Newcastle Castle, Newcastle, Co. Wicklow

Ecological Survey

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1. INTRODUCTION

1.1 Background

This report has been prepared by Faith Wilson (an independent ecological consultant and licensed bat specialist) who was appointed by Yvonne Whitty Archaeology, to prepare a baseline ecological survey and report as part of a Conservation Plan for Newcastle Castle, Co. Wicklow in 2023 (project reference code CMF23-2-WI003). The conservation plan was commissioned by Wicklow County Council Heritage Office and included historical research, ecological assessment (encompassed in this report), archaeological assessment, condition survey and detailed drawings.

Newcastle Castle is situated close to the Church of Ireland Church and lies west north-west of the main street of Newcastle Village - see **Figure 1**. This project indicated the works necessary to conserve and preserve the castle to ensure its long-term survival.

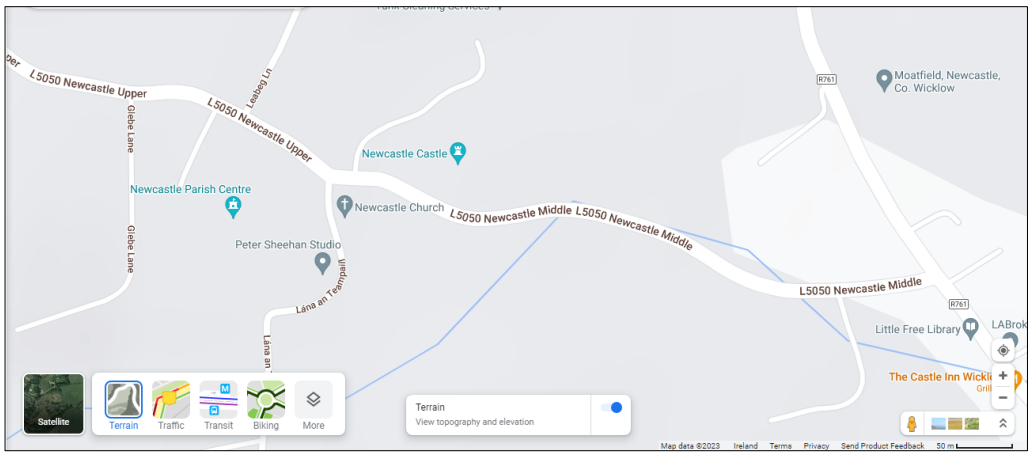

Figure 1. Location of Newcastle Castle, in Newcastle Village, Co. Wicklow.

The scope of works included:

- A botanical and habitat survey
- An invasive species survey
- A mammal survey
- A bird survey
- A preliminary bat survey

In 2025 the property received funding for conservation works under Stream 1 of the Community Monument Fund (Ref. No. CMF23-2-WI003 Newcastle Castle).

A bat survey was therefore completed in advance of the works commencing and to support an application for a bat derogation licence to National Parks and Wildlife Service. The 2023 report was therefore updated on foot of this survey.

1.2 Relevant Legislation

1.2.1 Nature Conservation Designations

International Conservation Designations
Special Areas of Conservation (SACs) are habitats of international significance that have been identified by NPWS and submitted for designation to the EU. SAC is a statutory designation, which has a legal basis under the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997, which were amended in 1998, 2005 and 2011. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

A Special Protection Area (SPA) is a statutory designation, which has a legal basis under the EU Birds Directive (79/409/EEC). The primary objective of SPAs is to maintain or enhance the favourable conservation status of the birds for which the SPAs have been designated.

National Conservation Designations
Proposed NHAs are habitats or sites of interest to wildlife that have been identified by NPWS. These sites become NHAs once they have been formally advertised and land owners have been notified of their designation. NHAs are protected under the Wildlife (Amendment) Act, 2000, from the date they are formally proposed. NHA is a statutory designation according to the Wildlife (Amended) Act, 2000 and requires consultation with NPWS if any development impacts on a pNHA.

1.2.2 Bats

Eleven species of bats occur in Ireland and all are protected under both national and international law.

Wildlife Act 1976
In the Republic, under Schedule 5 of the Wildlife Act 1976, all bats and their roosts are protected by law. It is unlawful to disturb either without the appropriate licence. The Act was amended in 2000.

Bern and Bonn Convention
Ireland has also ratified two international conventions, which afford protection to bats amongst other fauna. These are known as the 'Bern' and 'Bonn' Conventions. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), exists to conserve all species and their habitats, including bats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries, which covers certain species of bat.

EU Habitats Directive

All bat species are given strict protection under Annex IV of the EU Habitats Directive, whilst the lesser horseshoe bat (*Rhinolophus hipposideros*) and greater horseshoe bat (*Rhinolophus ferrumequinum*) are given further protection under Annex II of the EU Habitats Directive. Both are listed as a species of community interest that is in need of strict protection and for which E.U. nations must designate Special Areas of Conservation (SACs). The latter is only known from a single site and no breeding populations have been recorded to date. The former are a species of the western seaboard of Ireland and have not yet been recorded on the east coast.

The principal pressures on Irish bat species have been identified as follows:

- urbanized areas (e.g. light pollution);
- bridge/viaduct repairs;
- pesticides usage;
- removal of hedges, scrub, forestry;
- water pollution;
- other pollution and human impacts (e.g. renovation of dwellings with roosts);
- infillings of ditches, dykes, ponds, pools and marshes;
- management of aquatic and bank vegetation for drainage purposes;
- abandonment of pastoral systems;
- speleology and vandalism;
- communication routes: roads; and
- inappropriate forestry management.

1.2.3 Badgers

Badgers (*Meles meles*) are common and widespread in Ireland and are found in all lowland habitats where the soil is dry and not subject to flooding (Hayden and Harrington, 2000). Badgers are social animals that live in complex underground tunnel systems called setts. Badger territories may vary in size from about 60-200 ha (Smal, 1995).

Badgers and their setts legally are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. It is standard best practice to ensure that mitigation measures are taken to limit impacts on badgers and badger populations during developments.

1.2.4 Invasive Species

The legal framework for the control or eradication of non-native invasive species in the Republic of Ireland is the Birds and Habitats Regulations (2011), which include legislation on invasive and non-native species in Sections 49 and 50.

Since then, the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) also came into force on the 3rd August 2016.

The plant and animal species to which the Birds and Habitats Regulations (2011) apply are presented in Schedule Three. Part 1 details the plants species, while Part 3 outlines those animal or plant vector materials and are presented below.

Third Schedule: Part 1 Plants

Non-native species subject to restrictions under Regulations 49 and 50.

First column	**Second column**	**Third column**
Common name	**Scientific name**	**Geographical application**
American skunk-cabbage	*Lysichiton americanus*	Throughout the State
A red alga	*Grateloupia doryphora*	Throughout the State
Brazilian giant-rhubarb	*Gunnera manicata*	Throughout the State
Broad-leaved rush	*Juncus planifolius*	Throughout the State
Cape pondweed	*Aponogeton distachyos*	Throughout the State
Cord-grasses	*Spartina* (all species and hybrids)	Throughout the State
Curly waterweed	*Lagarosiphon major*	Throughout the State
Dwarf eel-grass	*Zostera japonica*	Throughout the State
Fanwort	*Cabomba caroliniana*	Throughout the State
Floating pennywort	*Hydrocotyle ranunculoides*	Throughout the State
Fringed water-lily	*Nymphoides peltata*	Throughout the State
Giant hogweed	*Heracleum mantegazzianum*	Throughout the State
Giant knotweed	*Fallopia sachalinensis*	Throughout the State
Giant-rhubarb	*Gunnera tinctoria*	Throughout the State
Giant salvinia	*Salvinia molesta*	Throughout the State
Himalayan balsam	*Impatiens glandulifera*	Throughout the State
Himalayan knotweed	*Persicaria wallichii*	Throughout the State
Hottentot-fig	*Carpobrotus edulis*	Throughout the State
Japanese knotweed	*Fallopia japonica*	Throughout the State
Large-flowered waterweed	*Egeria densa*	Throughout the State
Mile-a-minute weed	*Persicaria perfoliata*	Throughout the State
New Zealand pigmyweed	*Crassula helmsii*	Throughout the State
Parrot's feather	*Myriophyllum aquaticum*	Throughout the State
Rhododendron	*Rhododendron ponticum*	Throughout the State
Salmonberry	*Rubus spectabilis*	Throughout the State
Sea-buckthorn	*Hippophae rhamnoides*	Throughout the State
Spanish bluebell	*Hyacinthoides hispanica*	Throughout the State
Three-cornered leek	*Allium triquetrum*	Throughout the State
Wakame	*Undaria pinnatifida*	Throughout the State
Water chestnut	*Trapa natans*	Throughout the State
Water fern	*Azolla filiculoides*	Throughout the State

First column	Second column	Third column
Common name	**Scientific name**	**Geographical application**
Water lettuce	*Pistia stratiotes*	Throughout the State
Water-primrose	*Ludwigia* (all species)	Throughout the State
Waterweeds	*Elodea* (all species)	Throughout the State
Wireweed	*Sargassum muticum*	Throughout the State

EU Regulation 1143/2014 on Invasive Alien Species

On 14 July 2016 the European Commission published Commission Implementing Regulation 2016/1141 which set out an initial list of 37 species to which EU Invasive Alien Species Regulation 1143/2014 will apply. The associated restrictions and obligations came into force on 3rd August 2016.

