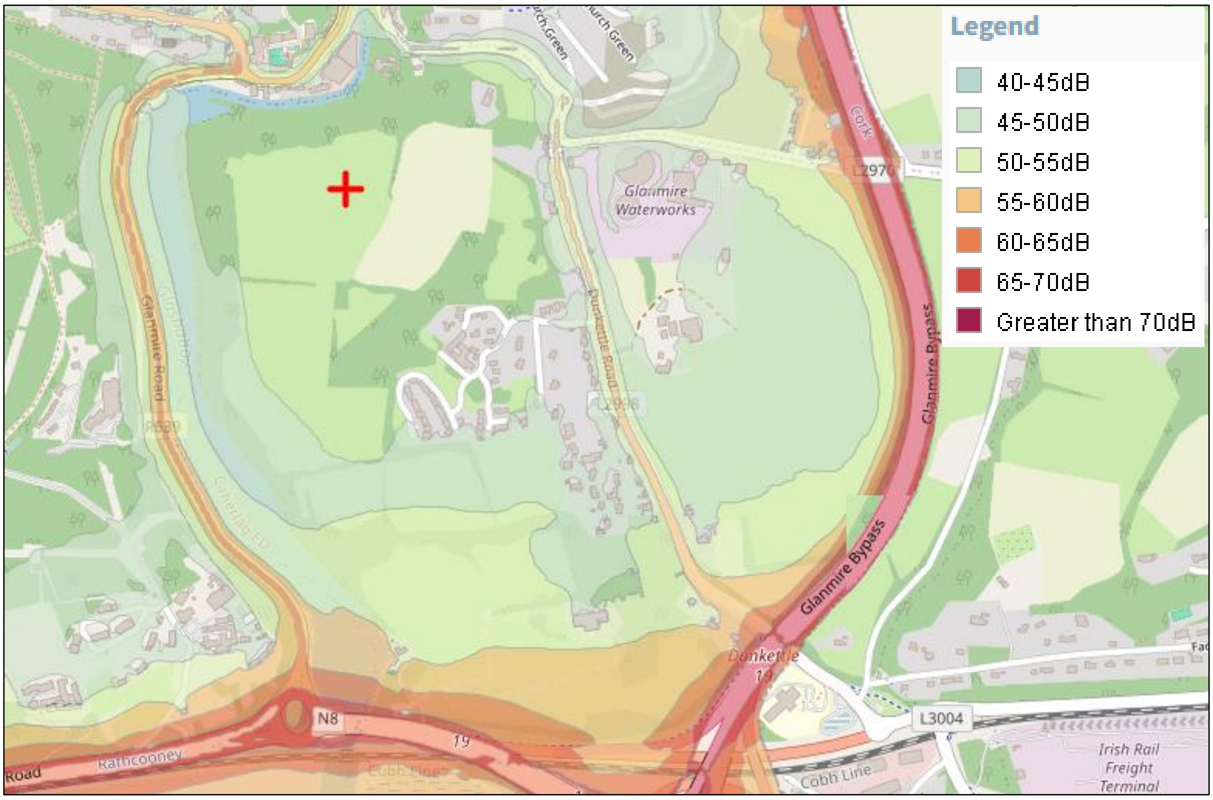


Figure A12.2 : Road Traffic Noise L_{night} noise contours

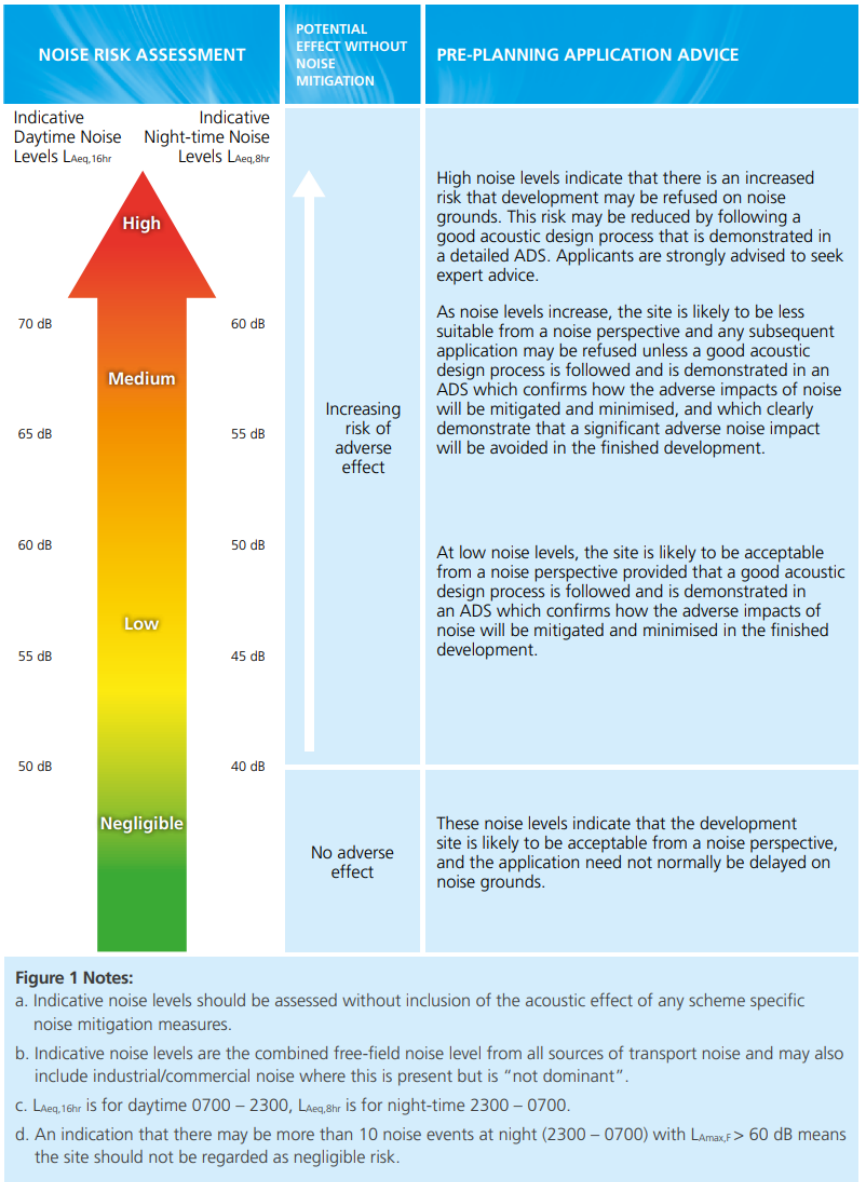
12.2.2 Methodology

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment.

Paragraph 2.9 of ProPG states that:

> *"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."*

Figure A12.3 summarises the ProPG Initial Noise Risk Assessment for the site using noise levels ranges for each category and compares the desk-based study of the EPA Map published data at UT1 at the site.



High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Figure 1 Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.

Figure A12.3: ProPG initial noise risk assessment

ProPG states the following with respect to the initial risk assessment:

> *"The risk assessment should not include the impact of any new or additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of a subsequent planning application. In other words, the risk assessment should include the acoustic effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds."*

In this instance there are no buildings to be demolished and the site topography is not expected to change significantly during construction.

LRD Phase 1 is located to the most northern section of the proposed cumulative development (LRD Phase 1, LRD Phase 2 and Dunkettle House), and at the furthest distance from the N8. The dominant noise sources on the LRD Phase 1 site are from the Glanmire and Dunkettle roads to the west and east of the site.

Review of the published data noise levels across the overall Phase 1 site, concludes the following:

Daytime: Across the majority of the site the published noise levels range are less than 55 dB $L_{den,}$ which fall within the negligible noise risk category.

At the H1/H2 Duplex apartments and House Type Fb and G to the east of the site, within 60m of the Dunkettle Road, the published noise levels range between 60 to 65 dB $L_{den,}$ and therefore fall within the low to medium noise risk categories.

Night-time: Across the majority of the site the published noise levels range are less than 45 dB L_{night} which fall within the negligible noise risk category.

At the H1/H2 Duplex apartments and House Type Fb and G to the east of the site, within 60m of the Dunkettle Road, the published noise levels range between 45 to 50 dB $L_{night,}$ fall in the low to medium noise risk categories.

12.2.2.1 Noise Risk Assessment Conclusion - Proposed Development – LRD Phase 1

Considering the noise levels presented in the preceding section and applied to Figure A12.3, the initial site noise risk assessment has concluded that the level of risk varies from negligible to low at distances greater than 60m from the redline site boundary. Within 60m of the east site the level of risk is low to medium. Figure A12.4 indicates where the majority of the site is within the negligible to low level of risk (shaded green area) and to the east where site is within the low to medium level of risk (shaded amber area).

Figure A12.4: LRD Phase 1 mark up of noise risk categories (green area - negligible to low risk and amber area - low to medium risk)

Comment on Negligible to Low Areas Across Site

Internal Noise Levels

In the first instance, it is important to note the typical level of sound reduction offered by a partially open window is typically applied as 15 dB[1] to 18 dB. Considering the internal design criteria outlined in Table 12.7 (Internal noise design range for residential buildings (BS 8233:2014)) of Chapter 12 of this EIAR, and a sound reduction across an open window of 15 dB, the free-field noise levels that would be required to ensure that internal noise levels do not exceed good internal noise levels with windows open have been summarised in Table A12.1 below.

Internal Noise Environment Level Desired	**External Noise Levels**	
	Daytime **07:00 to 23:00hrs**	**Night-time** **23:00 to 07:00hrs**
Good (i.e. at or below BS 8233 internal noise design criteria)	50 – 55dB $L_{Aeq,16hour}$	45dB $L_{Aeq,8hour}$

Table A12.1: External noise levels required to achieve desirable internal noise levels with windows open

---

[1] Section 2.33 of ProPG, additional information can be found in the DEFRA NANR116: *'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows'*

Making reference to the published noise levels across the site, the desirable internal noise levels for living rooms and bedrooms will be achieved across an open window in the green shaded areas in Figure A12.4. No further noise control measured at required in these areas.

External Noise Levels

BS 8233 notes that is it desirable that external areas used for amenity spaces such as gardens and patios noise levels should not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$

These values are achieved on site for gardens, balcony areas and external communal open space in the green shaded areas in Figure A12.4. No further noise control measured at required in these areas.

Comment on Low to Medium Areas to East of Site Along Dunkettle Road

As outlined in Figure A12.4 to the east where site is within the low to medium level of risk (shaded amber area).

ProPG states the following with respect to low and medium levels of risk:

Low Risk: "At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."

Medium Risk: "As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."

Given the above an ADS is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

12.3 Stage 2 – Full Acoustic Assessment- LRD Phase 1 Eastern Section (Duplexes H1/H2 and House Types Fb and G Only)

12.3.1 Element 1 – Good Acoustic Design Process

Based on the ProPG guidance, in practice, good acoustic design (GAD) should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. It is important to note that ProPG specifically states that good acoustic design is not equivalent to overdesign or 'gold plating' of a new development but that it seeks to deliver the optimum acoustic environment for a given site.

Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating, or reducing noise levels from relevant sources;

- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Assess the viability of alternative solutions; and
- Assess external amenity area noise.

In the context of the Proposed Development i.e. LRD Phase 1 Eastern Section (Duplexes H1/H2 and House Types Fb and G Only), each of the considerations listed above have been addressed in the following subsections.

12.3.1.1 Application of GAD Process to Proposed Application

Relocation or Reduction of Noise from Source

The main noise sources are located outside the site boundary and, therefore, it is beyond the scope of this proposed development to introduce any noise mitigation at source.

Planning, Layout and Orientation

Consideration has been given to the location of both the buildings and external amenity areas. In the first instance, a primary consideration was to ensure that residential buildings are located as far as possible from the busy roads. Where this cannot be accommodated along the Dunkettle Road additional façade noise attenuation measures will be incorporated into the design.

The orientation of the site is such that the residential buildings themselves screen many of the common external amenity areas associated with the development.

Select Construction Types for meeting Building Regulations

A mixture of masonry, brick and timber insulated constructions will be used in the external walls of the proposed development. These construction types offers high levels of sound insulation performance. However, as is typically the case, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade in terms of sound insulation performance.

Consideration will therefore be given to the provision of upgraded glazing and acoustic ventilators, where required. For units where it will not be possible to achieve the desirable internal acoustic environments with windows open, the proposal here will be to provide dwelling units with glazed elements and ventilators that have good acoustic insulation properties so that when the windows are closed the noise levels internally are good. Inhabitants will be able to open the windows if they wish. However, doing so will increase the internal noise level. This approach to mitigation is supported in ProPG where it states the following (emphasis has been added in bold):

> *"2.22: Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided;* ***occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open****. Solely relying*

> *on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents."*
>
> *"Note 5: Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded."*
>
> *"2.34: Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded."*

It is very important to note that it is impractical to achieve the good internal noise levels with windows open across the vast majority of development sites in close proximity to major infrastructure such as roads. Such sites would need to be classified as having a negligible risk in accordance with the ProPG noise risk assessment approach. For this reason, there are no guidance documents either at a local level or an international level that AWN is aware of which would support the approach of achieving the ideal internal noise levels in the open window scenario. It is, therefore, considered entirely justifiable to provide building façades with a moderate degree of sound insulation, such that with windows closed but vents opened, a good internal acoustic environment is achieved.

Impact of Noise Control Measures on Fire, Health and Safety

The good acoustic design measures that have been proposed on site do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

Due to the height and location of the proposed buildings it is considered that any acoustic screens along the boundary of the site to attenuate traffic noise would be ineffective and is not proposed anywhere on the site.

Assess External Amenity Area Noise

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Noise levels across external amenity areas associated with the development are presented in Section 12.3.3 of this Appendix.

Summary

Considering the constraints of the site, in so far as possible and without limiting the extent of the development area, the principles of GAD have been applied to the Proposed Development – LRD Phase 1.

In terms of viable alternatives to acoustic treatment of façade elements, currently it is not considered likely that there will be further options for mitigation outside of proprietary acoustic glazing and ventilation.

12.3.2 Element 2 – Internal Noise Guidelines

12.3.2.1 Internal Noise Criteria

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS8233:2014. The recommended indoor ambient noise levels are set out previously in Table 12.7 of Chapter 12 of this EIAR and reproduced below for reference.

Activity	**Location**	**Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$**	**Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$**
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/ area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$[2]

Table A12.2: Internal noise design range for residential buildings (BS 8233:2014)

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

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[2] The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In terms of the ventilation strategy it is understood that the air supply will be via mechanical ventilation (MVHR) which typically provides a sound insulation performance substantially improved over passive in-frame or wall vents.

Façade Noise Levels Based on Published Data – Noise Maps

Noise levels have been reviewed across the proposed development site during day and night-time periods using the desk based study of published noise data from the EPA Noise Maps.

Based on the correction values from the research paper *"Conversion between noise exposure indicators L_{eq24hr}, L_{Day}, $L_{Evening}$, L_{night}, L_{dn}, and L_{den}; Principles and practical guidance"*[3], the L_{den} value has been converted to $_{LAeq,\ 16hr}$ by subtracting 2 dB from the highest L_{den} value in the EPA noise map contours e.g. a noise contour of 60 to 65 dB L_{den} equates to a 63 dB $L_{Aeq,\ 16\ hour}$ value.