Plant species listed on the directive include:

- American skunk cabbage *Lysichiton americanus*
- Asiatic tearthumb *Persicaria perfoliata* (*Polygonum perfoliatum*)
- Curly waterweed *Lagarosiphon major*
- Eastern Baccharis *Baccharis halimifolia*
- Floating pennywort *Hydrocotyle ranunculoides*
- Floating primrose willow *Ludwigia peploides*
- Green cabomba *Cabomba caroliniana*
- Kudzu vine *Pueraria lobata*
- Parrot's feather *Myriophyllum aquaticum*
- Persian hogweed *Heracleum persicum*
- Sosnowski's hogweed *Heracleum sosnowskyi*
- Water hyacinth *Eichhornia crassipes*
- Water primrose *Ludwigia grandiflora*
- Whitetop weed *Parthenium hysterophorus*

Animal species listed on the directive include:

- Amur sleeper *Perccottus glenii*
- Asian hornet *Vespa velutina*
- Chinese mitten crab *Eriocheir sinensis*
- Coypu *Myocastor coypus*
- Fox squirrel *Sciurus niger*
- Grey squirrel *Sciurus carolinensis*
- Indian house crow *Corvus splendens*
- Marbled crayfish *Procambarus* spp.
- Muntjac deer *Muntiacus reevesii*
- North american bullfrog *Lithobates (Rana) catesbeianus*
- Pallas's squirrel *Callosciurus erythraeus*
- Raccoon *Procyon lotor*
- Red swamp crayfish *Procambarus clarkii*
- Red-eared terrapin/slider *Trachemys scripta elegans*
- Ruddy duck *Oxyura jamaicensis*
- Sacred ibis *Threskiornis aethiopicus*

- Siberian chipmunk *Tamias sibiricus*
- Signal crayfish *Pacifastacus leniusculus*
- Small Asian mongoose *Herpestes javanicus*
- South American coati *Nasua nasua*
- Spiny-cheek crayfish *Orconectes limosus*
- Topmouth gudgeon *Pseudorasbora parva*
- Virile crayfish *Orconectes virilis*

On 13 July 2017 the European Commission published Commission Implementing Regulation 2017/1263 which added a further 12 species to the current list of 37 species regulated under the EU Invasive Alien Species Regulation (1143/2014).

These are:

Plant species

- Alligator weed (*Alternanthera philoxeroides*)
- Milkweed (*Asclepias syriaca*)
- Nuttall's waterweed (*Elodea nuttallii*)
- Chilean rhubarb (*Gunnera tinctoria*)
- Giant hogweed (*Heracleum mantegazzianum*)
- Himalayan balsam (*Impatiens glandulifera*)
- Japanese stiltgrass (*Microstegium vimineum*)
- Broadleaf watermilfoil (*Myriophyllum heterophyllum*)
- Crimson fountaingrass (*Pennisetum setaceum*)

Animal species

- Egyptian goose (*Alopochen aegyptiacus*)
- Raccoon dog (*Nyctereutes procyonoides*)
- Muskrat (*Ondatra zibethicus*)

The associated restrictions and obligations came into force from 2 August 2017 for all these species apart from the Raccoon dog, which came into force on 2 February 2019.

Other Invasive Species

The main guidance document that has been prepared dealing with invasive species/noxious weeds on sites is the NRA *'Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads'* which was published in 2010. This document details other non-native species of note.

A detailed survey for such species within the environs of Newcastle Castle was conducted in order to ensure that any proposed works do not result in the disturbance and spread of any invasive species.

2. METHODOLOGY

2.1 Desk Study and Consultation

A desk study was carried out to collate any available information on the ecological environment of Newcastle Castle.

The National Parks and Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage (DHLGH) database of designated conservation areas and NPWS records of rare and protected plant species were checked with regard to the location of Newcastle Castle.

Information on protected species of fauna and flora listed for protection under Annex II of the EU Habitats Directive (92/43/EEC), Annex I of the Birds Directive (79/409/EEC) and the Wildlife (Amendment) Act (2000) was also sought from NPWS and published sources. A data search was made for any biological records held by the National Biodiversity Data Centre from the vicinity of the monument.

2.2 Field Surveys

Habitats and Flora

Newcastle Castle was visited on the 20th January, 11th April and 29th August 2023 to survey the habitats present, using the habitat survey and mapping techniques described by Smith *et al.* (2011) and described using the Heritage Council Habitat Classification (Fossitt, 2000). The habitats present were described to Fossitt Level 3 and any correspondence or potential correspondence to habitats listed under Annex I of the EU Habitats Directive were considered and assessed. Any changes to the receiving environment were noted during the 2025 surveys which were completed on the 13th May, 30th June and 14th July 2025.

A particular focus of the surveys was to determine if any protected species of plant under the Flora (Protection) Order (2022) or listed in the Irish Vascular Plants Red Data Book are present within the environs of Newcastle Castle.

Any invasive species present in the environs of Newcastle Castle were also checked for. A particular focus of the surveys was for those invasive species listed in the Birds and Habitats Regulations 2011.

Mammals

Bats

In accordance with best practice, a preliminary bat survey of the general environs of Newcastle Castle was conducted on 29th August 2023. This was further updated on surveys completed in 2025 with surveys completed on the 13th May, 30th June and 14th July 2025.

The castle building was examined for signs of bat use. Bat usage of structures is usually detected by the following signs (though direct observations are also occasionally made):

- bat droppings (these will accumulate under an established roost or under access points);
- insect remains (under feeding perches);
- oil (from fur) and urine stains;
- scratch marks; and
- bat corpses.

The nature and type of habitats present are also indicative of the species likely to be present. Trees within the environs of the castle were assessed for their potential use by bats using the following standard criteria, which were created by bat specialists from Bat Conservation Ireland for use in the assessments of tree roosts on large infrastructural projects and are summarised in NRA (2006):

- Presence or absence of bat droppings (these can be hard to find amongst leaf litter or may be washed away following periods of wet weather),
- Bat droppings may also be seen as a black streak beneath holes, cracks, branches, etc.,
- Presence or absence of smooth edges with dark marks at potential entrances to roosts,
- Presence or absence of urine stains at potential entrances to roosts,
- Presence of natural cracks and rot holes in the trunk or boughs of the tree,
- Hollow trees,
- Presence or absence of creepers such as ivy or honeysuckle on trees (ivy clad trees are often used by bat species such as pipistrelles as roosts),
- Presence or absence of loose bark such as that of sycamore, or flaky bark on coniferous species such as cedars, cypress and Scot's pine,
- Presence or absence of bracket fungi which may indicate a rotten or potentially hollow centre to the tree,
- Known bat roosts previously identified,
- Trees with storm or machinery damage or broken boughs,
- Clutter level - where the branches and trunk are easily accessible, this is considered a better tree for bat roosts,
- Adjoining habitat - if there are a variety of feeding opportunities for bats, this increases the potential of a tree as a bat roost,
- Adjoining potential roosts / known roosts. This raises the likelihood of a tree being of benefit as bats may move roosts if the roost becomes too hot or cold during roosting and a nearby alternative roost is highly desirable.

A bat detector survey was carried out at dusk on 29th August 2023 using several types of bat detectors – an Echometer Touch Pro, two Batbox Duet Heterodyne/Frequency Division detectors and a Pettersson D100 Heterodyne detector. The emergence of bats from the castle at dusk was monitored and a walkover survey of the general environs of the castle field was conducted. The preliminary survey was updated in 2025.

Other mammals

A dedicated large mammal survey was carried out by Faith Wilson during the site visit using the techniques as prescribed in Ecological Survey Techniques for Protected Flora and Fauna (NRA, 2008).

This entailed searching for and identification of signs, tracks and droppings of various mammals (potential/likely species include badger, fox, hedgehog, brown rat, house mouse and pygmy shrew along with non-native species such as grey squirrel and rabbit) within the environs of Newcastle Castle. Direct observations of fauna were also made.

3. ECOLOGY

3.1 Newcastle Castle

Various buildings and structures within the environs of Newcastle Castle are listed in the Record of Monuments (SMR/RMP number: WI019-005002-Anglo Norman Masonry Castle; WI019-005004- Ringwork).

Newcastle is one of four Anglo Norman masonry castles listed on the SMR files for County Wicklow.

The first reference to Newcastle Castle occurs early in the 13th century, in connection with the church (McNeill, 1950). However, there is no information available on its construction date. There may possibly have been a castle on the site previously, as the present castle is called Newcastle; alternatively, a fortification, not necessarily a castle, from pre-Norman times may have been present. A Church of Ireland church located to the south west of the castle (**Figure 2**) was built in 1788, possibly on the site of a medieval church.

The castle was an important fortification and was used as a base from which to subdue the 'rebellious Irish' in the Wicklow mountains. These fortifications were likely to have been extensive as a large gatehouse was remodelled in the 16th century.

A large, historical settlement has not been located, but there almost certainly was one as records indicate there were 191 burgages. For historical reasons alone, this is an important castle to preserve. The castle is in poor condition and will deteriorate further if no action is taken as vegetation and the effects of severe weather due to climate change will damage the remains of the castle.

Figure 2. Newcastle Church indicated by the red arrow) is located south west of Newcastle Castle (circled in red).

3.2 Newcastle Castle in a Wider Ecological Context

3.2.1 Landscape & Setting

Newcastle Castle is located in north east Co. Wicklow, in Newcastle Village, 13 km south of Greystones, 13 km north of Wicklow and less than 3 km from the coast. It is in a largely agricultural area, with some woodlands, but pressures from the increased development of housing estates around villages such as Kilcoole, Newcastle itself and Newtownmountkennedy, are becoming increasingly prevalent (**Figure 3).**

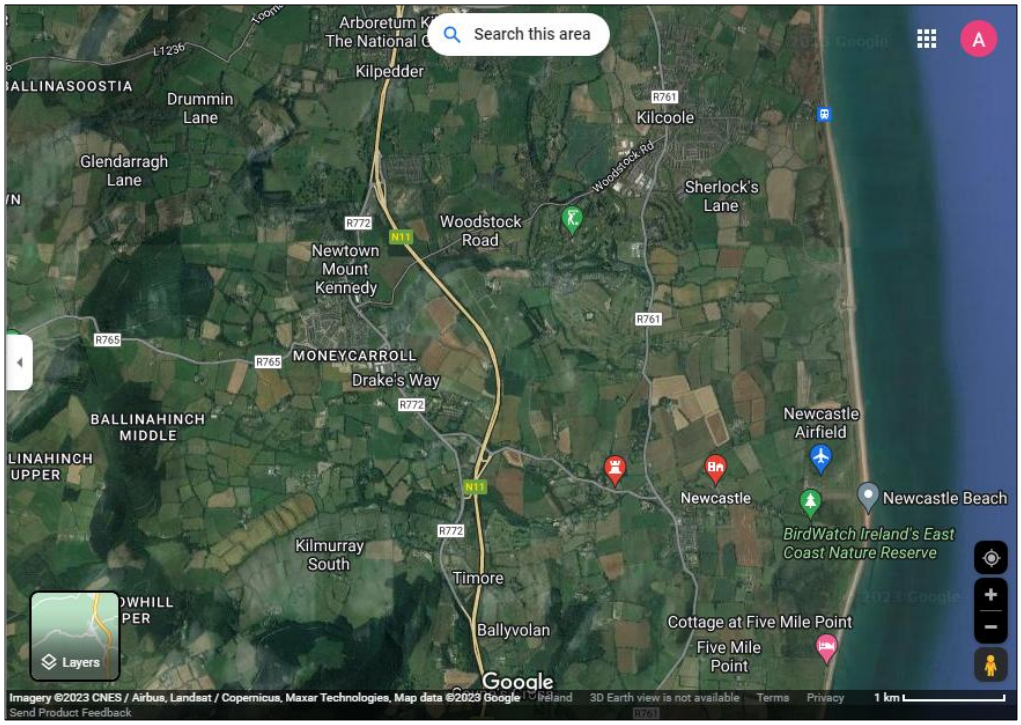

Figure 3. Newcastle Castle surrounded by agricultural land and villages, with the coast to the east.

3.2.2 Geology

The geology in the environs of Newcastle Castle consists of greywacke and quartz, which is known as the Bray Head Formation (**Figure 4**).

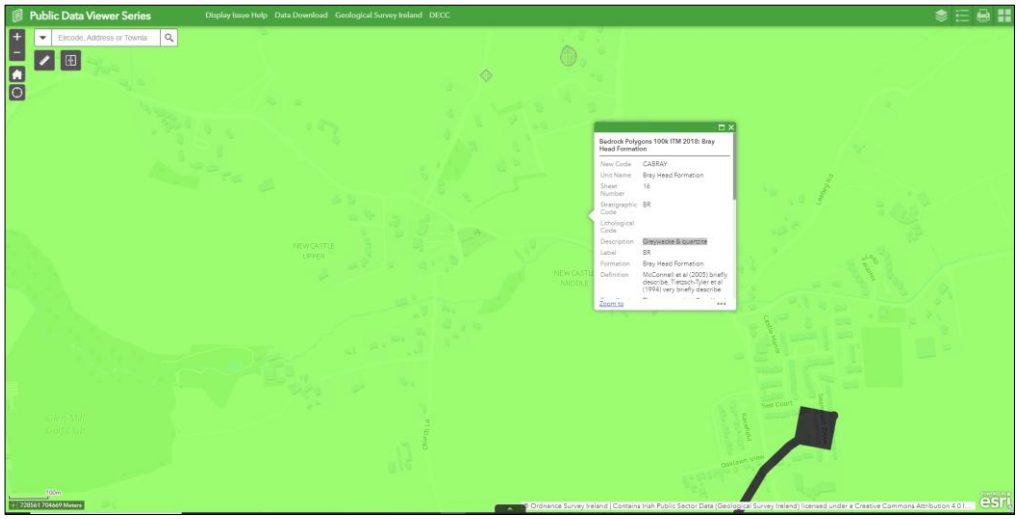

Figure 4. Newcastle is underlain by greywacke & quartzite (known as the Bray Head Formation) (Source: GSI).

3.2.3 Soils

The area around Newcastle Castle is underlain by glacial drift, which consists of a fine loamy drift with siliceous stones, which is known as the Clonroche Association (**Figure 5**).

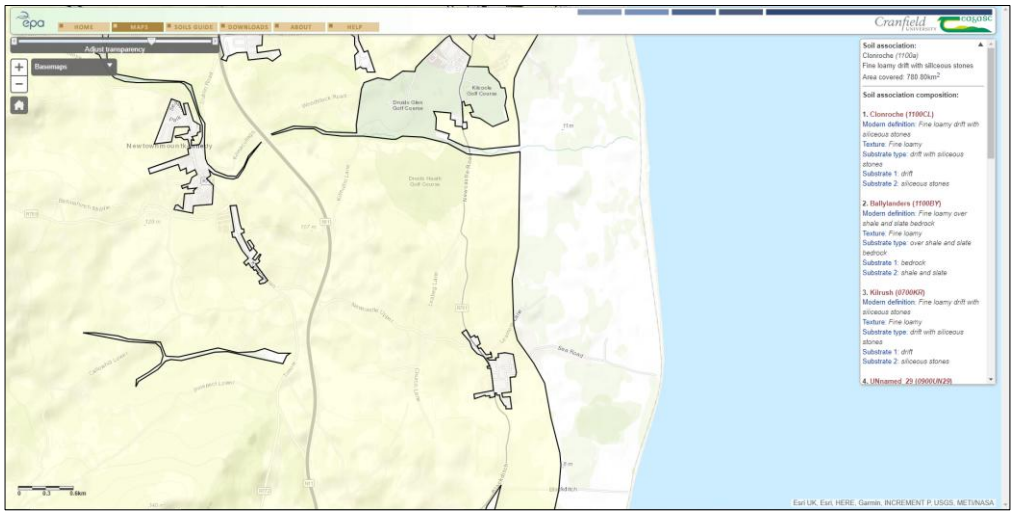

Figure 5. Soils in Newcastle are a Fine loamy drift with siliceous stones (known as the Clonroche Association) (Source: Teagasc/EPA).

3.2.4 Nature Conservation Designations

International/National Conservation Designations

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are habitats of international significance that have been identified by NPWS and submitted for designation to the EU. These are known collectively as the Natura 2000 sites. Proposed NHAs are habitats or sites of national interest to wildlife that have been identified by NPWS.

The lands at Newcastle Castle are not currently designated for nature conservation but a number of lands in the environs of the village are as shown on **Figure 6** below. The most important of these is The Murrough to the east at the coast, which is designated as both a Special Area of Conservation (The Murrough Wetlands SAC (Site Code: 002249)), a Special Protection Area (for Birds) (The Murrough Wetlands SPA (Site Code: 004186)) and a proposed Natural Heritage Area (The Murrough NHA (Site Code: 000730)).