Daytime noise levels at northern, eastern and southern facades across LRD Phase 1 Eastern Section (Duplexes H1/H2 and House Types Fb and G Only) facades are predicted to be no greater than 63 dB $L_{Aeq,\ 16\ hour}$. Night-time noise levels are predicted to be no greater than 50 dB $L_{Aeq,\ 8\ hour}$.

Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows e.g. to the western facades of the Duplexes H1/H2 and House Types Fb and G. Therefore, for those sheltered facades where the noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows to ensure that when windows are closed the internal noise criteria are achieved.

Expected noise levels on the northern, eastern and southern facing facades closest to Dunkettle Road are above a level whereby internal noise levels are achieved with standard double glazing and therefore mitigation in the form of enhanced glazing will be required.

Table A12.3 and Figure A12.5 present the noise levels predicted to be incident on the various façades during day and night-time periods respectively.

Ref	Period (T)	$L_{Aeq,\ T}$ dB	Octave Band Centre Frequency (Hz)					
			125	250	500	1k	2k	4k
Amber	Day (16hr)	63	62	60	60	60	50	38
	Night (8hr)	50	49	47	47	47	37	32

Table A12.3: Summary of predicted façade noise levels

Northern, eastern and southern facing residential facades in Zone Amber will require enhanced glazing. Façade performance specifications are outlined in Table A12.4.

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[3] Brink, Mark, Schaffer, Beat, Pieren, Reto, Wunderli, JeanMarc, Conversion between noise exposure indicators Leq24h, LDay, LEvening, LNight,Ldn and Lden: Principles and practical guidance. International Journal of Hygiene and Environmental Health https://doi.org/10.1016/j.ijheh.2017.10.003

Figure A12.5: Designation of predicted noise levels at northern, eastern and southern facing façades

Proposed Façade Treatment

The British Standard BS EN 12354-3: 2000: *Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound* provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths.

The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- Construction type of each element (i.e. windows, walls, etc.);
- Area of each element;
- Shape of the façade, and;
- Characteristics of the receiving room.

The principles outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provides a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades.

Glazing

As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. In this instance it has been calculated that the various facades are to be provided with glazing that, when closed, achieve the minimum sound insulation performance as set out in Table A12.4 (and assigned to each façade in the yellow zone in Figure A12.5).

Zone	**Nominal R_w (dB)**	**Octave Band Centre Frequency (Hz)**					
		125	**250**	**500**	**1k**	**2k**	**4k**
Amber	35	23	23	30	39	36	43

Table A12.4: Sound insulation performance requirements for glazing, SRI (dB)

Test data should be sought from the supplier of the glazing at detailed design stage to ensure that the acoustic specification is met.

It is important to note that the acoustic performance specifications detailed herein are requirements which apply to the overall glazing system. The over-riding requirement is that the internal noise criteria within Table A.12.3 is achieved. Other combinations of upgraded glazing may provide the same or better performance than those outlined within this report. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses. In particular, there is a requirement for enhanced glazing to the northern, eastern and southern facades of the H1/H2 Duplexes and House Types Fb and G located within 60m of the Dunkettle Road.

Wall Construction

In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 54 dB R_w for this construction.

Ventilation

A mechanical heat recovery ventilation (MHRV) system is proposed for the development therefore there is no requirement to have windows open to achieve background ventilation requirements. An appropriate acoustic specification for windows shall be provided in this instance to ensure the rooms achieve good internal noise levels.

Mechanical ventilation systems typically offer a high performance in terms of preventing sound intrusion from external sources, consequently there is no assessment of the ventilation system required for this noise impact assessment.

Overheating

Another issue arising is the impact of intrusive noise when the windows are temporarily opened during periods of overheating. Section 2.36 of ProPG provides the following guidance in respect of overheating:

"In addition to providing purge ventilation, open windows can also be used to mitigate overheating. Therefore, should the LPA accept a scheme is to be assessed with windows closed, but this scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition. In this case a more detailed assessment of the potential impact on occupants should be provided in the ADS. It should be noted that overheating issues will vary across the country and any specific design solutions will need to be developed alongside advice from energy consultants."

As is the case in the vast majority of residential dwellings, overheating will be controlled by opening windows as required. ProPG does not specify any internal noise targets to be achieved during the overheating scenario and neither do other guidance documents. In the absence of guidance, the Association of Noise Consultants (ANC) in the UK have produced a document entitled *Acoustics Ventilation and Overheating Residential Design Guide – January 2020.*

A two-level assessment procedure is recommended by the ANC guide, depending on the risk of potential impact. Figure A12.6 presents the Risk Categories presented within the ANC guide for the overheating conditions.

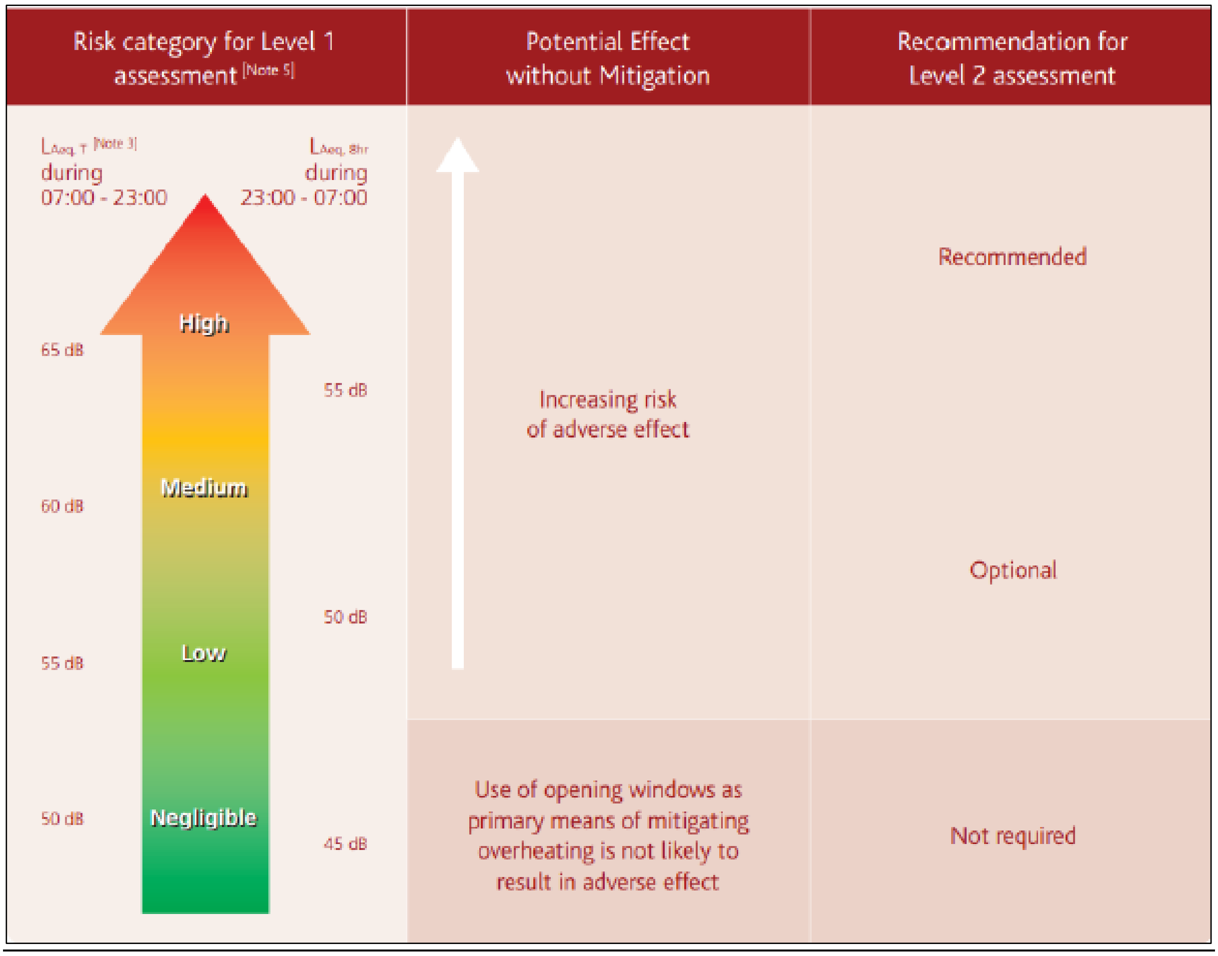

Figure A12.6: Façade noise levels on worst-affected façades

Given the external noise levels, the northern, eastern and southern façades within 60m of the Dunkettle Road are categorised as medium risk. In all instances, the overheating condition will be controlled by opening windows. This is the only practical option and will be required during the hottest days of the year. The façade levels taken of 50 dB $L_{Aeq,8hr}$ at night and up to 63 dB $L_{Aeq,16hr}$ during the day, indicates a Level 2 assessment is optional.

Using the standard open window noise reduction of up to 15 dB and the external noise levels across the site, the expected internal noise level during the overheating condition is in the range of 35 dB $L_{Aeq,8hr}$ at night and 48 dB $L_{Aeq,16hr}$ during the day.

For internal noise levels between ≥ 35 dB and <50 dB $L_{Aeq,16hr}$ daytime and ≥ 30 and <42 $L_{Aeq,8hr}$ night-time, the document notes the following potential effects:

> *"At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance.*

> *Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time[4].“*

Noise levels of this level are likely to be considered suitable if they occur for limited periods in the event of overheating conditions. It is noted that all rooms will incorporate mechanical ventilation as standard.

Internal Noise Levels

Taking into account the external façade levels and the specified building envelope, the internal noise levels have been calculated. In all instances the good internal noise criteria are achieved for daytime and night-time periods with the addition of enhanced glazing to the northern, eastern and southern facades of the H1/H2 Duplexes and House Types Fb and G located within 60m of the Dunkettle Road.

12.3.3 Element 3– External Amenity Area Noise Assessment

12.3.3.1 External Noise Levels

Making reference to Figure A12.1 the external noise levels within the vast majority of communal open spaces across the development site are less than the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$, particularly those located more than 60m from the Dunkettle Road.

Worst case external noise levels at the site during the daytime, have been calculated to be less than 63dB $L_{Aeq,16hr}$ within 60m of the Dunkettle Road. The following extract from BS 8233 on amenity areas is reiterated:

> *“However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”*

While the residents of the H1/H2 Duplexes and House Type Fb and G have a daytime noise exposure of 63 dB $L_{Aeq,16hr}$ to the east of their facades, the private and communal green areas are located to the western side of the buildings, largely screened by the Dunkettle Road by the buildings themselves and set back at least 20m from the road. Therefore it is expected that these communal open spaces are closer to the upper range of the ProPG external noise levels but the residents have access to the vast majority of open spaces at or below the 50 dB $L_{Aeq,16hr}$ value as they move westerly through the Phase 1 development.

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[4] ANC note 8: BS 8233 states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved

It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site, therefore no further mitigation is required to control external noise levels across amenity areas.

12.3.4 Element 4– Assessment of Other Relevant Issues

Element 4 gives consideration to other factors that may prove pertinent to the assessment, these are defined in the document as:

- 4(i) compliance with relevant national and local policy;
- 4(ii) magnitude and extent of compliance with ProPG;
- 4(iii) likely occupants of the development;
- 4(iv) acoustic design v unintended adverse consequences; and
- 4(v) acoustic design v wider planning objectives.

Each is discussed in turn below.

12.3.4.1 Compliance with Relevant National and Local Policy

There are no National policy documents relating to the acoustic design of residential dwellings. Locally the Cork Noise Action Plan 2024 – 2028 specifies that the guidance contained within ProPG should be used in assessing the noise impact on new residential developments.

This Acoustic Design Statement has been prepared in compliance with the requirements of ProPG and therefore complies with the requirements of local policy.

12.3.4.2 Magnitude and Extent of Compliance with ProPG

As discussed within this chapter, the following conclusion has been drawn with regards to the extent of compliance with ProPG:

- All dwellings as part of the development have been designed to achieve the good level of internal noise levels specified within ProPG. The units within 60m of the Dunkettle Road will require closed windows to achieve this level;
- External amenity areas have been assessed and calculated and they comply with the recommended criterion set out in ProPG across the vast majority of the site. The communal open spaces immediately within 60m of the Dunkettle Road are expected to be at or marginally above the ProPG upper noise level for external spaces.
- An assessment of the potential for adverse noise impacts during the overheating condition has also been included and it has concluded that there is a medium risk of an adverse impact which is considered acceptable if the overheating condition occurs for a limited period.

Based on the preceding, it is concluded that the proposed development is in compliance with the requirements of ProPG.

12.3.4.3 Likely Occupants of the Development

The criteria adopted as part of this assessment are based on those recommended for permanent dwellings and are, therefore, considered robust and appropriate for the likely occupants.

Acoustic Design v Unintended Adverse Consequences

Unintended adverse consequences did not occur in relation to this proposed development.

Acoustic Design v Wider Planning Objectives

There are no wider planning objectives that effect the acoustic design that are apparent at the time of writing.

12.3.5 Acoustic Design Statement Conclusion –LRD Phase 1 Eastern Section (Duplexes H1/H2 and House Types Fb and G Only)

An initial site noise risk assessment has been carried out in respect of the proposed development for the LRD Phase 1 Eastern Section (Duplexes H1/H2 and House Types Fb and G Only). The assessment has classified the immediately eastern section of the site as having 'low to medium' noise risk. This was determined through a review of published noise map data for the proposed development site.

Further discussion is presented in terms of the likely noise impact of both the external and internal areas of the proposed development. It will be necessary to provide enhanced acoustic glazing to ensure that when windows are closed that the internal noise environment is good. The noise level internally with the windows open will be higher than ideal. However, inhabitants will have the option to close the window to reduce the noise level internally with mechanical ventilation.

Appendix 12.2 Glossary of Acoustic Terminology

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Appendix 12.2 Glossary of Acoustic Terminology

Ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
Background noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 µPa).
dB(A)	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$D_{n,e,w}$	Weighted element-normalized level difference. This is the value of sound insulation performance of a ventilator measured under laboratory conditions. It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature for acoustic ventilators typically presents sound insulation data in terms of the $D_{n,e,w}$ parameter.
Hertz (Hz)	The unit of sound frequency in cycles per second.
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T).The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
L_{AF10}	Refers to those A-weighted noise levels in the upper 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the

	measurement period. It is typically representative of traffic noise levels. Measured using the “Fast” time weighting.
L_{AFmax}	is the instantaneous fast time weighted maximum sound level measured during the sample period.
Octave band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
R_w	Weighted Sound Reduction Index – This is the value of the sound insulation performance of a partition or element measured under laboratory conditions. It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature typically presents sound insulation data in terms of the R_w parameter.

Dunkettle EIAR

CHAPTER 15 Cultural Heritage

Appendix 15.1	Archaeological Inventory Entries
Appendix 15.2	Geophysical Survey Report
Appendix 15.3	Archaeological Test Trenching Report
Appendix 15.4	Photographic Record

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Appendix 15.1 Archaeological Inventory Entries

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Appendix 15.1: Archaeological Inventory Entries

The following descriptions are largely derived from the published 'Archaeological Inventory of County Cork. Volume 2: East and South Cork' (Dublin: Stationery Office, 1994). In certain instances, the entries have been revised and updated in the light of recent research or other survey sources.

Country House (Monument Number CO075-075----)
Late 18th century 2-storey house overlooking Lough Mahon in Lee Estuary. Entrance front (S) of 9 bays, 3-bay central breakfront. Central fanlighted doorcase with an entablature and engaged Tuscan columns (Bence-Jones 1978, 115). Plate glass sash windows, parapet wall. Rendered with stone quoins exposed on corners of house and breakfront. Hipped roof with central guttered valley; 4-bay deep. 'Screen walls with rusticated niches' join house to office wings extending back; the front ends of the wings being treated as 2-storey 2-bay pavilions with oculi in their upper storey (Bence-Jones 1978, 115). Office wings return in towards centre to enclose cobbled yard to rear. Bifurcating staircase and exceptionally well preserved early 19th century interior within.

Designed landscape - belvedere (CO075-049----)
The Archaeological Survey of Ireland does not present a summary of this structure on its website. However, the following description is from the National Inventory of Architectural Heritage (NIAH): Freestanding single-bay three-stage tower, built 1843-6, on a circular plan with single-bay four-stage turret on a circular plan. Derelict, 1983. Repointed coursed rubble stone walls originally rendered on margined tooled cut-limestone chamfered cushion course on repointed coursed rubble stone battered base with margined tooled limestone ashlar corbelled battlements on ogee consoles having roll-topped coping. Square-headed window openings in bipartite arrangement (first stage), margined tooled cut-limestone block-and-start surrounds having chamfered reveals with hood mouldings framing replacement windows. Pointed-arch window openings in bipartite arrangement (second stage), margined tooled cut-limestone block-and-start surrounds having chamfered reveals with hood mouldings framing replacement windows. Tudor-headed window openings in bipartite arrangement (top stage), margined tooled cut-limestone block-and-start surrounds having chamfered reveals with hood mouldings framing replacement windows. Set in landscaped grounds with cast concrete statue on coursed rubble stone battered pedestal.

Icehouse (CO075-080----)
Situated on the E bank of the Glashaboy River adjacent to a boat slip and boat house, on the demesne woodland of Dunkettle House (CO075-075----) located 350m to E. Dunkettle bridge and the River Lee located 125m to S. According to the Glashaboy Walk tourist trail leaflet, the icehouse at Dunkettle was; 'built c. 1700's - also site of ancient boat house and boat slip. Property of Dunkathel [Dunkettle] House [CO075-075----]' (Heritage Society Glanmire Area Community Association 2002).

Country house (CO074-026----)
Overlooking Lee estuary to S and mouth of Glashaboy River to W, built 1765 to design of Davis Duckart. Central block 3-storey, 9-bay; prominent quoins and elaborately carved cornice. Central 3-bay breakfront with pedimenta bove Baroque porch; above porch four pilasters enclose 3 central bays, surmounted by urns on the parapet (Glin 1967, 739). Symmetrical arcaded wings extend from rear of W and E elevations to pyramidal-roofed pavilions. 'The interior has an elaborate, double-ramp mahogany staircase' (Glin ibid.). 18th century prints show a plainer house with string course between ground and 1st floors. Plaster window surrounds, string courses at base of 1st and 2nd floor windows and pediment over breakfront all added. Roof originally parapeted; raised to extend to upper edge parapet; gabled roofs of wings also raised and pavilions heavily altered. Now owned by Brothers of Charity.

Church (CO074-104----)
In Glanmire village, St. Mary and All Saints C of I church. Built in 1784 on privately donated site (Lewis 1837, vol. 1, 654). Shown on 1842 OS 6-inch map as plain rectangle with small extension to W. Nave has pointed 1- and2- light windows on rendered N wall; aisle of uncoursed limestone blocks added to S with 2- and 3-light pointed windows. Short chancel, also of limestone blocks, has single pointed windows in N and S walls; central E window, 5 pointed lights divided by mullions. Vestry on S side of chancel. Rendered tower at W end; pointed arch entrance with traceried pointed fanlight on W face; blocked window on N face surmounted by clock; upper levels have octagonal belfry with slender spire.

Cloth Mill (CO075-001----)
On W bank of Glashaboy river 0.5km N of Glanmire. L-shaped complex shown on 1842 OS 6-inch map as Cloth mill; shown as Beetling mill on 1902 OS 6-inch map. Present L-shaped layout is constructed in two phases. Earliest structure (long axis N-S) on W side is of 4 storeys gable-ended with attic; stone-arched window opes. Attached to S end E wall is 4-storey, 7-bay mill (long axis E-W), with wheel-pit along E wall. Windows with brick surrounds with roof gabled to W, half hipped to E; date plaque (1796) on weatherslated S elevation. Smaller mid/late 19th century mill (long axis E-W) to N; decorated bargeboards along gable ends; wheel pit along E gable. Mill pond to N; two millraces flow S to power both mills. According to local information turbine installed 1929. Access to interior not gained. Functioned as saw-mill in recent past, now functions as furniture factory.

Corn Mill (CO075-002001-)
Indicated on 1842 OS 6-inch map as large complex on E bank of Glashaboy river. Rectangular mill (19.85m N-S; 12.5m E-W) survives; double gable-ended except for hipped E end of southern roof, with roof vent. W elevation of coursed limestone ashlar; two elliptically-headed doors at ground floorwith limestone surrounds, brick surrounds to rest of opes. Wheel-pit (Wth 4.1m) along E elevation; houses low breastshot iron waterwheel with pinion wheel attached to shrouding. Mill race still flowing approaching mill from N; remains of sluice-gate just N of wheel-pit. Five-bay extension from E elevation of mill survive; connected mill to large complex of buildings indicated to E of mill on 1842 and 1902 OS 6-inch maps but which no longer survive; straddling wheel-pit, burnt 1960 and subsequently rebuilt to present 1-storey height.

Lime Kiln (CO075-002002-)
In grounds of flour mill (CO075-00201-). Partially collapsed; front has arched recess (H 2.3m; Wth 2.9m); joist-holes above recess to support lean-to structure. Rear of kiln inaccessible.

Bridge (CO075-048----)
Hump-backed road bridge (Wth 8.85m) over Glashaboy river. Three semicircular arches with dressed voussoirs; pointed breakwaters.

Coach House (CO075-069----)
Late 18th/early 19th century 2-storey (over basement) coaching house of Glyntown House (in ruins) to SW. Hipped roof. Entrance front (S) of 5 bays; central 3-bay pedimented breakfront with wide arched doorway flanked by narrower arched door opes. Oval-shaped 1st floor windows with brick surrounds; oculus in pediment with brick surrounds. Brick string course between floors.

Mound (CO074-071---)
In pasture, on grounds of Castle Jane House. Oval grass-covered mound (5.5m x 8m; H 1.2m) locally regarded as ancient site.

Architectural fragment (CO075-094001-)

The well is built into a slight S-facing slope in ground, in a field of pasture. Water from the spring flows out from it and thus creates a wet boggy area immediately to the front. The well has an apsidal stone-built surround, built into the sloping ground. The top of the vault stones are now exposed, probably due to erosion. The front of the wall has a built façade but this has been damaged and only the west side is now intact; only the two basal stones survive in situ on the east side. The stones from which this façade is built are mostly dressed and two are from the arch of a 15th century ogee-headed window light. They both have a deep outer chamfered edge and a shallow inner chamfer. Only one of these is still in place, the other is now lying loose beside the well. These window stones formed the upper end stones of the facade and are inscribed with the date "1788". This is presumably the date when the surround of the well was built. The surviving arch stone of the well surround is also likely to be 15th century though it is not chamfered, and judging by the similarity of the dressing on the other stones of the façade these are also likely to late-medieval as well. There is no tradition that this well was ever venerated and is likely to be a secular well. A short distance to the north is a folly building (CO075-094002-) which also contains reused 15th century dressed stone matching in style the well stones and it is likely the well surround and the folly building were built at the same time. These dressed stones must have come from a nearby tower house but there is no tradition or local information regarding this, nor is any castle marked in this location on the OS maps.

Architectural fragment (CO075-094002-)

This is a two-phased construction. At the west end is a lime kiln and onto the east side of this a folly castellated building has been added creating a façade which disguises the lime kiln as part of the folly. The front opening of the kiln has been blocked up but the funnel is still evident from above though the top of the kiln is partially covered by scrub and ivy. The folly building is now a shell and the top part of the front wall has fallen though it is clear that the top of the wall was battlemented- these survive where the wall still stands to full height though that part now covered by ivy. The building is built against a rock outcrop on its north side so that it is not a free-standing structure (typically lime kilns are built into sloping ground). The front façade consists of a central ground-floor door, flanked on its west side by the blocked-up kiln opening and on its east side by a star-shaped recess. On the first floor there is a window ope directly above the ground-floor door. This is flanked by two niches with bluntly-pointed arched heads. The inside of the door surround is a re-set 15th century two-centred pointed arched surround. The inwardly curve of the jamb stones show this to have been a doorway in a spiral stairs. There is a deep chamfered edge and on the east side a pyramidal stop-chamfer with a plain horizontal roll at its apex. Also of this date and matching both the door and the stones at the nearby well (CO075-094001-) is the surround of the single-light window directly above. The top of this is now covered by ivy but the ogee-head is clear as is a recessed spandrel (at last on the west side). These dressed stones must have come from a nearby tower house but there is no tradition or local information regarding this, nor is any castle marked in this location on the OS maps.

CO074-052---- : Castle - tower house

At tip of low limestone projection, on S shore of river Lee; circular tower (diam. c. 10.5m), now surviving to two storeys; built directly on rock outcrop and now at N end of complex built 1828-9 (Coleman 1914, 175). Exterior face not visible ENE->WSW where later building abuts tower. round floor (int. diam. 6m) entered from base of spiral stairs through intelled doorway to S; now used as store. Evenly spaced, double-splayed embrasures to NE, N, NW, W and SW; latter ope smaller than other four which appear similar; all now blocked up at narrowest point (c. 0.85 from outsid eedge; c. 1.5m from inside edge; wth c. 0.6m). Inside of embrasures (wth1.75m) covered by plank-centred segmental arch (H c. 1.85m), base at floor level; outside covered by upward inclined lintels with downward inclined sill and splayed sides (max. H c. 0.75m; max. wth 1.2m). Recent roof now covers ground floor, but stone corbels indicate lower level of original wooden roof.

First floor chamber now part of bar/restaurant. Door from spiral stairs blocked and room now entered through recent doorway to S. Five evenly-spaced embrasures, off-set with ground floor opes, covered by segmental arches. Three central embrasures adopted to take window frames; embrasure to E has outer half blocked; embrasure to W has front part ivided by horizontal slab, below is splayed ope similar to those at ground level, now blocked; above is squat round-headed light. Stone corbels indicate level of original wooden roof.

Ground floor embrasures purpose-built gun ports; opes at first floor probably had similar function. Original tower ends at this height with plain cornice course but 18th century paintings show it standing at least two stories higher (Coleman 1914, facing 168; Coleman 1915, facing 1); these show 'handsome octagon room' (Smith 1750, vol 1, 358) atop tower and abutting tower to S gable-ended two-storey house, both of 18th century appearance. Present complex entered through embatteled gateway to S, with stone plaque recording 1828-9 rebuilding of entire complex to design of James and G.R. Pain, in neo-Gothic style; courtyard flanked by further embatteled buildings to W and S with stone wall to E; to S original circular tower, now surmounted by slimmer tower rising a further three storeys with slender turret attached containing spiral stairs (presumably rebuilt upwards from first floor level in 19th century); on E side of tower elaborate water-gate leading to slipway.

Built c. 1582 by citizens of Cork 'with artillery to resist pirates and other invaders' (Flood 1915, 102; Hayes-McCoy 1964, 32); sometimes mistakenly ascribed to Mountjoy (Smith 1750, vol 1, 358; Lewis 1837, vol. 1, 208 (Lewis gives date 1604); Coleman 1914, 169). Rare Irish example of circular tower built for cannon. Used throughout 18th and 19th centuries by Cork Corporation for entertaining and functions.

Built into external 1st floor wall of circular tower, in foyer of bar/restraunt, is fireplace removed here from Ronayn's Court (CO074-059---); large lintel with shallow elliptical arch cut on underside and edge roll moulding carried down jambs, topped by projecting cornice. Lintel bears the inscription "Morris Ronayn and Margaret Gould builded this house in the yeare of oure lorde 1627 and in the 3 yeare of Kinge Charles. Love god and neighbors"; centrally placed monogram "IHS", flanked by family armorial shields; also fleurs-de-lis and tudor rose (rubbing of inscription JCHAS 1912, facing 81).

Appendix 15.2 Geophysical Survey Report

November 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Geophysical Survey Report

Proposed residential development of lands at Dunkettle, Co. Cork

Client
O'Flynn Construction

Detection License
24R0003

TAG Project
2024IE02

Date
January 2024

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TARGET GEOPHYSICAL SURVEY REPORT 2024IE02
PROPOSED RESIDENTIAL DEVELOPMENT OF LANDS AT DUNKETTLE, CO. CORK

PROJECT BACKGROUND

Target Archaeological Geophysics Ltd. was appointed by O'Flynn Construction to undertake a geophysical survey at the site of a proposed residential development within lands presently attached to Dunkettle House, to the NE of Cork City. Located c.0.63km NW of the Dunkettle Interchange, to the E of the Glashaboy River estuary and the R639, and W of the M8 Motorway, the proposed development encompasses c.33ha of agricultural land sub-divided in to 8 adjacent fields situated c.0.2km NW of Dunkettle House. The geophysical survey of the site completed a total 25.32ha of high-resolution recorded magnetometry within the proposed development boundary, examining all lands available at the time of investigation.

This work was carried out as part of a pre-planning archaeological assessment being undertaken on behalf of the client by John Cronin & Associates. The geophysical survey was conducted under license from the National Monuments Service, Department of Housing, Local Government & Heritage with the following aims (detection license 24R0003):

- to identify geophysical anomalies of possible archaeological origin within the investigation areas
- accurately locate these anomalies and present the findings in graphical format
- describe the anomalies and discuss their likely provenance in a written report

ITM central coordinates: 572619 573510

Townland: Dunkettle

County: Cork

Landuse: Tillage & rough pasture

Landscape, soils, geology

The proposed development traverses predominantly W-SW facing agricultural land bordering the Glashaboy River estuary. Soils of the locality comprise of Clonroche (1100a) Association fine loamy drift overlying superficial geology derived from Devonian sandstones. Bedrock is characterised by Gyleen formation sandstone, mudstone and siltstone (Irish National Soils Map, 1:250,000k, V1b, 2014; Geological Survey of Ireland Spatial Resources, Public Data Viewer Series).