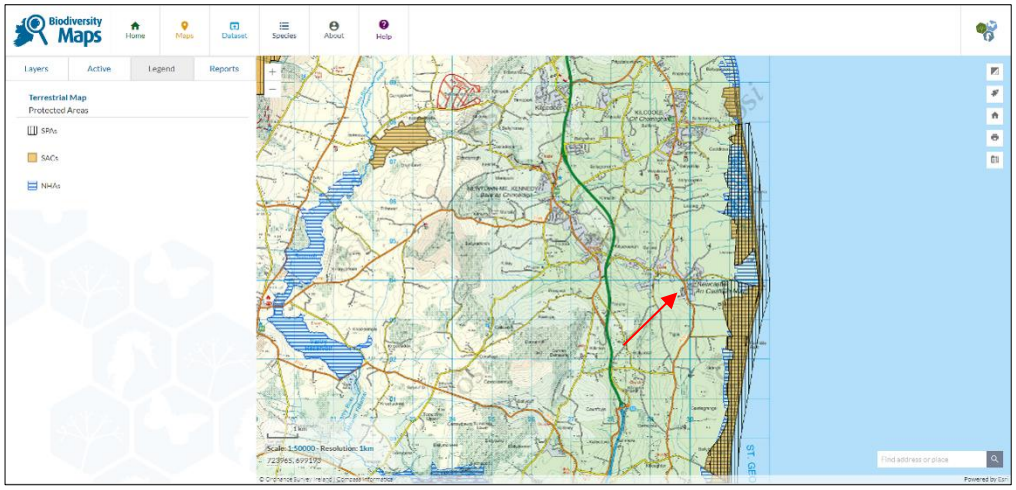

Figure 6. Areas legally designated for nature conservation within the environs of Newcastle Village (indicated by the red arrow).

Full site descriptions are provided in **Appendix I**, but the main qualifying interests (reasons for designation) are set out below.

Qualifying Interests of The Murrough Wetlands SAC (Site Code: 002249)

- Annual vegetation of drift lines [1210]
- Perennial vegetation of stony banks [1220]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
- Alkaline fens [7230]

Qualifying Interests of The Murrough Wetlands SPA (Site Code: 004186)

- Red-throated Diver (*Gavia stellata*) [A001]
- Greylag Goose (*Anser anser*) [A043]
- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
- Wigeon (*Anas penelope*) [A050]
- Teal (*Anas crecca*) [A052]

- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Herring Gull (*Larus argentatus*) [A184]
- Little Tern (*Sterna albifrons*) [A195]
- Wetland and Waterbirds [A999]

The Newcastle River, which flows below the castle, forms an important conduit between the uplands at Callow Hill and the designated sites at the coast.

3.3 Biological Records held by The National Biodiversity Data Centre

The National Biodiversity Data Centre (NBDC) provides information on biological records submitted throughout Ireland. For the purposes of biological recording records in the country are divided up into 10km squares and then further divided into 1km squares.

Newcastle Castle lies in NBDC 1 km square O2904 (**Figures 7 & 8**). There are surprisingly few biological records for this square, totalling just 98 species (**Table 1**). Only four mammal species have been recorded, of which two were bats; many more are likely to be present.

Table 1. Number of species in each organism group recorded in 1 km Square O2904. (Source: NBDC).

Organism group	Number of records in O2904
Bird	27
Conifer	1
Fern	1
Flowering plant	39
Insect	26
Mammal	4

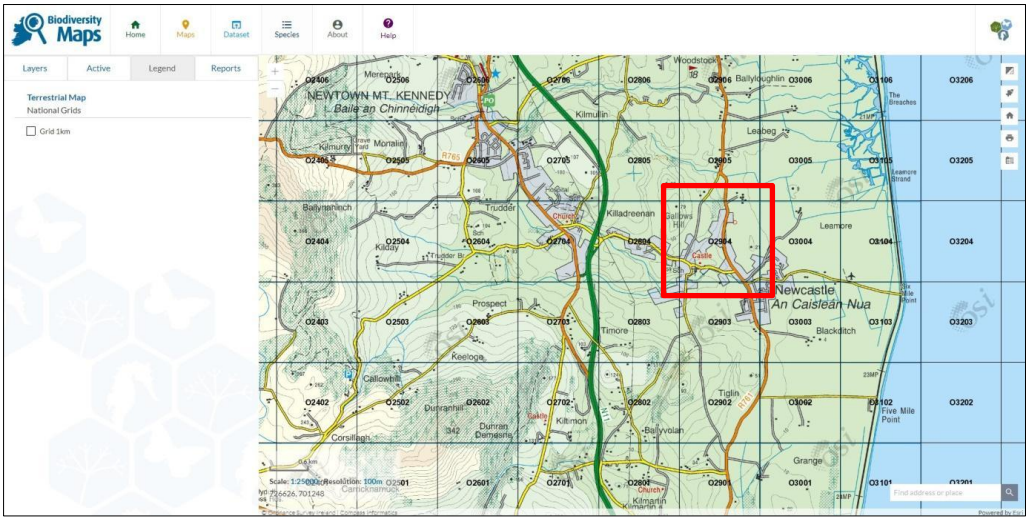

Figure 7. Newcastle Castle is located in NBDC 1 km square O2904 (Source: NBDC).

Figure 8. Square O2904 contains 98 NBDC records as summarised in Table 1.

3.4 Receiving Environment

Newcastle Castle lies in a historically largely agricultural area, as mapped early in the 20th century in the first edition 6" series OSI maps (**Figures 9 & 10**). The latter is in colour and clearly shows a mill pond close to the church; in subsequent maps, second edition 6"series and 25"series mapping (**Figures 11 & 12**), this pond no longer appears to be present. The area is still agricultural, although there are many more houses and, increasingly, housing estates being built around Newcastle village.

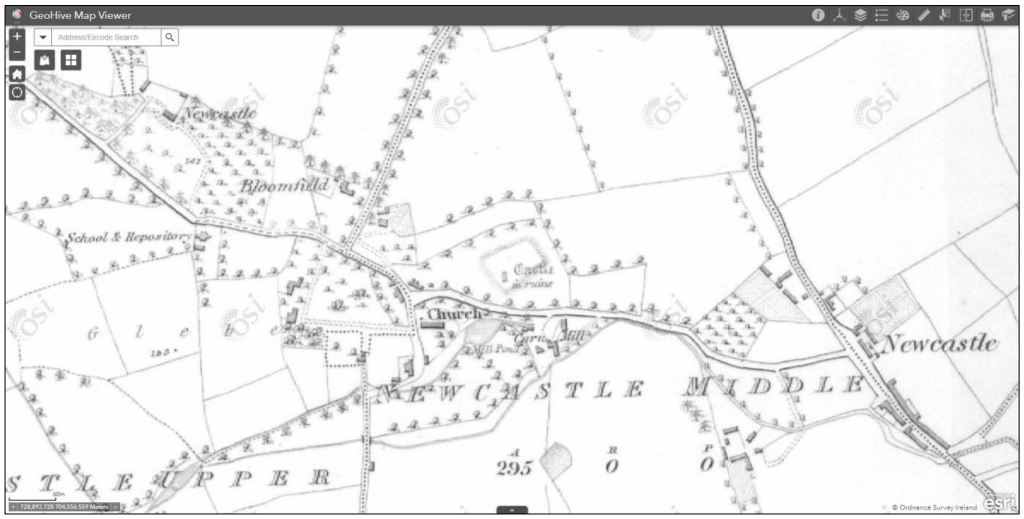

Figure 9. Ordnance Survey Ireland First Edition 6" series mapping (OSI).

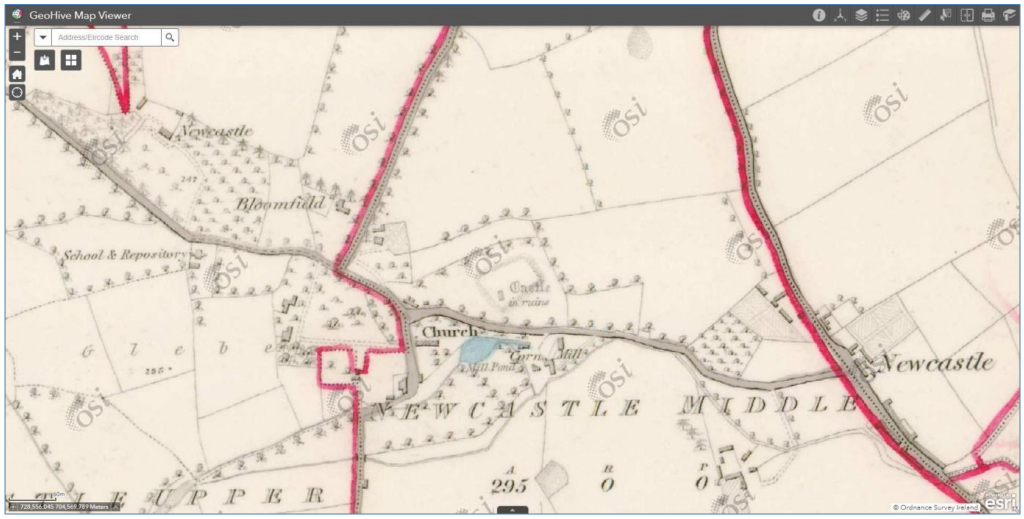

Figure 10. Ordnance Survey Ireland First Edition 6" series mapping – colour edition (OSI).

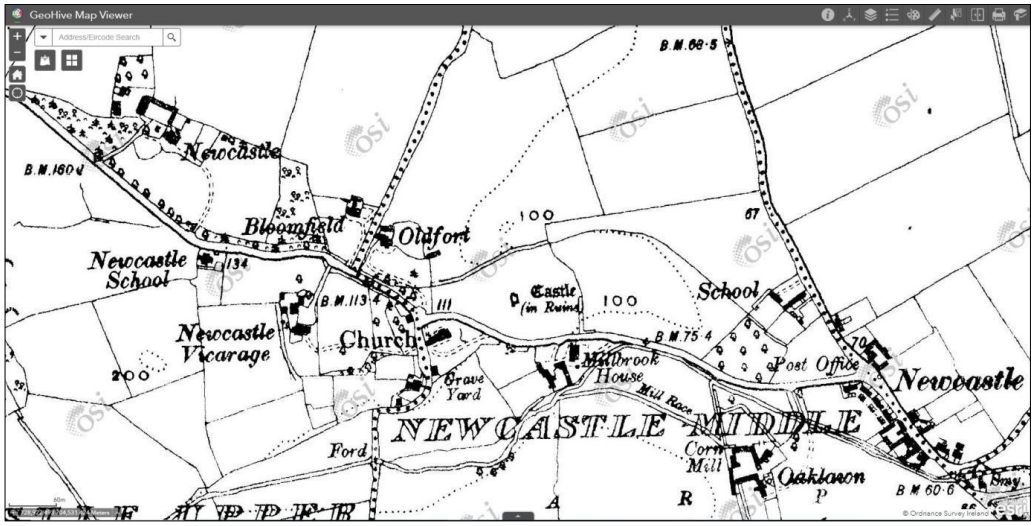

Figure 11. Ordnance Survey Ireland Second Edition 6″ series mapping (OSI).

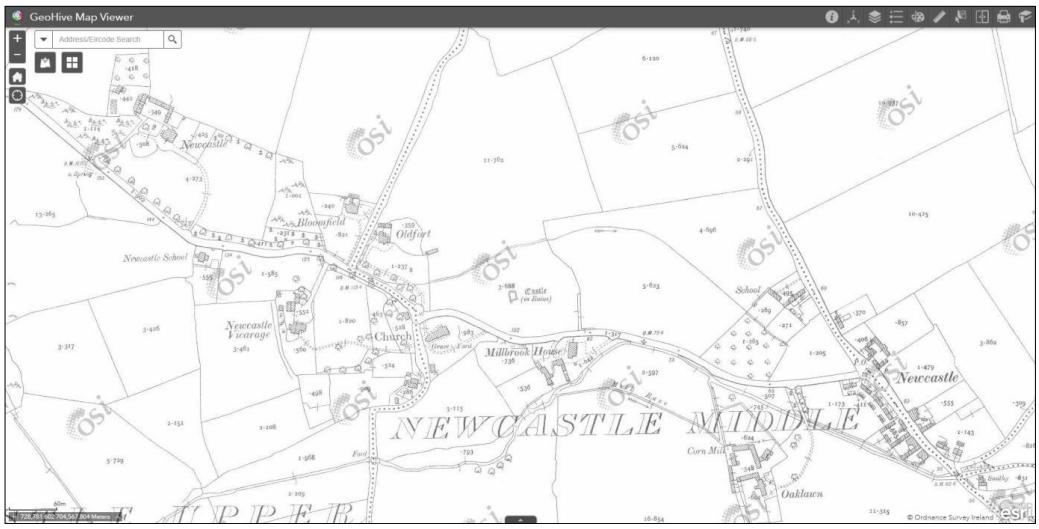

Figure 12. Ordnance Survey Ireland 25″ series mapping (OSI).

3.5 Habitats and Species Recorded

The small hill or motte on which the castle is located is currently managed as agricultural land, which was grazed by horses in both 2023 and 2025.

The northern boundary of the motte has a dense tangle of bramble (*Rubus fruticosus* agg.) scrub, which extends from a treeline of ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), with Norway maple (*Acer pseudoplatanus*), Scots pine (*Pinus sylvestris*) and lime (*Tilia platyphyllos*). These trees are located on an **earthen bank (BL2)** and a **drainage ditch (FW4)** which contained flowing water was located at the rear of the treeline. There have been recent movements of earth along this ditch which may compromise the trees in the long term. A very mature old hawthorn (*Crataegus monogyna*) tree is found here. The big ash tree is suffering from ash die-back disease. To the south of the ditch the banks of the motte are vegetated with nettles (*Urtica dioica*), lady fern (*Athyrium filix-femina*), elder (*Sambuccus nigra*) and bramble. The ditch is quite silt laden and the non-native species invasive Montbretia (*Crocosmia* x *crocosmiiflora*) is found on the bank.

The north eastern side of the motte has a good area of scrub (**Scrub WS1**), with blackthorn (*Prunus spinosa*), bramble, elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), dog rose (*Rosa canina* agg.) and unfortunately a lot of the non-native invasive species - old man's beard (*Clematis vitalba*).

The southern boundary of the field in which the castle is located adjoins the min road to Newcastle Village from the M11. There is a steep bank here and a newly built retaining wall. A small copse of trees here includes eucalyptus (*Eucalyptus* sp.), copper beech (*Fagus sylvatica purpurea*) and an ornamental oak (*Quercus* sp.). There are also occasional clumps of red osier dogwood (*Cornus canadensis*) and bramble tangles.

The motte itself has been reseeded (**Improved Agricultural Grassland GA1**) and is not that species rich as a result. It is also overgrazed by the horses which results in species such as creeping buttercup (*Ranunculus repens*) dominating with yarrow (*Achillea millefolium*), common stork's-bill (*Erodium cicutarium),* red dead nettle (*Lamium purpureum*), perennial rye grass (*Lolium perenne*), white clover (*Trifolium repens*), meadow buttercup (*Ranunculus acris*), and creeping thistle (*Cirsium arvense*). Lessening the intensity of grazing in this field would allow this grassland to recover. There are occasional patches of nettles, some ragwort (*Senecio* sp.), hogweed (*Heracleum sphondylium*), red bartsia (*Odontites verna*), sweet vernal grass (*Anthoxanthum odoratum)*, ribwort plantain *(Plantago lanceolata)*, and Yorkshire fog (*Holcus lanatus*).

On the steep slopes of the motte the grassland is more diverse on account of the poaching activity from the horses and the leaching of nutrients. Additional species recorded on these slopes include bird's-foot trefoil (*Lotus corniculatus*), and meadow vetchling (*Lathyrus pratensis)*, alongside a lot of yarrow, ragwort, ribwort plantain, dog bent grass (*Agrostis canina*) and sweet vernal grass.

Plate 1. Closely grazed grassland below Newcastle Castle atop the motte.

Plate 2. Looking south across the field to Newcastle Church and graveyard.

Plate 3. Newcastle Church and graveyard. The Castle field is bounded to the south and south west by a concrete block wall.

Plate 4. Looking west towards the entrance.

Plate 5. Heavily grazed grassland below Newcastle Castle - looking north towards the treeline.

Plate 6. Treeline and bramble scrub to the north of Newcastle Castle.

Plate 7. The bank of brambles bordering the treeline to the north of the castle – providing important breeding bird habitat.

Plate 8. Water filled ditch at the foot of the Castle field on the northern boundary.

Plate 9. Treeline on the earthen bank adjoining the ditch.

Plate 10. Sheep pasture to the east of Newcastle Castle, with rough grass, old man's beard and brambles in the castle ditch in the foreground.

Plate 11. Rough grassland on the motte - east of Newcastle Castle.

3.6 Rare, Scarce and Threatened Flora

There are no reported records of any rare, scarce or threatened plant species from Newcastle Castle in any of the datasets examined.

A species of note that was recorded from the immediate environs of the castle during this study is Milk thistle (*Silybum marianum*). This is a rare[1] and decreasing species in Ireland, which is found in rough cultivated and waste ground and on hedge banks. It is also found, as in this case at Newcastle, as a relic of cultivation near houses or ruins.

The National Biodiversity Data Centre has records of Milk thistle from 19 10km squares in Ireland[2] as shown on **Figure 13** below. The recent BSBI Atlas recorded only 9 10km squares with species present during 2000 – 2019 in comparison with 44 10km squares pre 1930 – see **Figure 14**.

It is listed as a 'Near threatened' species in Ireland[3].

This species is one of several traditional medicinal or culinary herbs that are associated with Norman Castles and Abbeys in Ireland. Other plants in this group include:

- Parsley (*Petroselinum crispum*)

[1] Rare - species recorded in 10 or fewer hectads in Ireland 2000-2019; scarce - species recorded in 11-25 hectads in Ireland 2000-2019.