Archaeology

No recorded monuments and places are located within the boundary of the proposed development. The late 18th century Dunkettle country house lies c.0.2m to the SE. CO075-002001 (cornmill), CO075-002002 (lime kiln) & CO075-080 (icehouse) are also located in close proximity to the proposed development < 250m N & S-SW. The following extract from the National Monuments Service SMR database provides summary details of all RMPs located within a 1km radius of the proposed development:

SMR No.	Townland	ITM East	ITM North	Monument Class
CO075-048----	Ballinglanna, Poulacurry South	572756	574173	Bridge
CO074-026----	Lotamore	572485	572918	Country House
CO074-071----	Poulacurry South	572540	574699	Mound
CO074-104----	Poulacurry South	572393	574075	Church
CO075-001----	Poulacurry South	572814	574684	Mill - Cloth
CO075-002001-	Ballinglanna	572793	574029	Mill - Corn
CO075-002002-	Ballinglanna	572761	573957	Kiln - Lime
CO075-069----	Ballinglanna	573064	574810	Coach House
CO075-075----	Dunkettle	573185	572969	Country House
CO075-080----	Dunkettle	572810	572879	Icehouse

CO075-094001-	Ballinglanna	573291	573985	Architectural Fragment
CO075-094002-	Ballinglanna	573285	574008	Architectural Fragment
CO075-048----	Ballinglanna, Poulacurry South	572756	574173	Bridge
CO074-026----	Lotamore	572485	572918	Country House
CO074-071----	Poulacurry South	572540	574699	Mound
CO074-104----	Poulacurry South	572393	574075	Church
CO075-001----	Poulacurry South	572814	574684	Mill - Cloth
CO075-002001-	Ballinglanna	572793	574029	Mill - Corn
CO075-002002-	Ballinglanna	572761	573957	Kiln - Lime
CO075-069----	Ballinglanna	573064	574810	Coach House
CO075-075----	Dunkettle	573185	572969	Country House
CO075-080----	Dunkettle	572810	572879	Icehouse
CO075-094001-	Ballinglanna	573291	573985	Architectural Fragment
CO075-094002-	Ballinglanna	573285	574008	Architectural Fragment
CO075-048----	Ballinglanna, Poulacurry South	572756	574173	Bridge
CO074-026----	Lotamore	572485	572918	Country House
CO074-071----	Poulacurry South	572540	574699	Mound
CO074-104----	Poulacurry South	572393	574075	Church
CO075-001----	Poulacurry South	572814	574684	Mill - Cloth
CO075-002001-	Ballinglanna	572793	574029	Mill - Corn
CO075-002002-	Ballinglanna	572761	573957	Kiln - Lime

Fieldwork period	18th – 22nd January 2024
Geophysical technique	High-resolution recorded magnetometry (fluxgate gradiometry)
Report issue date	4th February 2024
Author	John Nicholls MSc.
Detection license no.	24R0003
Client	O'Flynn Construction
Archaeologists	John Cronin & Associates

1 SURVEY METHODOLOGY

1.1 Methodology

1.1.1 Geophysical survey by high-resolution recorded magnetometry was conducted in 8 areas (M1-M8) within the site of the proposed development, investigating 25.32ha of available land within a site boundary encompassing c.33ha.

1.1.2 The geophysical investigation employed an advanced multichannel fluxgate gradiometer system combined with cm precision GPS, recording magnetometer (fluxgate gradiometer) and GPS data simultaneously at rates of 50Hz and 1Hz. The geophysical data were acquired along parallel instrument traverses 3.64m in width, the instrumentation installed in 'tow configuration' for use with an ATV.

1.2 Instrumentation

1.2.1 The following table provides a summary of the survey methodology and geophysical instrumentation employed during the course of this work:

Technique	Sensor spacing	Sample rate	Instrumentation	Sensitivity/precision	No. of data recorded
Magnetometry (fluxgate gradiometry)	0.28m	50Hz	Multi-channel fluxgate gradiometer	<75pT/√Hz @ 1Hz (650mm baseline)	1,400,501
GPS	3.92m	1Hz	Trimble R10 (VRS)	<0.1m	34,829

1.2.2 The instrumentation and software employed for this geophysical survey were configured to apply a spatial resolution of c.80 magnetometer measurements per m^2. This spatial resolution meets with ease the 'Level 3 – Characterisation' EAC Guidelines for geophysical survey in archaeology (Schmidt et al, 2016).

1.3 Data processing

1.3.1 Post-fieldwork geophysical survey data processing was undertaken as follows:

Process	Description
i	Positioning of geophysical data based on real-time GPS measurements (WGS84 Geodetic CRS)
ii	Zero median transect processing for multi-sensor magnetometer data collected along parallel transects
iii	Transformation from WGS84 geodetic coordinate system to ITM (IRENET95) projected CRS
iv	Gridding (ordinary kriging)
v	Export of greyscale images georeferenced in ITM (IRENET95) projected CRS

1.3.2 To maintain the integrity of the processed geophysical data, and its correlation with the original raw on-site measurements, no further processing, filtering or 'smoothing' of the data was undertaken following steps i-v.

1.4 Data display

1.4.1 Figure 1 presents a site location diagram (scale 1:12,500), highlighting the site of the proposed development to the NW of Dunkettle House and Dunkettle Interchange with RMPs in a 1km radius indicated.

1.4.2 Figure 2 presents a summary greyscale of the results from geophysical survey in M1-M8 at a scale of 1:3000, with 1:1500 scale greyscales of the results presented in figures 3-5.

1.4.3 Figure 6 presents a summary interpretation of the results from geophysical survey in M1-M8 at a scale of 1:3000, with 1:1500 scale interpretation diagrams presented in figures 7-9.

2 GENERAL CONSIDERATIONS

2.1 Ground conditions & access

2.1.1 The geophysical survey investigated 7 good quality arable and pasture fields, 1 poorly maintained pasture field, and excluded an area of woodland to the N-NE.

2.1.2 The following table details the conditions of the terrain investigated during the course of the geophysical survey, and hectares of geophysical survey completed:

Areas	Description of terrain	Ha
M1	Well-drained undulating sub-rectangular stubble field with elevated ground to the W. Suitable ground conditions for geophysical survey throughout.	6.61
M2	Large sub-rectangular field with steep W facing slope to the E-NE. Despite the presence of an abandoned rape seed crop > 1m in height it was possible to complete the geophysical survey throughout the majority of this area.	4.95
M3	Poorly maintained pasture field facing N-E. Dense vegetation & small trees at the survey perimeter and E-SW precluded complete geophysical survey of this area.	0.93
M4	Well drained sub-rectangular stubble field facing S-W. Suitable ground conditions for geophysical survey throughout.	3.52
M5	Well drained sub-rectangular stubble field facing W. Suitable ground conditions for geophysical survey throughout.	3.37
M6	Well drained sub-rectangular stubble field facing W. Survey was precluded by remnants of a former boundary and deep machine tracks to the W and E-NE.	1.34
M7	Well drained sub-rectangular stubble field descending gently W-SW. Suitable ground conditions for geophysical survey throughout	2.43
M8	Good quality sub-rectangular pasture field descending gently W-SW. Suitable ground conditions for geophysical survey throughout	2.17

2.2 Modern interference

2.2.1 The results from geophysical survey in M1-M8 display an abundance of small-scale ferrous throughout. These are a common occurrence in magnetometer data and relate mostly to modern metallic debris in the topsoil.

2.2.2 Broad ferrous responses are also evident in the results, mostly at the perimeter of survey in proximity to existing field boundaries and modern surfaces, most notably NW-SE in M8.

2.3 Recent landuse & cultivation

2.3.1 Responses associated with former/suspected former boundaries are indicated by the results from survey in M1-M5. Remnants of former cultivation are also evident in the results for all areas, visible as closely spaced parallel linear responses on various alignments.

2.3.2 The survey data also highlight the locations of 2 buried services traversing M1, M3 and M5-M6.

2.4 Natural soil/geological variation

2.4.1 The geophysical survey has recorded an abundance of responses indicative of natural soil/geological variation. These are manifested as concentrations of weakly positive/negative linear/curvilinear variations.

3 GEOPHYSICAL SURVEY RESULTS

3.1 General overview

3.1.1 The results from geophysical survey in M1-M8 demonstrate a generally quiet magnetic background across the site and this is mostly within the range of +/-1.5nT. Weakly positive/negative natural soil/geological variations are present in abundance in all survey areas, with further responses in the data deriving from modern ferrous and recent landuse/cultivation.

3.1.2 No responses of definite archaeological character are present in the results from geophysical survey at the site. No concentrations of anomalies indicative of levelled enclosure remains, settlement activity or groups of potentially significant response have been recorded. Discrete positive anomalies, poorly defined linear responses and trends are present in the survey data. However, none of these exhibit notable characteristics or sufficient patterning to warrant an archaeological interpretation. These anomalies are mostly expected to derive from a combination of recent landuse, natural soil/geological variation and/or modern ferrous.

3.2 Survey results (figures 2-9)

3.2.1 The following table discusses the results from geophysical survey in M1-M8 within the site of the proposed development:

Discussion of survey results from M1-M8			
Area	**Anomaly(s)**	**Location**	**Description & likely provenance**
M1	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M1. The data highlight small-scale positives and linear trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation. Remnants of a former field boundary (historic mapping) traverse M1 N of centre roughly E-W. A buried service has been detected along the eastern survey limit, with numerous responses from natural soil/geological variation and cultivation also recorded.
M2	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M2. The results highlight small-scale positives likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation. Remnants of a former field boundary (historic mapping) traverse M2 N of centre roughly NW-SE, with cultivation trends and natural soil/geological variation present in abundance.
M3	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M3. The data highlight 1 small-scale positive and 2 linear trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation. 3 former/suspected former field boundaries traverse M3 roughly E-W, with multiple cultivation trends and some natural soil/geological variation also recorded.
M4	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M4. Small-scale positives and trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation have been recorded. A suspected former field boundary traverses M4 NW-SE S of survey centre, with cultivation trends and natural soil/geological variations apparent in abundance.
M5	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M5. Small-scale positives and trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation have been recorded. Remnants of a former boundary (historic mapping) traverse M5 from survey centre to the SW, with a buried service detected E of centre. Natural soil/geological variations and cultivation trends are also present in abundance.

M6	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M6. Small-scale positives and trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation have been recorded. A buried service traverses M6 E of centre with responses from natural soil/geological variation and cultivation trends also present.
M7	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M7. Small-scale positives and trends likely deriving from recent landuse, modern ferrous and/or natural soil/geological variation have been recorded. Cultivation trends and responses from natural soil/geological variation are present in abundance.
M8	NA	NA	No responses indicative of archaeological settlement/activity or significant potential are evident in the results from M8. Large-scale modern ferrous extends along much of the survey perimeter, with natural soil/geological variation and cultivation trends present in abundance. Small-scale positives present in the results are expected to derive from recent landuse, modern ferrous and/or natural soil/geological variation.

4 CONCLUSION

4.1 No concentrations of archaeological/potential archaeological response have been recorded by the geophysical survey conducted at the site of proposed development. No anomalies indicative of archaeological settlement, buried enclosure remains or groups of significant response have been recorded by the geophysical survey. The geophysical survey results instead highlight an abundance of responses associated with natural soil/geological variation, cultivation, former/suspected former boundaries and modern ferrous.

4.2 Numerous discrete positive anomalies and trends of uncertain origin have been recorded within the proposed development boundary by the geophysical survey. These anomalies are expected to relate to recent landuse, local soil/geological variation and/or modern ferrous. Where archaeological testing may be required in advance of proposed development of the site, it is advised that a number of these anomalies be examined to clarify their exact origin.

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Schmidt A, (2002), Archaeology Data Service. Geophysical Data in Archaeology. A guide to good practice.

Schmidt A, Linford P, Linford N, David A, Gaffney C, Sarris A, and Fassbinder J, (2016), EAC Guidelines for the Use of Geophysics in Archaeology.

ONLINE RESOURCES

Archaeological Survey of Ireland SMR Database:
https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=0c9eb9575b544081b0d296436d8f60f8

Bing Maps: https://www.bing.com/maps

Geological Survey of Ireland Spatial Resources, Public Data Viewer Series:
https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

Google Maps: https://www.google.com/maps

Geohive Mapviewer: http://www.geohive.ie

Irish National Soils Map, 1:250,000k, V1b (2014). Teagasc, Cranfield University (jointly funded by the EPA STRIVE Research Programme 2007-2013 & Teagasc): http://gis.teagasc.ie/soils/map.php

LIST OF FIGURES

APPENDIX

MAGNETOMETRY

Introduction

Magnetometry represents one of a suite of geophysical techniques employed in archaeological prospection to inform invasive work such as trial trenching and excavation.

Frequently used to determine the often non-visible boundaries of archaeological remains, magnetometer surveys enable archaeologists to identify the location, form and extent of a diverse array of archaeological features no longer visible at the surface.

Buried archaeological remains successfully identified using magnetometry include sites such as enclosure systems and deserted villages, hillforts and military encampments, henges and tumuli, villa/castle foundations, ecclesiastical settlements and formal gardens.

Background to application

The basis for use of magnetometry in archaeological prospection derives from the abundance of natural iron oxides in most soils, and our ability to measure subtle variations in the magnetic properties of these iron oxides caused by human activity. Discrete variations in soil magnetism associated with buried archaeological remains derive typically from in situ burning and organic enrichment of the soil, through activities such as cooking and heating; pottery manufacture and metal working; as well as use of fired building materials such as ceramic tiles and brick. These burnt, fired and organic rich deposits create subtle magnetic contrasts visible as discrete magnetic anomalies superimposed on the earth's geomagnetic field.

1. Magnetometer survey data in greyscale format highlighting pit remains SE of an enclosure and Roman villa.

2. Burnt-fired debris uncovered during excavation of the highlighted area SE of the same enclosure and Roman villa.

Magnetometer surveys conducted in both commercial and research archaeological investigations enable determination of the location, form and extent of buried archaeological remains. Data acquired from these surveys can be quickly generated into georeferenced images and interpretation layers to inform subsequent trial trenching and excavation.

Technology

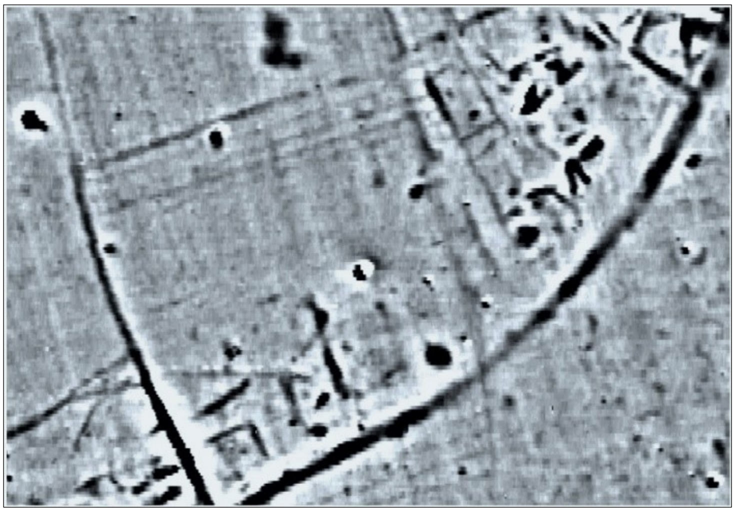
TARGET provides precise mapping and characterization of buried archaeological remains by employing an array of highly stable and sensitive fluxgate gradiometers, combined with an advanced data logging system and cm precision GPS. This state-of-the-art geophysical instrumentation, which is capable of collecting extremely dense data sets, permits detailed high-resolution survey of archaeological sites from as small as 1ha in size, to larger scale investigation of sites up to 150ha or more.