[2] National Biodiversity Data Centre, Ireland, Milk Thistle (*Silybum marianum*), accessed 06 November 2023, <https://maps.biodiversityireland.ie/Species/45240>

[3] Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). **Ireland Red List No. 10: Vascular Plants.** National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

- Hemlock (*Conium maculatum*)
- Mallow (*Malva sylvestris*)
- Henbane (*Hyoscyamus niger*)
- Pellitory of the wall (*Parietaria judaica*)
- Annual nettle (*Urtica urens*)
- Slender thistle (*Carduus tenuiflorus*)
- Welted thistle (*Carduus acanthoides*)

Wyse Jackson[4] reports:

"Gerard's Herball from 1597 suggested that milk thistle can be eaten. Its' leaves were used as a pot herb, as a vegetable or in salads (the leaves were trimmed of the spines first) and it's stalks peeled, soaked to remove the bitterness and cooked like rhubarb".

"It was used in Ireland as a medicinal herb for various purposes including the treatment of whooping cough and warts. Its leaves have white veins which were said to contain the milk of the Virgin Mary, which gave it its common name. Its Irish name is 'feochadán Muire', which has similar origins. It was also said to help increase the flow of nursing mother milk".

Wyse Jackson notes that:

"A study completed by Synnott in 1977 recorded that "18 out of 20 Norman castles he visited from Tipperary to north Louth had plants of hemlock and mallow associated with them and noted that older habitations (pre-Norman sites) do not have such plants associated with them. He suggested that traditions associated with these plants are probably Norman and date from the 12th century at the earliest".

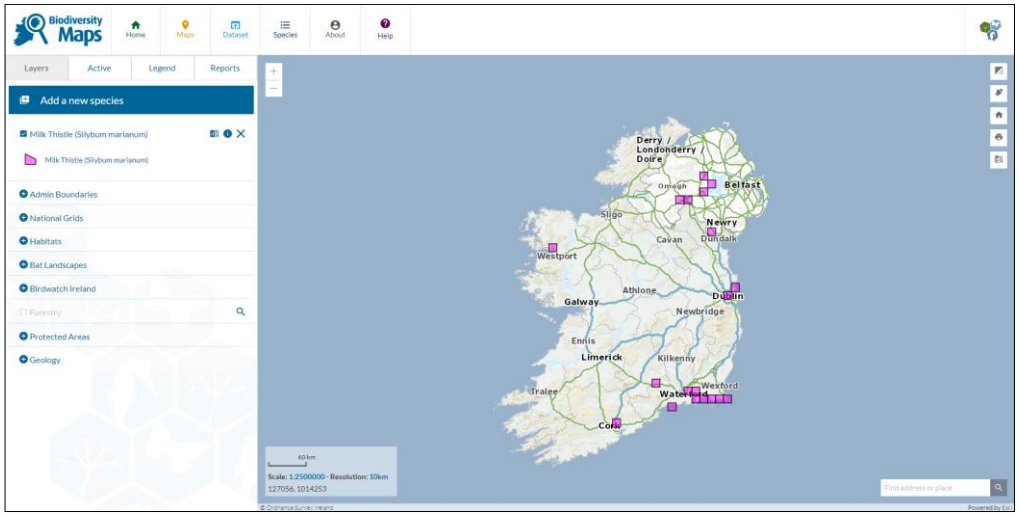

Figure 13. The distribution of Milk thistle in Ireland (Source: NBDC).

[4] Wyse Jackson, P (2014). **Ireland's Generous Nature. The Past and Present Uses of Wild Plants in Ireland**. Missouri Botanical Garden, National Botanic Gardens of Ireland.

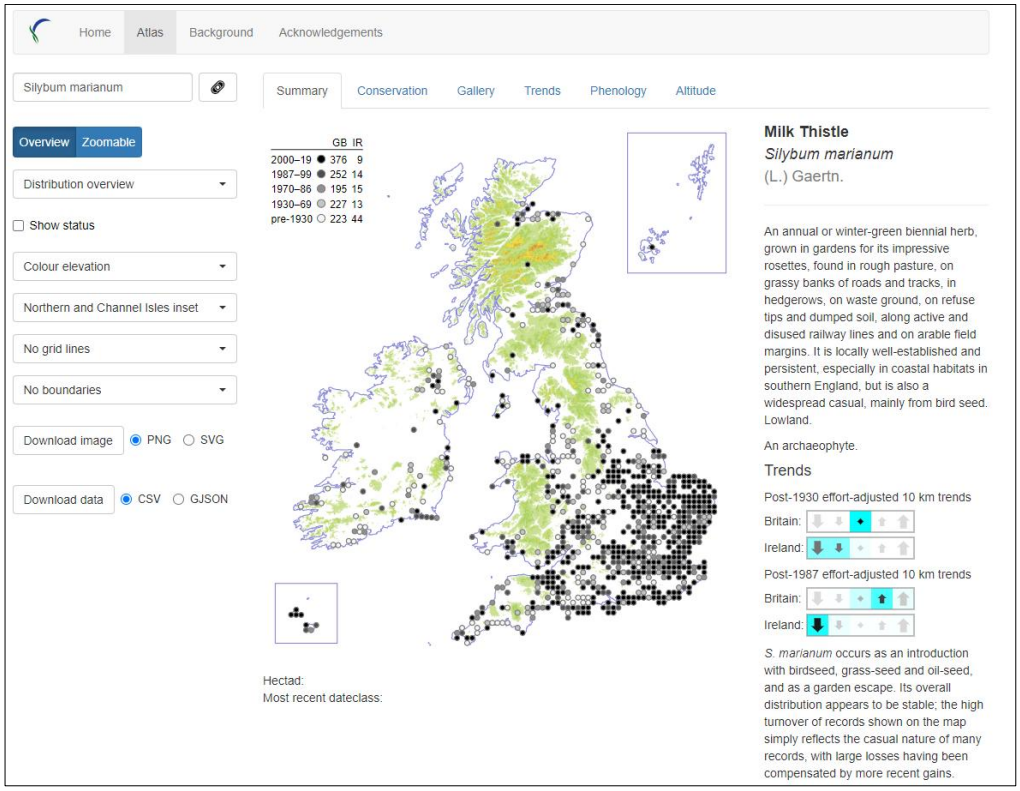

Figure 14. The distribution of Milk thistle in Ireland and Britain (Source: BSBI).

Plate 12. Milk thistle (*Silybum marianum*).

Herbalists know this plant well for its medicinal properties. Milk Thistle is one of the most important and easily available liver remedies in the world. It is used in a variety of liver and gall bladder conditions such as cirrhosis, hepatitis,

gall stones, fatty liver (making it of use in treating hypercholesterol) and poisoning.

Plate 13. The characteristic white veins of the Milk thistle leaves.

Plate 14. Abundant vegetation, including Milk thistle, at the foot of the castle.

Plate 15. Seed heads of Milk thistle.

3.7 Faunal Interest

3.7.1 Mammals (excluding bats)

The NBDC website holds records in the 1 km square O2904 for only two mammal species, namely the non-native invasive North American grey squirrel (*Sciurus carolinensis*) and badger.

During the survey, a lot of red squirrel (*Sciurus vulgaris*) digging activity was observed in an adjoining wooded area. A large badger sett is present there, with many signs that the badgers are very active – latrines, lots of fresh diggings; many trees have fallen over the sett, which gives it protection.

It is probable that many other mammal species occur in the vicinity of the castle, including foxes (*Vulpes vulpes*), hedgehog (*Erinaceus europaeus*), brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*).

Rabbits (*Oryctolagus cuniculus*) a Norman introduction to Ireland may also occur.

3.7.2 Bats

3.7.2.1 Desktop Research

The Bat Conservation Ireland Database of bat records was searched for records of bats from the Newcastle Castle and village area. Only two species were recorded in the 1km square O2904 surrounding the castle, namely Leisler's bat (*Nyctalus leisleri*) and soprano pipistrelle (*Pipistrellus pygmaeus*).

However, several other bat species have been recorded in the 10km square (O20) surrounding the castle. These include:

- Whiskered bat (*Myotis mystacinus*)
- Brown long-eared bats (*Plecotus auritus*)
- Natterer's bat (*Myotis nattereri*)
- Daubenton's bat (*Myotis daubentonii*)
- Common pipistrelle (*Pipistrellus pipistrellus*)

3.7.2.2 Visual Inspection

Suitable crevices, holes, gaps in stonework, etc. in the castle were inspected with an endoscope to check for the presence of roosting bats in both 2023 and 2025.

No bats were recorded during daytime visual inspections of the stonework of the castle however the building offers unlimited roosting potential for both hibernation and breeding purposes within its stonework.

3.7.2.3 2023 Bat Activity Survey

A dedicated bat survey was first conducted at Newcastle Castle in 2023 given the potential for bats to utilise the ruined structure for roosting purposes. A bat detector survey was carried out at dusk on 29th August 2023 using several types of bat detectors – an Echometer Touch Pro, two Batbox Duet Heterodyne/Frequency Division detectors and a Pettersson D100 Heterodyne detector. The emergence of bats from the castle at dusk was monitored and a walkover survey of the general environs of the castle field was conducted. Weather conditions were initially suitable for bat surveys with temperatures of 15°C and it was overcast, dry and calm. The study was concluded at 23.20.

Bat activity is predominantly bi-modal, with bats taking advantage of increased insect numbers on the wing during the periods after dusk and before dawn, (there is usually a lull in activity in the middle of the night). While this holds true for 'hawking' species (bats that capture prey in the open air), 'gleaning' species such as brown long-eared (*Plecotus auritus*), Natterer's (*Myotis nattereri*) and Whiskered/Brandt's bats (*Myotis mystacinus/brandtii*) remain active throughout the night, as prey is available on foliage for longer periods.

Bats would be expected at the site as there is available habitat for them, in ivy, trees and crevices in the castle stone walls. Species such as bramble and elder, which are native shrubs, support a rich diversity of invertebrates on which bats feed.

The landscape in the Newcastle Castle area offers some darkened and safe hunting areas for bats with a diversity of natural vegetation, which in turn supports a variety of insects on which bats feed. However, lit areas in the

southern vicinity of the castle (near the road) were less hospitable to bats who generally avoid lit areas.

Plate 16. Looking west over the grassland surrounding the castle with Newcastle Church in background at sunset. An elder bush is visible beside the castle – behind the electric fence.

Plate 17. Moon rising in the east during the bat survey in 2023.

Three species of bat were recorded at Newcastle Castle in 2023 - these were Common pipistrelle, Soprano pipistrelle and Leisler's bat. Their sonograms are shown in **Figures 15, 16 and 17** respectively.

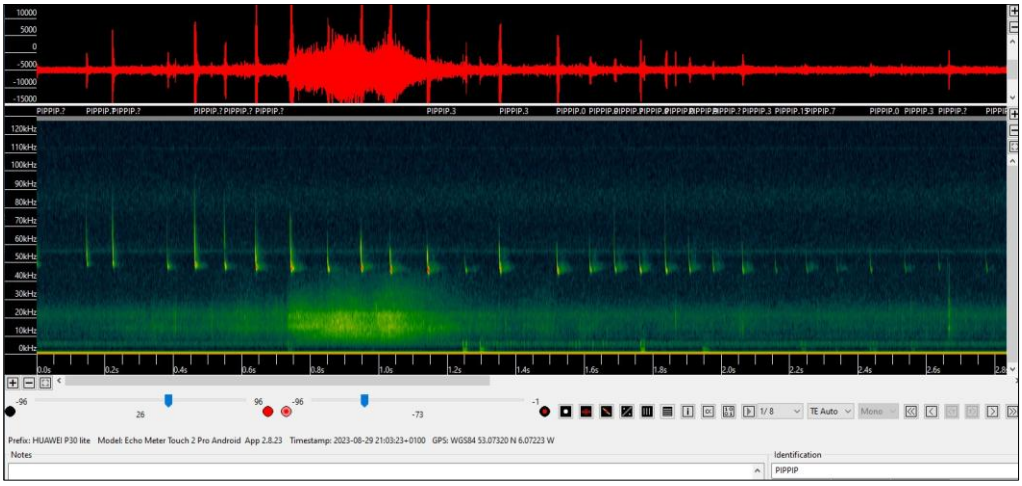

Figure 15. Sonogram of Common pipistrelle recorded at Newcastle Castle in 2023.

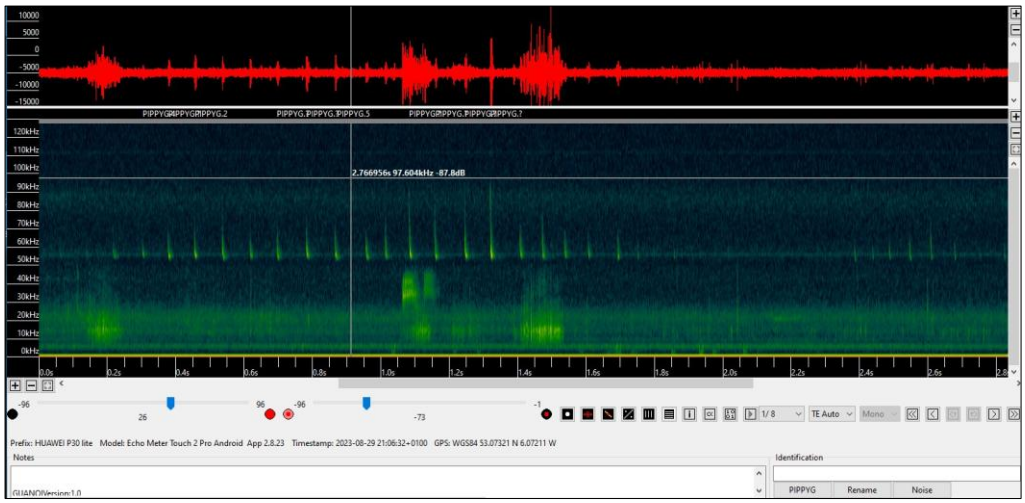

Figure 16. Sonogram of Soprano pipistrelle recorded at Newcastle Castle in 2023.

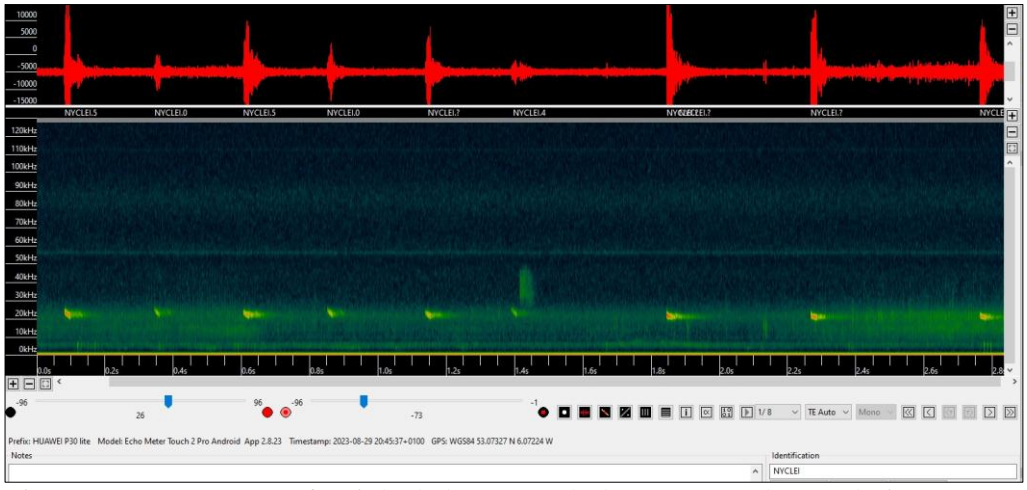

Figure 17. Sonogram of Leisler's bat recorded at Newcastle Castle in 2023.

Bats emerged shortly after dusk and it was suspected that they were roosting within the castle structure.

There was a large amount of foraging activity in the general environs of the castle with up to four pipistrelle bats flying at any one time. A large amount of pipistrelle social calls were heard.

The lime tree to the north of the castle contains a large hollow which is also highly suitable for roosting bats.

Plate 18. The hollow in the lime tree below the castle offers high roosting potential for bats.

Plate 19. There are numerous cracks, crevices and holes within the castle that could support roosting bats.

3.7.2.4 2025 Bat Activity Survey

A bat detector survey was carried out at dusk on 30th June 2025 using an Echometer Touch Pro 2 made by Wildlife Acoustics Inc. (Massachusetts, USA). EM Touch Pro 2s which are triggered to record when a bat call is emitted louder than 18dB for 1sec. These detectors use full spectrum sampling; detecting all frequencies simultaneously, meaning that multiple bat calls can be recorded at the same time. Two Batbox Duet Heterodyne/Frequency Division detectors and a Pettersson D100 Heterodyne detector were also used.

In addition, a Guidetrack Pro TK612 thermal scope which is a Night Vision Aid (NVA) was also used to aid spotting emerging bats.

The emergence of bats from the castle at dusk was monitored and a walkover survey of the general environs of the castle field was conducted.

Weather conditions were ideal for bat surveys – it was warm and initially overcast, 17.5°C with winds easing. Clouds began to dissipate later in the night and temperatures decreased slightly. There was frequent midges activity which the bats were feeding on.

A static Songmeter mini bat detector was also left in situ on the Herras fencing on the southern side of the castle recording from the 30th June to the 3rd July 2025.

Bats were identified by their ultrasonic calls coupled with behavioural and flight observations and on computer by sound analysis of recorded echolocation and social calls with dedicated software (Wildlife Acoustic's Kaleidoscope Pro; version 5.6.0).

The emergence survey completed in 2025 recorded a similar suite of species utilising the site as in 2023 with Common and Soprano pipistrelle bats roosting in small numbers within the castle. Bats were recorded emerging from the north western corner of the castle in particular and also from the XX,..

c.10 – 15 pipistrelles were recorded emerging with a maximum of five seen at any one time.

Leisler's bats were recorded early in the survey flying south to north. A Myotis species (possibly a Daubenton's bat or a Natterer's bat was recorded @ c.10:58.