High resolution magnetometer surveys are undertaken as standard, recording data at c.5cm intervals with probe separations of 0.3m for precise measurement and characterization of buried archaeological remains. This spatial resolution meets with ease the 'Level 3 – Characterisation' EAC Guidelines recommendation for geophysical survey in archaeology (Schmidt et al, 2016).

Instrumentation is used in combination with cm precision GPS and data collected along parallel traverses with the system installed in 'tow configuration' for use with an ATV or in push mode.

Data Display

Greyscale plots are the most common format for displaying magnetometer data. This display format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within a given data set. This display method also enables the identification of discrete responses barely visible above natural 'background' magnetic variation on site.



6. Greyscale from survey at the site of a deserted medieval village.

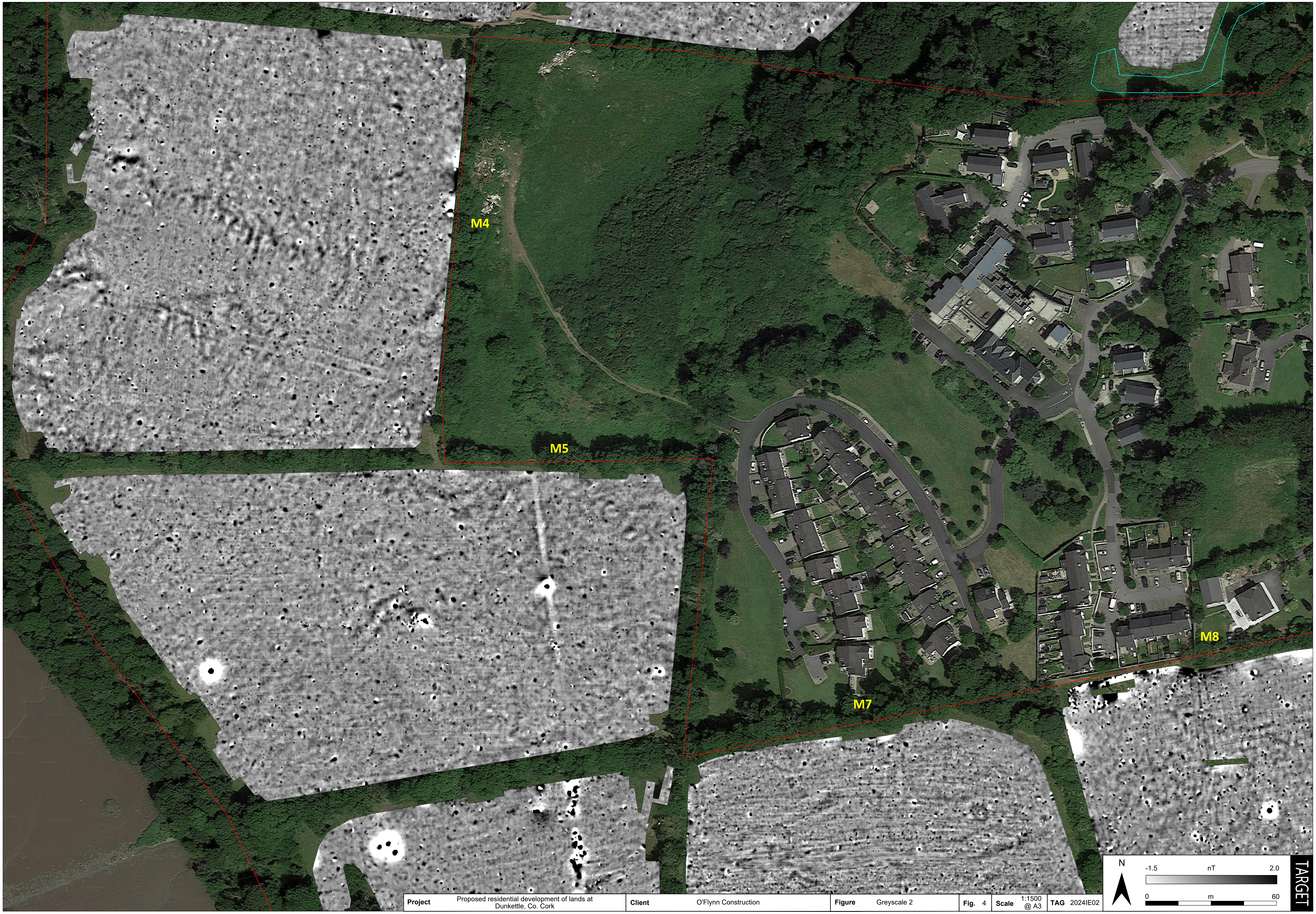
XY trace plots provide a near-perspective representation of measurements along individual lines of data recorded from each magnetometer sensor. The XY trace format is used as a conventional method for identifying responses of modern ferrous debris, and also as an aid in identifying locations of potential industrial features, such kilns and metal working.

7. XY trace from survey at the site of a deserted medieval village.

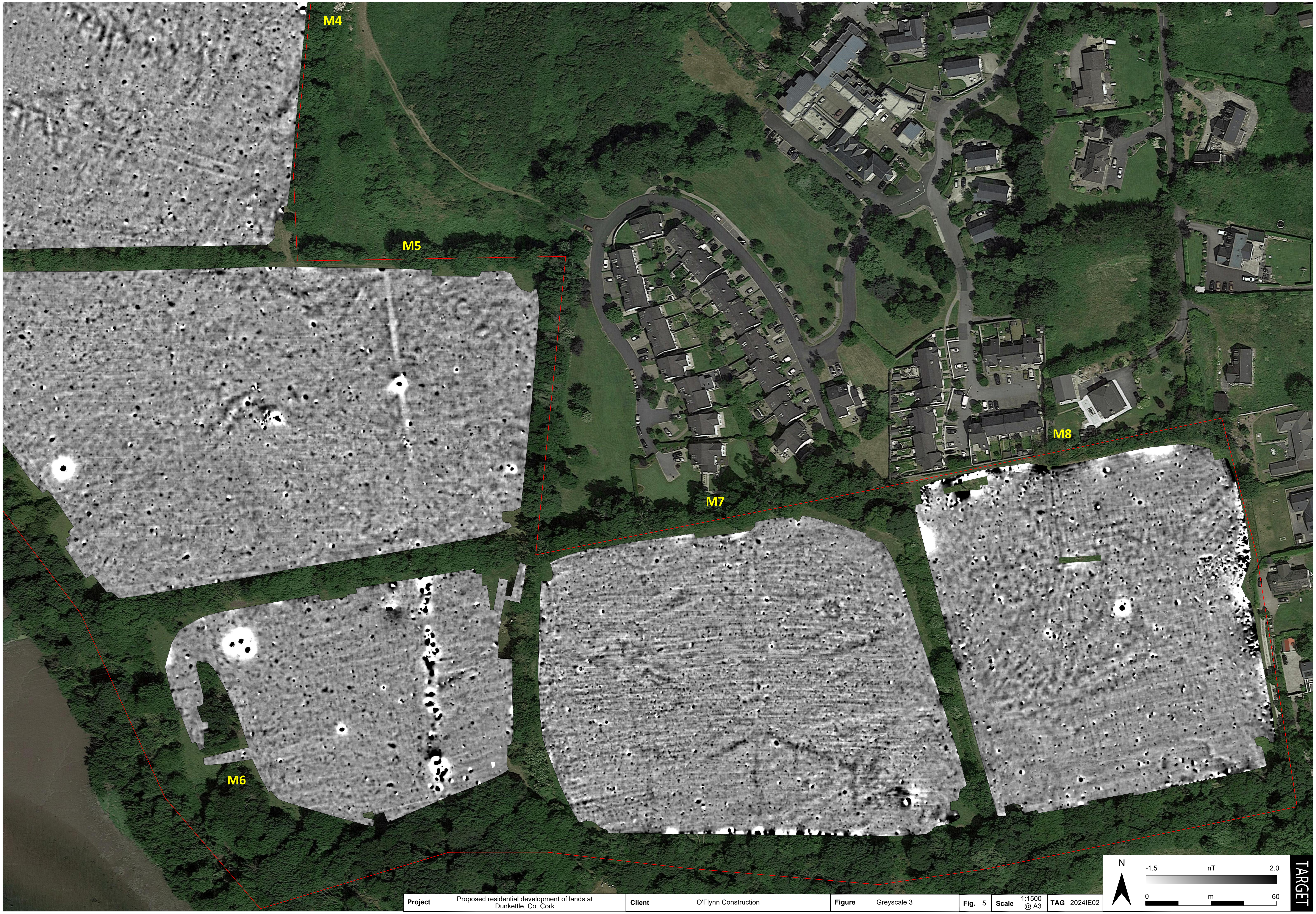
Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Site location	**Fig.** 1	**Scale** 1:12,500 @ A3	**TAG** 2024IE02

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Summary greyscale M1-M8	**Fig.**	2	**Scale**	1:3000 @ A3	**TAG**	2024IE02

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Greyscale 1	**Fig.**	3	**Scale**	1:1500 @ A3	**TAG**	2024IE02



Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Greyscale 2	**Fig.**	4	**Scale**	1:1500 @ A3	**TAG**	2024IE02



Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Greyscale 3	**Fig.**	5	**Scale**	1:1500 @ A3	**TAG**	2024IE02	TARGET

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Summary interpretation M1-M8	**Fig.**	6	**Scale**	1:3000 @ A3	**TAG**	2024IE02

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Interpretation 1	**Fig.**	7	**Scale**	1:1500 @ A3	**TAG**	2024IE02

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Interpretation 2	**Fig.**	8	**Scale**	1:1500 @ A3	**TAG**	2024IE02

Project	Proposed residential development of lands at Dunkettle, Co. Cork	**Client**	O'Flynn Construction	**Figure**	Interpretation 3	**Fig.**	9	**Scale**	1:1500 @ A3	**TAG**	2024IE02

Appendix 15.3 Archaeological Test Trenching Report

November 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

JOHN CRONIN & ASSOCIATES
ARCHAEOLOGY | CONSERVATION | HERITAGE | PLANNING

Archaeological Assessment
Large-scale residential development, Dunkettle, Glanmire, Cork City

Excavation Licence Number 24E0395

Prepared by
John Cronin & Associates
3a Westpoint Trade Centre
Ballincollig
County Cork

On behalf of
O'Flynn Construction Co. Unlimited Co.
Beckett House
Barrack Square
Ballincollig
Cork

April 2024

Contents

Core data

Excavation Licence Number	**24E0395**
Licence Holder	Colm Chambers
Site Type	Archaeological testing
Testing Commenced	10/04/2024
Testing Completed	22/04/2024
ITM Reference	573144, 573021
Townlands	Dunkettle
County	Cork
OS 6" Sheet	CO075
Planning authority	Cork City Council
Planning ref. no.	Pre-planning
Archaeological Contractor	John Cronin & Associates
Summary of findings	Twenty-nine linear test trenches with a combined length of 4735m were excavated across the proposed development site. Natural subsoil was identified at a depth of between 0.2m and 0.5m below modern surface level. While evidence of agricultural activity was revealed in most of the excavated trenches, **nothing of archaeological significance** was encountered during the testing programme.

1. Introduction

John Cronin & Associates were commissioned to undertake a programme of archaeological test trenching at the location of a proposed Large-scale Residential Development (LRD) in the townland of Dunkettle, Glanmire, County Cork (see **Figures 1** & **2** below). The test trenching was carried out between Wednesday 10th April and Monday 22nd April 2024 under **Excavation Licence Number 24E0395**, as issued by the National Monuments Service of the Department of Housing, Local Government and Heritage.

Figure 1: *General location of subject site (circled in red) at Dunkettle, Glanmire, County Cork (Source: Government of Ireland: Historic Environment Viewer)*

The programme of archaeological investigation was commissioned ahead of a planning application and on foot of a programme of geophysical survey carried out by **Target Archaeological Geophysics** under licence **24R0003** in January 2024.

The results from geophysical survey demonstrate a generally quiet magnetic background across the site and this was mostly within the range of +/-1.5nT. Weakly positive/negative natural soil/geological variations were noted in abundance in all survey areas, with further responses in the data deriving from modern ferrous and recent land use/cultivation. No responses of definite archaeological character were present in the results from geophysical survey at the site. No concentrations of anomalies indicative of levelled enclosure remains, settlement activity or groups of potentially significant response were noted. Discrete positive anomalies, poorly defined linear responses and trends were present in the survey data. However, **none of these exhibit notable characteristics or sufficient patterning to warrant an archaeological interpretation.** These anomalies were mostly expected to derive from a combination of recent land use, natural soil/geological variation and/or modern ferrous. This testing assessment should be read in conjunction with the report on the results of the programme of geophysical survey carried out under licence 24R0003.

The archaeological testing entailed the excavation of 29 no. linear trenches with a combined length of 4735m. The proposed development site is located within a rural setting on the expanding edge of Cork City and the lands are located to the north of Dunkettle House (Monument Number CO075-075----). The subject site is located *c*.0.63km northwest of the Dunkettle Interchange, to the east of the Glashaboy River estuary and the R639, and west of the M8 Motorway. The proposed development encompasses *c*.33ha of agricultural land sub-divided into eight adjacent fields situated to the northwest of Dunkettle House.

Section 2 of this report provides archaeological context for the general area within 1km of the proposed development site. **Section 3** summarises the results of the archaeological test trenching, while **Section 4** details the preliminary conclusions arising from the site investigations. In summary, no archaeological features were uncovered within the excavated test trenches.

2. Context

Location

The proposed development site encompasses *c.*33ha of agricultural land sub-divided into 8 adjacent fields situated on the expanding edge of Cork City (see **Figure 2**). The development site is bound to the west by Glashaboy River estuary, and the R639, to the east by the M8 motorway, to the north by Glanmire village and to the south by the N8 (Dunkettle interchange).

Figure 2: *Indicative site layout*

Archaeological and historical context

There are **no recorded archaeological sites within the lands comprising the proposed development area**. The late 18th century Dunkettle country house (CO075-075----) lies *c.*0.2m to the southeast. CO075-002001 (cornmill), CO075-002002 (lime kiln) and CO075- 080 (icehouse) are also located in close proximity to the proposed development *c.*250m north and south-southwest. However, none of these features will be directly impacted by the proposed development. The Government of Ireland's *Historic Environment Viewer* records **twelve archaeological** sites within *c*.1km of the proposed site boundary (see **Figure 3**).

Figure 3*: Recorded archaeological sites (shaded blue) located within c.1km of proposed development site (red), with 1km buffer outlined in yellow (Source: Government of Ireland: Historic Environment Viewer)*

Table 1: *List of recorded archaeological sites within approximately 1km of the proposed development site*

SMR No.	***Monument Class***	***Townland***	***ITM East***	***ITM North***
CO075-048----	Bridge	Ballinglanna, Poulacurry South	572756	574173
CO074-026----	Country House	Lotamore	572485	572918
CO074-071----	Mound	Poulacurry South	572540	574699
CO074-104----	Church	Poulacurry South	572393	574075
CO075-001----	Mill - Cloth	Poulacurry South	572814	574684

SMR No.	***Monument Class***	***Townland***	***ITM East***	***ITM North***
CO075-002001-	Mill - Corn	Ballinglanna	572793	574029
CO075-002002-	Kiln - Lime	Ballinglanna	572761	573957
CO075-069----	Coach House	Ballinglanna	573064	574810
CO075-075----	Country House	Dunkettle	573185	572969
CO075-080----	Icehouse	Dunkettle	572810	572879
CO075-094001-	Architectural Fragment	Ballinglanna	573291	573985
CO075-094002-	Architectural Fragment	Ballinglanna	573285	574008

Early Prehistoric

Traditionally, the earliest recorded evidence for human settlement in Ireland dates to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers arrived on the island, however recent evidence in the form of a butchered bear patella found in Alice and Gwendoline Cave near Ennis in Co. Clare now suggests that humans were present in Ireland during the Paleolithic period (Dowd & Carden 2016, 161). While the Mesolithic settlers did not construct any settlements or monuments that leave any above ground traces, their presence in an area can often be identified by scatters of worked flints in ploughed fields or shell middens adjacent to the coastline. There are no recorded sites dating to the Mesolithic period within the study area. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, begin to appear in the archaeological record during this period. No sites within the study area dated to this period.

Late Prehistoric periods

Metalworking arrived in Ireland with the advent of the Bronze Age period (*c.*2400–500 BC). This period was also associated with the construction of new monument types such as standing stones, stone rows, stone circles and *fulachta fia*. *Fulacht fia* translates as cooking places of the wild (or of deer), they are often interpreted as the remains of cooking sites and are the most numerous archaeological site type in Ireland, radiocarbon dating of excavated examples has generally produced dates in the Bronze Age (*c.*2400-500BC). A number of alternative interpretations have been forwarded as to the function of these archaeological sites, such as their potential uses as bathing, saunas, garment washing and dyeing, leather processing and even brewing sites. The development of new burial practices saw the construction of funerary monuments such as cairns, barrows, boulder burials and cists. The later first millennium BC and the early centuries AD comprise the Irish Iron Age, which is the most obscure period in the Irish archaeological record. While there is general agreement that the introduction of an iron technology was a significant factor in the eventual demise of bronze working on a large scale, but how, why and when this came about in Ireland is far from clear. **A mound within the study area may date to this period (CO074-071----).**

Early medieval

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (*c.*400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to ringforts but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. This period saw the emergence of the first phases of urbanisation around the large monasteries and the Hiberno-Norse ports. However, the dominant settlement pattern of the period continued to be rural-based in sites such as ringforts, which comprise roughly circular enclosures delimited by roughly circular earthen banks formed of material thrown up from a concentric external ditch. Ringforts are one of the most numerous monuments in the Irish landscape and the early medieval terms for these sites – rath/lios/dun these still form some of the most common place-name elements in the country. Archaeological excavations indicate that the majority of ringforts were early medieval farmsteads with internal timber buildings and were surrounded by associated field systems. No sites within the study area dated to this period.

Late and post-medieval

The arrival and conquest of large parts of Ireland by the Anglo-Normans in the late 12th-century broadly marks the advent of the Irish late medieval period, which continued up until the beginning of the post-medieval period in c.1550. Within the late medieval period, towns, markets, and fairs were established and change and reform was attempted in the Irish church. By the 15th-century the native Irish chieftains and lords began to establish tower houses and smaller castles as centres of territorial control. The post-medieval period (1550+) saw the development of high and low status stone houses throughout the Irish country. During this period any given settlement cluster is likely to have consisted primarily of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common in the 19th-century. In the latter half of the 20th-century, there was a radical change in the nature and character of Irish domestic architecture manifested by the replacement of older stone-built structures with modern bungalows of concrete blockwork construction. There are no sites within the study area that date to this period. **The cloth mills (CO075-001----; CO075-002001-), architectural fragments (CO075-094001-; CO075-094002-), lime kiln (CO075-002002-), country houses (CO074-026----; CO075-075), icehouse (CO075-080----), coach house (CO075-069----), church (CO074-104----) and bridge (CO075-048----) which are located within the study area likely date to this period.**

The site of the proposed development is located within the Civil Parish of Caherlag and is described as follows during the 19th century (Lewis 1837):

> *CAHIRLAG, a parish, in the barony of BARRYMORE, county of CORK, and province of MUNSTER, 6 miles (E. by N.) from Cork; containing 1840 inhabitants. It is situated on the road from Cork to Youghal, and comprises 3530 statute acres, as applotted under the tithe act: nearly one-third is held by private gentlemen and laid of in lawns, plantations, and pleasure grounds; the remaining two-thirds are almost equally divided between pasture and tillage. The dairy farms furnish Cork and its neighbourhood with a great quantity of butter, which is celebrated for its flavour. The tillage is conducted on an improved plan, the Scottish system being generally prevalent; and, from the vicinity of Cork and the sea, an abundance of various kinds of manure is easily obtained. The river Glanmire turns several valuable mills, of which the Glanmire boulting-mill is the property of R. Shaw, Esq.; a steam-engine is being erected for this mill, which will enable it to manufacture more than 25,000 barrels of flour annually. The river is navigable, at spring tides, to the bridge at Lower Glanmire for vessels of 40 tons' burden, which bring up coal, culm, and sea sand, for the supply of the neighbourhood. At Riverstown is a distillery belonging to Messrs. Lyons and Co., which is capable of making 180,000 gallons of spirits annually.*
>
> *The scenery of the parish and its vicinity is pleasingly diversified, and embellished with numerous gentlemen's houses, among which are Dunkettle, the seat of A. Morris, Esq.; Richmond, of R. Mannix, Esq.; Factory Hill, of W. Letch-field, Esq.; Glenville, of E. Newsom,*

> *Esq.; Glentown, of Mrs. McCall; Maryborough, of J. Wallis, Esq.; Rochgrove, of Simon Dring, Esq.; Glenburn, of A. Lewis, Esq.; Annmount, of the Rev. Dr. Coghlan; Killora Lodge, of the Rev. R. Berry; Woodville, of N.W. Cummins, Esq.;Killahora, of J. Martin, Esq.; Richmond, of the Rev. W.L. Beaufort; Northesk, of J. Carnegie, Esq.; New Glanmire Lodge, of the Rev. Dr. Collins; and Combermere Cottage of J. Keane, Esq.*

The Excavations Database

The Database of Irish excavation reports (available at excavations.ie) contains summary accounts of all archaeological excavations carried out in Ireland from the 1960s to present. This database was searched using map search as well as by townland names. A number of programmes of archaeological excavations and monitoring have taken place within the vicinity of the development area including works associated with the N25 Dunkettle Interchange Improvement (licences E004939, E005002 and E5029). A burnt mound was identified during these works. Testing ahead of a housing development to the east of the subject site was carried out under licence 18E0466 and this programme of testing did not identify anything of archaeological significance. The excavations summary is as follows:

> *A geophysical survey followed by test trenching was carried out within a housing development site in fields surrounding Ballinglanna House, an 18th-century country house, located to the south-east of Glanmire village. There is one recorded archaeological site within the development boundary and this comprises a number of medieval architectural fragments (CO075-094001-) set into a later well feature which will be maintained within a green area as part of the housing development. The geophysical survey was carried out by J.M. Leigh Surveys (18R0098) and indicated that the fields had been impacted upon by extensive ploughing activity. A number of small, isolated anomalies were tentatively interpreted as being of archaeological potential although a modern agricultural origin was not discounted. The layout of the thirty test trenches excavated within the site was designed to facilitate an examination of these features combined with a wider investigation of the fields. A licence for the use of a metal-detector was also obtained in order to assist in artefact retrieval (18R0162). A single musket ball was identified during metal detecting of trench upcast in the north end of the site and the other cultural inclusions noted in the trenches dated from the 18th century onward with a predominance of material dating to the 19th and 20th centuries.*
>
> *The test trench investigations confirmed that the soil profiles throughout the site had been disturbed down into the natural subsoil by widespread ploughing activity. The investigated anomalies originated from recent agricultural activity, including a spread of modern material adjacent to a farmyard, and no archaeological features were revealed.*

Cartographic Review

The detail on historic cartographic sources demonstrates the nature of past settlements and land use patterns in recent centuries and can also highlight the impacts of modern developments and agricultural practices. This information can aid in the identification of the location and extent of unrecorded or partially levelled features of archaeological or architectural heritage interest. The cartographic sources examined for the study areas include the 1:10,560 Ordnance Survey map (1837-42) (referred to as the first edition 6-inch OS map) and the 1:2500 Ordnance Survey map (1888-1913) (referred to as the 25-inch edition OS map).

The subject lands are shown as agricultural fields on historic mapping and no potential archaeological features were noted within the areas proposed for development.

Figure 4*: Extract from 1:10,560 Ordnance Survey map (1837-42) (Source: Government of Ireland, Historic Environment Viewer)*

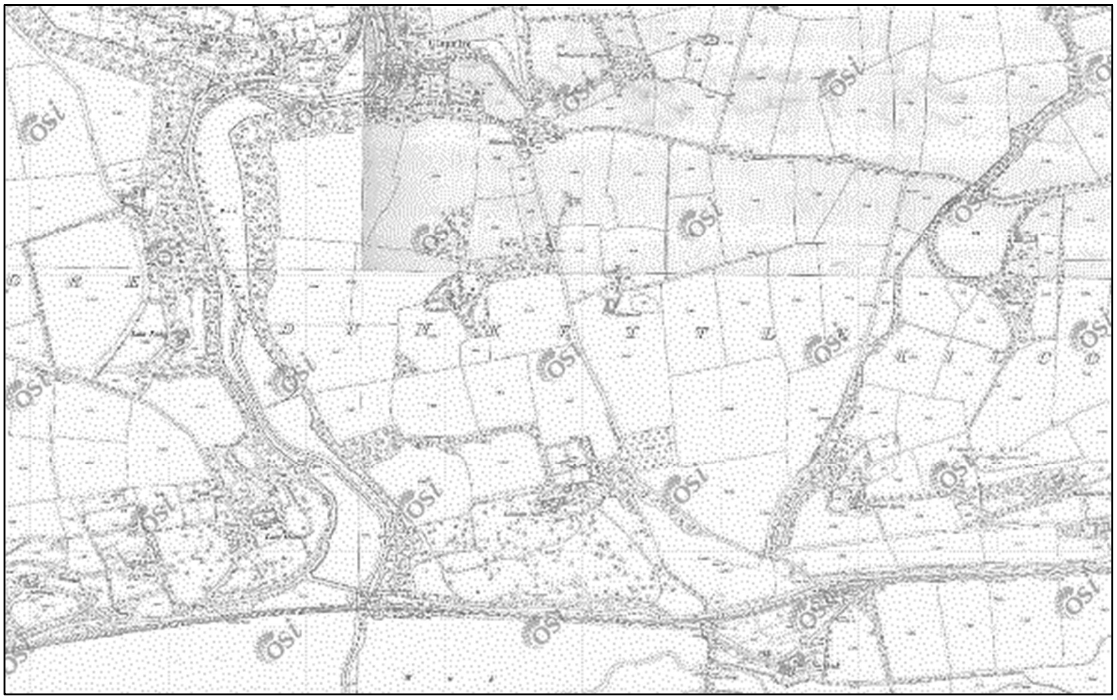


Figure 5: *Extract from 1:2500 Ordnance Survey map (1888-1913) (Source: Government of Ireland, Historic Environment Viewer)*

A review of available aerial images of the site revealed that it has been in use as a pasture field over previous decades and has not been developed. Nothing of potential archaeological nature was identified during this aerial review (**Figures 6** & **7**).

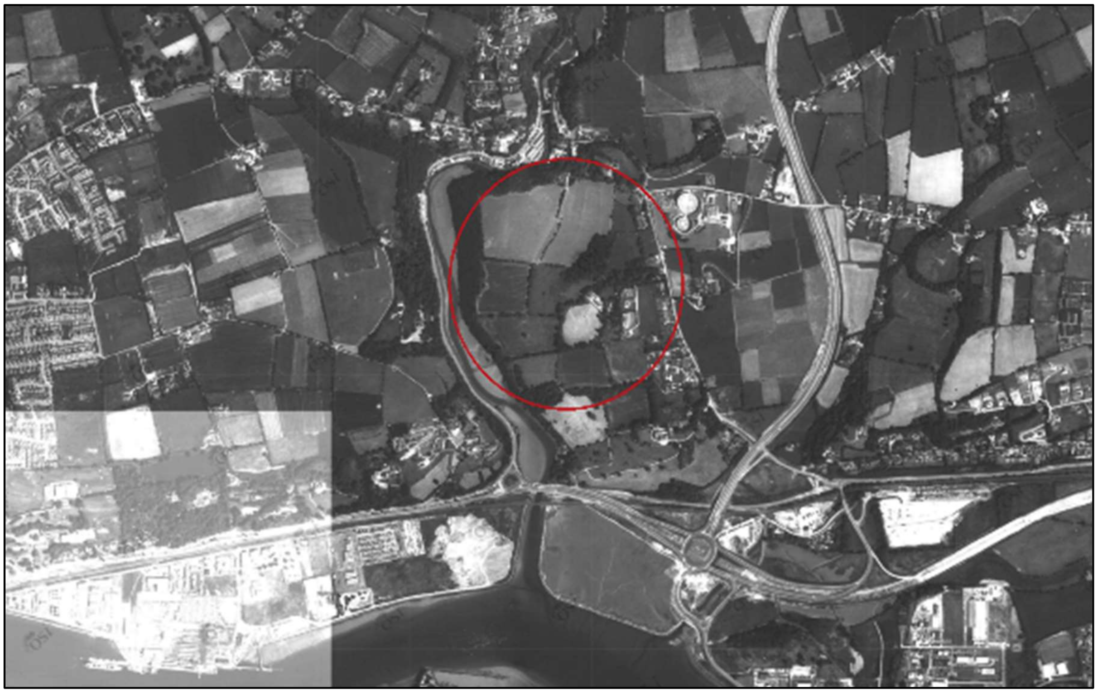


Figure 6: *Aerial view of the subject site and general location (red circle) c.1995 (Source: Government of Ireland)*

Figure 7: *Aerial view of the subject site and general location (red circle) c.2001 – 2005 (Source: Government of Ireland)*

Placenames

The proposed development is located within Dunkettle and there are a further five townlands within the *c*.1km wide study area. Townlands are the smallest unit of land division in the Irish landscape and many preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The layout and nomenclature of Irish townlands was recorded and standardised by the work of the Ordnance Survey in the 19th century. The Irish translations of the townlands names often refer to natural topographical features, but name elements may also give an indication of the presence of past human activity within the townland, e.g. dun, lios or rath indicate the presence of a ringfort while temple, saggart, termon or kill record an association with a church site. The Irish origins and translations for the townlands within the study area were sought from the Placename Database of Ireland.

Table 2: *Translation of townland names*

Townland	***Irish root***	***Translation***	***Earliest historical reference***
Dunkettle	*Dún Citil*	**Dún, dúnaibh** – fort	1301 'Dunkytill'
Ballinglanna	*Baile an Ghleanna*	**Baile** - townland, town, homestead **Gleann** – glen	1612 'Ballinglanny'
Inchera	*Inis Iarthach*	**Inis, inse** – island; river meadow	1624 'Inshipheragh'
Kilcoolishal	*Cill Chúil Íseal*	**Cill** – church **Cúil** – corner, nook	1301 'Coulissyll'
Poulacurry South	*Poll an Churraigh Theas*	**Currach** – marsh **Poll** – hole, pool (tidal-)stream?	1586 'Pollekerrye'
Wallingstown	*Baile an Bhailisigh*	**Baile** – townland, town, homestead	1301 'Walystown'

3. Results from archaeological testing

Overview

Archaeological testing at the site of a proposed large-scale residential development at Dunkettle, Glanmire, County Cork was undertaken between Wednesday 10th April and Monday 22nd April 2024 under Excavation Licence Number **24E0395**, as issued by the National Monuments Service.

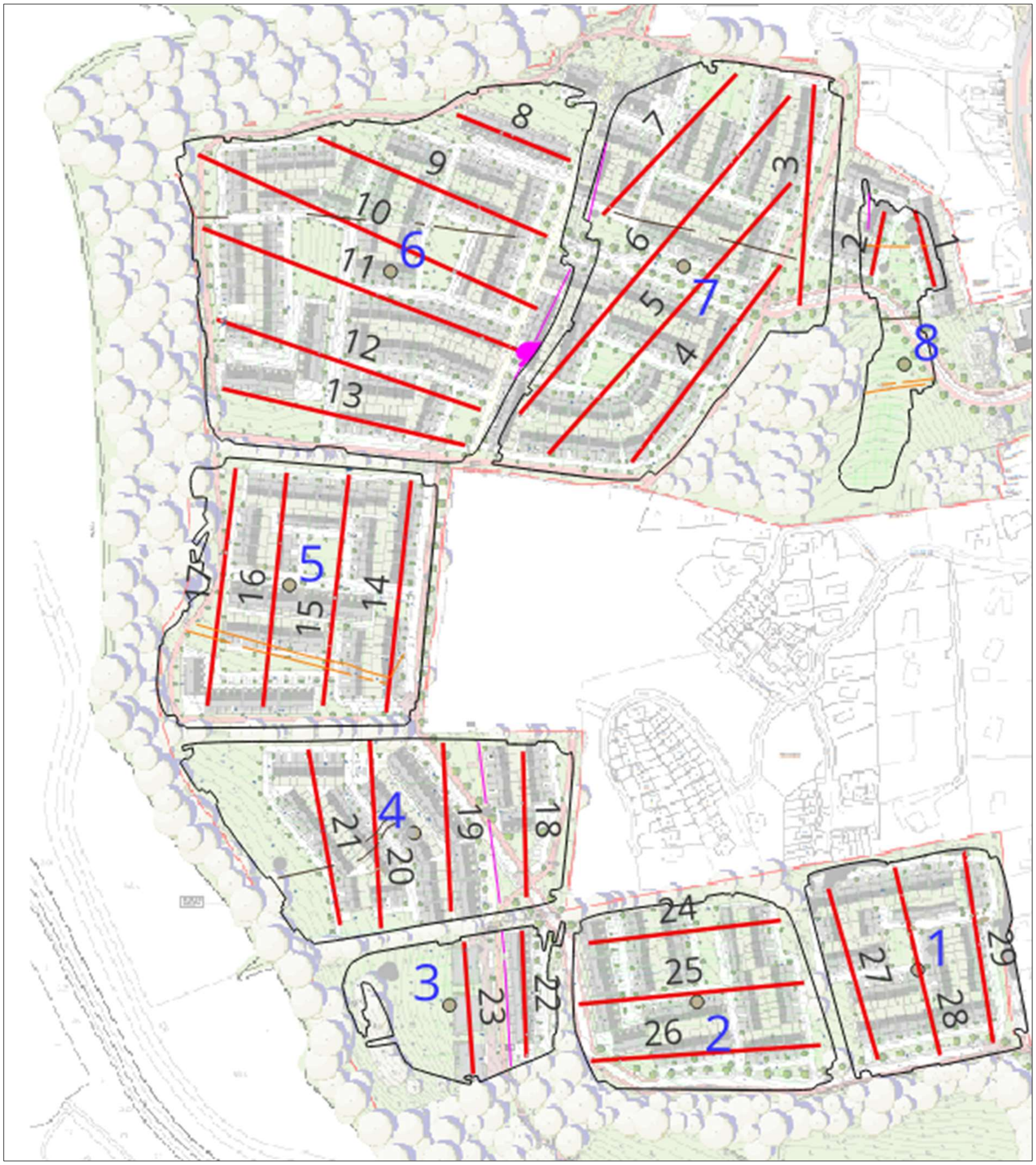


Figure 8: *Trenches excavated (red) for this programme of archaeological testing over indicative development layout, field numbers in blue*

A total of 29 test trenches were excavated across the site (see **Figure 8** above). The trenches varied in length between 50m and 310m and were excavated by a 20-tonne mechanical excavator, fitted with a 1.85m wide toothless grading bucket which operated under constant archaeological supervision. No difficulties were encountered during testing and all trenches were excavated to the complete lengths outlined in the method statement. A total of 4735 linear meters of trenches were excavated.

The weather conditions were varied between poor with persistent rain to dry and overcast. The natural subsoil was largely comprised of a mid-orange clayey silt with patches of whitish pink and was moderately well-draining, meaning that despite the rain, there was no retention of water within the open test trenches. Areas of outcropping bedrock were noted throughout the site.

The topsoil varied in depth across the site, ranging between 0.17m and 0.50m. The topsoil was largely comprised of a mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds, glass shards and occasional fragments of plastic and modern refuse.

While evidence of agricultural activity was revealed in the majority of the excavated trenches, **nothing of archaeological significance** was encountered during the testing programme.

Extracts from the photographic record are provided in the **Appendix** to this report, while each test trench is described below.

Trench ID	**Tr1**
Length	60m
Orientation	N/S
Description	Test trench 1 (Tr1) was excavated to a maximum depth of 0.43m below the existing surface level. The trench was excavated through a 0.34-0.43m thick layer of topsoil consisting dark-brown clayey silt and contained occasional small to medium sized sub-angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a pinkish orange clayey silt with frequent medium to large angular stones. Nothing of archaeological significance was encountered in this trench. **Plates 1 – 3**

Trench ID	**Tr2**
Length	50m
Orientation	N/S
Description	Test trench 2 (Tr2) was excavated to a maximum depth of 0.32m below the existing surface level. The trench was excavated through a 0.28-0.32m thick layer of topsoil consisting dark-brown clayey silt and contained very frequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a purplish, pinkish orange silty clay across the trench with frequent large angular stones. Bedrock was noted towards the northern end of the trench. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench. **Plates 4** & **5**

Trench ID	**Tr3**
Length	170m
Orientation	N/S
Description	Test trench 3 (Tr3) was excavated to a maximum depth of 0.38m below the existing surface level. The trench was excavated through a 0.19-0.38m thick layer of topsoil consisting dark-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange silty clay with patches of whitish pink across the trench with occasional large angular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Some discrete burning was noted near the centre of the cutting, and this was interpreted as the result of root burning. An east to west orientated stone drain type feature was noted in this trench and measured 0.80m in width. A stony linear traversed the trench west to west and measured 1.0m in width and 0.10m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 6 & 8**

Trench ID	**Tr4**
Length	185m
Orientation	NE/SW
Description	Test trench 4 (Tr4) was excavated to a maximum depth of 0.33m below the existing surface level. The trench was excavated through a 0.2-0.33m thick layer of topsoil consisting dark-brown clayey silt and contained very frequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish orange silty clay across the trench with patches of whitish pink, with occasional large angular stones. Occasional ephemeral linear features crossed this trench with an north to south orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench. **Plates 9, 10 & 11**

Trench ID	**Tr5**
Length	275m
Orientation	NE/SW
Description	Test trench 5 (Tr5) was excavated to a maximum depth of 0.28m below the existing surface level. The trench was excavated through a 0.25-0.28m thick layer of topsoil consisting dark-brown clayey silt and contained very frequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clay with patches of whitish pink and occasional decayed bedrock at the east. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A series of shallow (0.05m depth) furrows orientated east to west were also identified. Nothing of archaeological significance was encountered in this trench. **Plates 12 & 13**

Trench ID	**Tr6**
Length	310m
Orientation	NE/SW
Description	Test trench 6 (Tr6) was excavated to a maximum depth of 0.35m below the existing surface level. The trench was excavated through a 0.2-0.35m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. The topsoil had a high concentration of roots at the southwest portion which bordered the field boundary which was marked with a stone wall and medium height deciduous treeline. Subsoil was comprised of a mid-orange clay with patches of whitish pink and occasional decayed bedrock at the east. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A modern stone drain orientated southwest to northeast was also identified and measured 0.40m in width and 0.16m in depth, its fill consisted of graded stones. A series of furrows orientated west to east were also identified and measured on average 0.54m in width and 0.04m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 14** & **15**

Trench ID	**Tr7**
Length	145m
Orientation	NE/SW
Description	Test trench 7 (Tr7) was excavated to a maximum depth of 0.44m below the existing surface level. The trench was excavated through a 0.27-0.44m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish orange clayey silt across the trench with frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with a north to south orientation, these were interpreted as being related to cultivation. A modern stone drain was identified within this trench orientated north to south and measured 0.80m in width and contained modern ceramic/pipe sherds. This was likely indicated on the geophysics results. Nothing of archaeological significance was encountered in this trench. **Plates 16, 17** & **18**

Trench ID	**Tr8**
Length	95m
Orientation	NW/SE
Description	Test trench 8 (Tr8) was excavated to a maximum depth of 0.35m below the existing surface level. The trench was excavated through a 0.25-0.35m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish orange clayey silt across the trench with patches or greyish white and frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with a southwest to northeast orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench.

	Plates 19 & 20

Trench ID	**Tr9**
Length	185m
Orientation	NW/SE
Description	Test trench 9 (Tr9) was excavated to a maximum depth of 0.30m below the existing surface level. The trench was excavated through a 0.24-0.30m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a bright orange clayey silt across the trench with frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. They measured on average 0.20m in width and 0.05m in depth. There were occasional pockets of charcoal associated with root burning/land clearance. A northwest to southeast orientated furrow was identified and measured 0.40m in width and 0.03m in depth. A shallow and irregular pit was identified with modern pottery within its fill. These features were indicated on the geophysics results. Nothing of archaeological significance was encountered in this trench. **Plates 21 & 22**

Trench ID	**Tr10**
Length	280m
Orientation	NW/SE
Description	Test trench 10 (Tr10) was excavated to a maximum depth of 0.28m below the existing surface level. The trench was excavated through a 0.22-0.28m thick layer of topsoil consisting mid-brown clayey silt and contained very frequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt across the trench with patches of whitish pink. There were frequent inclusions of small to medium sized subangular stones. A patch of quarry-type material was identified sporadically in the southeastern portion of the trench but was likely a variation in the natural due to its lack of regularity. Occasional ephemeral linear features crossed this trench with a northeast to southwest orientation, these were interpreted as being related to cultivation. They measured on average 0.40m in width and 0.06m in depth. There were occasional pockets of charcoal associated with root burning/land clearance. Nothing of archaeological significance was encountered in this trench. **Plates 23, 24 & 25**

Trench ID	**Tr11**
Length	250m
Orientation	NW/SE
Description	Test trench 11 (Tr11) was excavated to a maximum depth of 0.33m below the existing surface level. The trench was excavated through a 0.24-0.33m thick layer of topsoil consisting mid-brown clayey silt and contained very frequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt across the trench with patches of whitish pink. There were frequent inclusions of small to medium sized subangular stones.

	Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A patch of gravel/slate-like mix of material was located at the southeast end of the trench and interpreted as a variation in the natural. Nothing of archaeological significance was encountered in this trench. **Plates 26** & **27**

Trench ID	**Tr12**
Length	210m
Orientation	NW/SE
Description	Test trench 12 (Tr12) was excavated to a maximum depth of 0.29m below the existing surface level. The trench was excavated through a 0.22-0.29m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt at the northwest end of the trench and changed to an orangish yellow from the centre to the southeast end with patches of whitish pink. There were frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with a north to south orientation, these were interpreted as being related to cultivation and were indicated on the geophysical survey results. A patch of quarry material was located at the northwest end of the trench. This material contained a dump of modern refuse including modern pottery sherds, modern plastic, a cow tag, animal bone with clean cut marks indicating modern butchering and shells. The material extended from the northwest end of the trench for 6.5m and covered the width of the trench. Nothing of archaeological significance was encountered in this trench. **Plates 28, 29, 30** & **31**

Trench ID	**Tr13**
Length	190m
Orientation	NW/SE
Description	Test trench 13 (Tr13) was excavated to a maximum depth of 0.34m below the existing surface level. The trench was excavated through a 0.27-0.34m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt across the trench and consisted of frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench. **Plates 32** & **33**

Trench ID	**Tr14**
Length	175m
Orientation	N/S
Description	Test trench 14 (Tr14) was excavated to a maximum depth of 0.41m below the existing surface level. The trench was excavated through a 0.33-0.41m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic.

	Subsoil was comprised of a mid-orange clayey silt across the trench with patches of greyish orange. Occasional ephemeral linear features crossed this trench with a north to south orientation, these were interpreted as being related to cultivation. A former land cultivation/cultivation boundary was identified in the southern portion of this trench, orientated northeast to southwest and measured 1.04m in width and between 0.03m to 0.08m in depth. It consisted of a compact, stony, greyish brown silty fill. Nothing of archaeological significance was encountered in this trench. **Plates 34, 35** & **36**

Trench ID	**Tr15**
Length	175m
Orientation	N/S
Description	Test trench 15 (Tr15) was excavated to a maximum depth of 0.45m below the existing surface level. The trench was excavated through a 030-0.45m thick layer of topsoil consisting mid-brown clayey silt and contained very frequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt across the trench with patches of greyish orange and frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Patches of charcoal were identified and associated with root burning/land clearance. A former land cultivation/cultivation boundary was identified in the southern portion of this trench at a southeast to northwest orientation, this was indicated by the geophysical survey results. It measured 2.10m in width and contained modern pottery sherds. Nothing of archaeological significance was encountered in this trench. **Plates 37, 38** & **39**

Trench ID	**Tr16**
Length	175m
Orientation	N/S
Description	Test trench 16 (Tr16) was excavated to a maximum depth of 0.40m below the existing surface level. The trench was excavated through a 0.30-0.40m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a mid-orange clayey silt in the northern portion of the trench with patches of greyish orange and frequent inclusions of small to medium sized subangular stones. It became more compact and a whitish, greyish purple to the southern portion. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A former land cultivation/cultivation boundary was identified in the southern portion of this trench at a southeast to northwest orientation, this was indicated by the geophysical survey results. It measured 1.7m in width and 0.05m in depth. Another likely cultivation boundary was identified, also orientated southeast to northwest measured 1.0m in width. This was also indicated on the geophysical survey results. Nothing of archaeological significance was encountered in this trench. **Plates 40, 41,** & **42**

Trench ID	**Tr17**
Length	175m
Orientation	N/S
Description	Test trench 17 (Tr17) was excavated to a maximum depth of 0.42m below the existing surface level. The trench was excavated through a 0.30-0.42m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish orange clayey silt across the trench with patches of greyish purplish orange. An east to west orientated furrow was identified and measured 0.81m in width and 0.02m in depth. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A former land cultivation/cultivation boundary was identified in the southern portion of this trench at a southeast to northwest orientation, this was indicated by the geophysical survey results. It measured 1.40m in width and 0.28m in depth and varied greatly in depth from how the ditch was seen in trenches 16, 15 and 14. Another likely cultivation boundary was identified, also orientated southeast to northwest measured 0.8m in width. This was also indicated on the geophysical survey results. Nothing of archaeological significance was encountered in this trench. **Plates 43** & **44**

Trench ID	**Tr18**
Length	115m
Orientation	N/S
Description	Test trench 18 (Tr18) was excavated to a maximum depth of 0.25m below the existing surface level. The trench was excavated through a 0.20-0.25m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic and glass shards. Subsoil was comprised of a brownish orange clay across the trench with frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with a north to south orientation, these were interpreted as being related to cultivation and were 0.05m in width. Occasional north to south orientated agricultural furrows were noted and measured 0.50m in width and 0.05m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 45** & **46**

Trench ID	**Tr19**
Length	125m
Orientation	N/S
Description	Test trench 19 (Tr19) was excavated to a maximum depth of 0.25m below the existing surface level. The trench was excavated through a 0.20-0.25m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a brownish orange clay across the trench with frequent inclusions of small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with a north to south orientation, these were interpreted as being related to cultivation and were 0.05m in width. Occasional north to south orientated agricultural furrows were noted and measured 0.50m in width and 0.05m in depth.

	Nothing of archaeological significance was encountered in this trench. **Plates 47** & **48**

Trench ID	**Tr20**
Length	140m
Orientation	N/S
Description	Test trench 20 (Tr20) was excavated to a maximum depth of 0.25m below the existing surface level. The trench was excavated through a 0.2-0.25m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a brownish orange clay across the trench with frequent inclusions of small to medium sized subangular stones. A large east to west linear which was shown on the geophysical survey results was identified and measured 1.2m in width and 0.6m in depth. It had steep, V-shaped sides and contained modern pottery sherds. Nothing of archaeological significance was encountered in this trench. **Plates 49** & **50**

Trench ID	**Tr21**
Length	135m
Orientation	N/S
Description	Test trench 21 (Tr21) was excavated to a maximum depth of 0.50m below the existing surface level. The trench was excavated through a 0.28-0.50m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish orange clayey silt across the trench with frequent small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A series of east to west orientated agricultural furrows were identified and measured 0.20m in width and 0.04m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 51** & **52**

Trench ID	**Tr22**
Length	95m
Orientation	N/S
Description	Test trench 22 (Tr22) was excavated to a maximum depth of 0.25m below the existing surface level. The trench was excavated through a 0.21-0.25m thick layer of topsoil consisting mid-brown clayey silt and contained very frequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish pinkish orange clayey silt across the trench with frequent small to medium sized subangular stones with outcropping bedrock to the northern portion of the trench. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A series of east to west orientated agricultural furrows were identified and measured 0.20m in width and 0.04m in depth. A patch of modern quarrying type material was identified in the central portion of the trench and measured 7m in length and expanded beyond the

	width of the trench. It consisted of modern refuse material including animal bone with clean cut marks indicating modern butchery, modern pottery sherds, glass shards and metal fragments. The fill was a graded stone fill. There were foul sewer services running north to south across the central portion of this field. Nothing of archaeological significance was encountered in this trench. **Plates 53, 54, 55** & **56**

Trench ID	**Tr23**
Length	100m
Orientation	N/S
Description	Test trench 23 (Tr23) was excavated to a maximum depth of 0.25m below the existing surface level. The trench was excavated through a 0.10-0.25m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a yellowish pinkish orange clayey silt across the trench with frequent small to medium sized subangular stones with outcropping bedrock to the northern portion of the trench. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench. **Plates 57** & **58**

Trench ID	**Tr24**
Length	145m
Orientation	E/W
Description	Test trench 24 (Tr24) was excavated to a maximum depth of 0.32m below the existing surface level. The trench was excavated through a 017-0.32m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a pinkish yellowish orange clay across the trench with patches of greyish purple variation. It consisted of frequent small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A series of east to west furrows were also identified and were indicated on the geophysical survey results. Occasional pockets of charcoal were identified and associated with root burning/land clearance. Nothing of archaeological significance was encountered in this trench. **Plates 59, 60** & **61**

Trench ID	**Tr25**
Length	175m
Orientation	E/W
Description	Test trench 25 (Tr25) was excavated to a maximum depth of 0.39m below the existing surface level. The trench was excavated through a 0.25-0.39m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a pinkish yellowish orange clay across the trench with patches of greyish purple variation. It consisted of frequent small to medium sized subangular stones.

	Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A series of east to west orientated furrows were also noted and indicated on the geophysical survey results. Nothing of archaeological significance was encountered in this trench. **Plates 62, 63 & 64**

Trench ID	**Tr26**
Length	175m
Orientation	E/W
Description	Test trench 26 (Tr26) was excavated to a maximum depth of 0.36m below the existing surface level. The trench was excavated through a 0.22-0.36m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of an orangish pink clay in the eastern portion and a yellowish orange towards the western portion of the trench. It consisted of frequent small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. East to west agricultural furrows were also identified and measured on average 0.25m in width and 0.04m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 65 & 66**

Trench ID	**Tr27**
Length	135m
Orientation	N/S
Description	Test trench 27 (Tr27) was excavated to a maximum depth of 0.42m below the existing surface level. The trench was excavated through a 0.2-0.42m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a pinkish orange clayey silt across the trench with patches of greyish purple variation. It consisted of frequent small to medium sized subangular stones. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. Nothing of archaeological significance was encountered in this trench. **Plates 67 & 68**

Trench ID	**Tr28**
Length	145m
Orientation	N/S
Description	Test trench 28 (Tr28) was excavated to a maximum depth of 0.28m below the existing surface level. The trench was excavated through a 0.2-0.28m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, occasional modern pottery sherds and fragments of plastic. Subsoil was comprised of a purplish orange clay to the northern portion of the trench and changes to a mid-orange from the centre to the southern portion. It consisted of

	frequent small to medium sized subangular stones. Occasional patches of outcropping bedrock to the northern portion. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A 7.5 tonne machine was used to excavate this trench. Nothing of archaeological significance was encountered in this trench. **Plates 69** & **70**

Trench ID	**Tr29**
Length	145m
Orientation	N/S
Description	Test trench 29 (Tr29) was excavated to a maximum depth of 0.22m below the existing surface level. The trench was excavated through a 0.2-0.22m thick layer of topsoil consisting mid-brown clayey silt and contained very infrequent small to medium angular stones, modern pottery sherds and fragments of plastic. Subsoil was comprised of a purplish orange clay to the northern portion of the trench and changes to a mid-orange from the centre to the southern portion. It consisted of frequent small to medium sized subangular stones. Occasional patches of outcropping bedrock to the northern portion. Occasional ephemeral linear features crossed this trench with an east to west orientation, these were interpreted as being related to cultivation. A 7.5 tonne machine was used to excavate this trench. A series of north to south orientated furrows were identified and indicated on the geophysical survey results. They measured on average 0.50m in width and 0.13m in depth. Nothing of archaeological significance was encountered in this trench. **Plates 71, 72** & **73**

4. Conclusions and recommendations

Conclusions

The proposed development site at Dunkettle, Glanmire, County Cork has been archaeologically assessed by way of site inspection, geophysical survey, and archaeological testing. The archaeological testing was undertaken between Wednesday 10th April and Monday 22nd April 2024 under Excavation Licence Number **24E0395**, as issued by the National Monuments Service.

The testing programme was carried out ahead of a planning application and on foot of a programme of geophysical survey carried out by **Target Archaeological Geophysics** under licence **24R0003** in January 2024.

A total of 29 linear test trenches with a combined length of 4735m were excavated across the subject site. Natural subsoil was identified at a depth of between 0.17m and 0.5m below the modern surface level. Evidence of agricultural activity was encountered; however, ***no artefacts, features or deposits of archaeological significance were revealed within the excavated test trenches.***

Recommendations

The absence of archaeological material from (a) the excavated test trenches, along with (b) the findings of the desktop review and (c) a programme of geophysical survey, indicate that there is ***very low potential*** for deposits and features of archaeological significance to be present within the development lands.

No further archaeological mitigation measures are recommended in advance of the proposed development.

It should be noted that the above recommendations are subject to the approval of the National Monuments Service and Cork County Council.

5. References/sources

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Appendix: Photographic record

Plate 1: *Trench 1, facing south*

Plate 2: *Trench 1, facing north*

Plate 3: *Modern pottery sherds from Trench 1*

Plate 4: *Trench 2, facing south*

Plate 5: *Trench 2, facing north*

Plate 6: *Trench 3, facing northeast*

Plate 7: *Trench 3, stone drain, facing northeast*

Plate 8: *Trench 3, showing slot in furrow, facing southwest*

Plate 9: *Trench 4, facing southwest*

Plate 10: *Trench 4, facing northeast*

Plate 11: *Trench 4, modern pottery sherd*

Plate 12: *Trench 5, facing southwest*

Plate 13: *Trench 5, facing northeast*

Plate 14: *Trench 6, facing northeast*

Plate 15: *Trench 6, facing southwest*

Plate 16: *Trench 7, facing southwest*

Plate 17: *Trench 7, facing northeast*

Plate 18: *Trench 7, modern stone drain, facing northeast*

Plate 19: *Trench 8, facing northwest*

Plate 20: *Trench 8, facing southeast*

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Plate 21: *Trench 9, facing southeast*

Plate 22: *Trench9, facing northwest*

Plate 23: *Trench 10, facing southwest*

Plate 24: *Trench 10, facing northeast*

Plate 25: *Trench 10, quarry type material/natural variation, facing northeast*

Plate 26: *Trench 11, facing northwest*

Plate 27: *Trench 11, facing southeast*

Plate 28: *Trench 12, facing northwest*

Plate 29: *Trench 12, facing southeast*

Plate 30: *Trench 12, modern quarry and refuse material, facing southeast*

Plate 31: *Trench 12, modern agricultural furrow with slot, facing southeast*

Plate 32: *Trench13, facing northwest*

Plate 33: *Trench 13, facing southeast*

Plate 34: *Trench 14, facing north*

Plate 35: *Trench 14, facing south*

Plate 36: *Trench 14, modern ditch (seen on historic OS mapping w/ modern pottery), facing north*

Plate 37: *Trench 15, facing south*

Plate 38: *Trench 15, facing north*

Plate 39: *Trench 15, modern pottery sherd*

Plate 40: *Trench 16, facing south*

Plate 41: *Trench 16, facing north*

Plate 42: *Trench 16, modern cultivation boundary, facing north*

Plate 43: *Trench 17, facing north*

Plate 44: *Trench 17, modern cultivation boundary, facing south*

Plate 45: *Trench 18, facing south*

Plate 46: *Trench 18, facing north*

Plate 47: *Trench 19, facing north*

Plate 48: *Trench 19, facing south*

Plate 49: *Trench 20, facing south*

Plate 50: *Trench 20, facing north*

***Plate 51:** Trench 21, facing north*

***Plate 52:** Trench 21, facing south*

Plate 53: *Trench 22, facing south*

Plate 54: *Trench 22, facing north*

Plate 55: *Trench 22, modern quarrying material, facing north*

Plate 56: *Trench 22, modern refuse from quarrying material*

Plate 57: *Trench 23, facing south*

Plate 58: *Trench 23, facing north*

Plate 59: *Trench 24, facing east*

Plate 60: *Trench 24, facing west*

Plate 61: *Trench 24, clay pipe stem*

Plate 62: *Trench 25, facing west*

Plate 63: *Trench 25, facing east*

Plate 64: *Trench 25, modern ceramic*

Plate 65: *Trench 26, facing west*

Plate 66: *Trench 26, facing east*

Plate 67: *Trench 27, facing south*

Plate 68: *Trench 27, facing north*

Plate 69: *Trench 28, facing south*

Plate 70: *Trench 28, facing north*

Plate 71: *Trench 29, facing south*

Plate 72: *Trench 29, facing north*

Plate 73: *Trench 29, modern agricultural furrow slotted, facing north*

Appendix 15.4 Photographic Record

November 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Appendix 15.4: Photographic record

***Plate 15.1**: Northern pedestrian and cycle access route to proposed development site from L2998 – the planned upgrade of this existing laneway will facilitate more direct pedestrian and cycle access to Glanmire Village from the proposed development.*

***Plate 15.2**: Existing roadside construction compound at location of the proposed principal access to the development from the existing Dunkettle Road (L2998)*

***Plate 15.3**: General view of LRD Phase 1 lands (from northeast) during period of crop growth*

***Plate 15.4**: General view of LRD Phase 1 lands (from southeast) during period of crop growth*

Plate 15.5: *View of a section of the LRD Phase 2 lands at time of cut crops and programme of archaeological testing*

Plate 15.6: *General view of amenity greenway area from north (right of frame)*

***Plate 15.7**: View of section of amenity greenway route with adjacent woodland at right side of frame*

***Plate 15.8**: Eastern gateway to Dunkettle House – this will not be impacted by or used for the proposed development*

Plate 15.9*: Front (south) elevation of the main block of Dunkettle House – the proposed development will not impact this protected structure*

Plate 15.10*: Entrance of hall of Dunkettle House – the protected structure will remain in private residential use and will not be impacted by the proposed development.*

Plate 15.11: View to south-south-east from the parking area that fronts Dunkettle House – this view will be unchanged by the proposed LRD Phase 1 and 2 developments.

Plate 15.12: View of courtyard and outbuildings to the rear of Dunkettle House – these buildings will not be impacted by the proposed LRD Phase 1 and 2 developments.

Plate 15.13: View of a section of the existing access road to the north of the former walled garden. The external face of the northern wall of the former walled garden is also included in this photograph. This wall may be negatively impacted by the upgrade/construction of a second access road proposed as part of the LRD Phase 2 development. It is envisaged that the existing access will be upgraded to facilitate pedestrian, cyclist and/or vehicular movements. The planned upgrade may require adaption of a small portion of the walled garden.

Plate 15.14: View of the northernmost portion of the former walled garden. This area may be required to accommodate a secondary access to the LRD Phase 2 development.