Figure 18. Bat activity at Newcastle Castle in 2025.

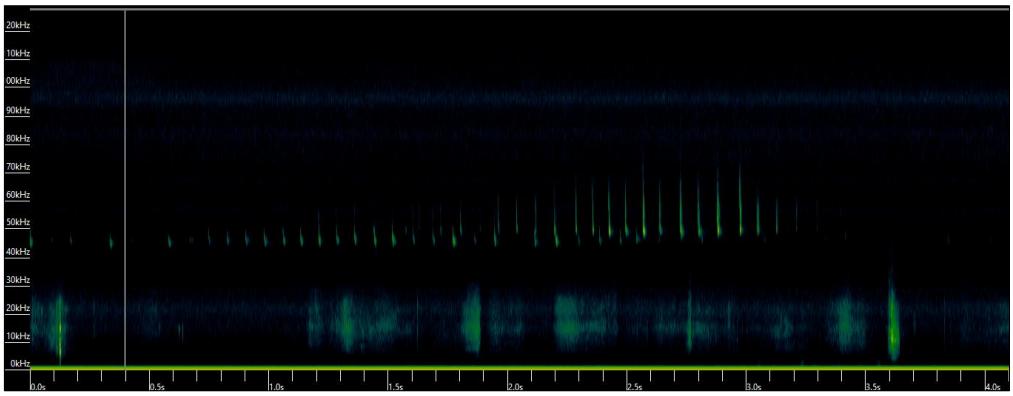

Figure 19. Sonogram of Common pipistrelle at Newcastle Castle in 2025.

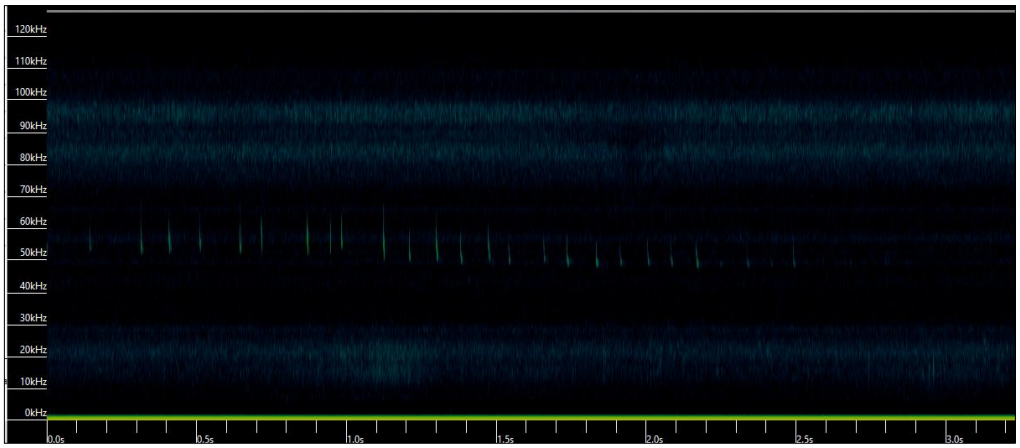

Figure 20. Sonogram of Soprano pipistrelle at Newcastle Castle in 2025.

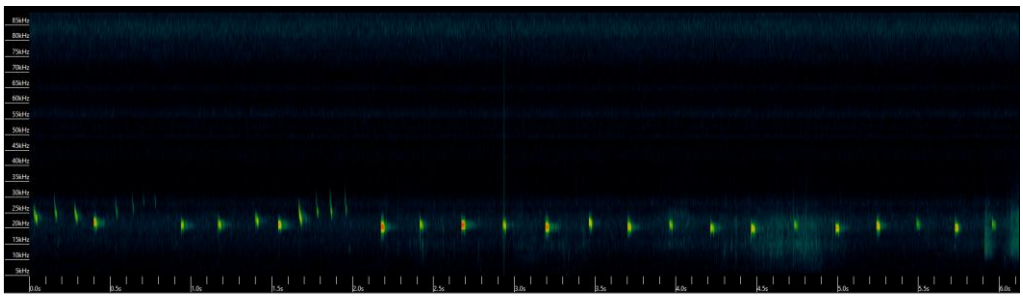

Figure 21. Sonogram of Leisler's bat at Newcastle Castle in 2025.

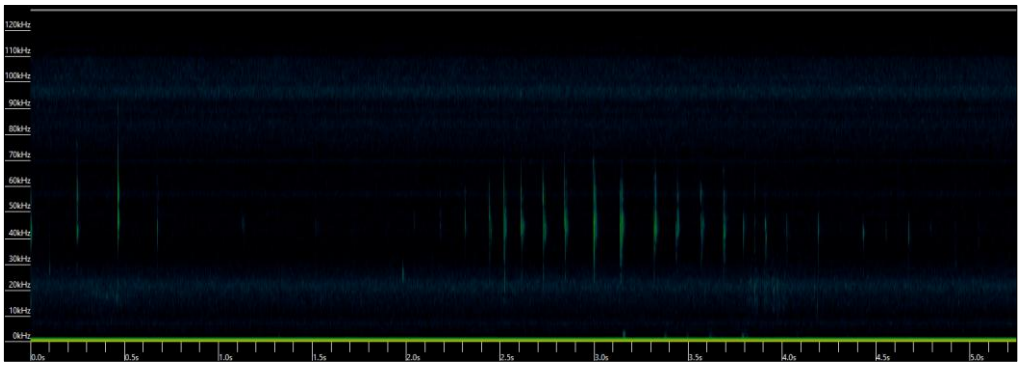

Figure 22. Possible Daubenton's bat at Newcastle Castle in 2025.

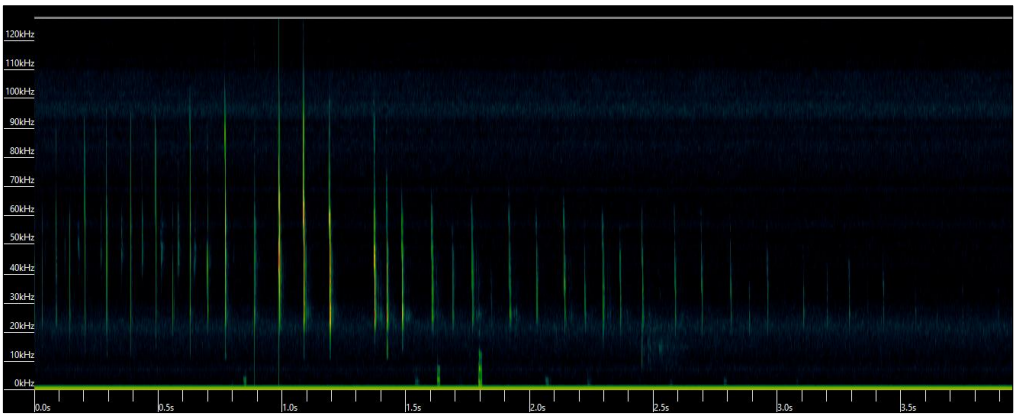

Figure 23. Possible Natterer's bat at Newcastle Castle in 2025.

Table 3. Bats recorded by the Songmeter Mini Static Detector.

Detector	Leisler's Bat	Common Pipistrelle	Soprano Pipistrelle	Unidentified Myotis
Total	106	484	165	1

Plate 20. The undercroft of the castle contains numerous locations to support roosting bats – these will all be conserved.

Plate 21. There will be rebuilding of this section of the undercroft of the castle.

Plate 22. Dusk survey on the 30th June 2025.

3.7.3 Birds

During the 2023 survey, remarkably few bird species were noted with only coal tit (*Periparis ater*) and robin (*Erithacus rubecula*) recorded, while rooks (*Corvus frugilegus*) are clearly present as there is a rookery nearby. One would expect many other species to occur, such as blackbird (*Turdus merula*), song thrush (*Turdus philomelos*), dunnock (*Prunella modularis*), blue tit (*Cyanistes caeruleus*), great tit (*Parus major*), goldfinch (*Carduelis carduelis*), chaffinch (*Fringilla coelebs*), magpie (*Pica pica*), jackdaw (*Corvus monedula*), woodpigeon (*Columba palumbus*), wren (*Troglodytes troglodytes*) and starlings (*Sturnus vulgaris*). Other species such as linnet (*Acanthis cannabina*) may occur, even sporadically.

There was no evidence in either 2023/2025 that species such as Barn owl were using the castle for nesting purposes.

4. PROPOSED CONSERVATION WORKS

A conservation management plan has been developed for Newcastle Castle, 'Conservation and Management Plan Newcastle Castle, Newcastle, Co. Wicklow. CMF23-2-WI003', which is a national monument in private ownership.

The plan is supported by National Monuments Service and Wicklow County Council and the castle owners.

The plan includes proposals to complete conservation works to the castle to conserve this national monument for the future.

A condition report and conservation assessment (Dermot Nolan & Associates (2025)[5]) was completed by Dermot Nolan (Conservation Engineer) for the castle as part of the Conservation Management Plan and accompanies this report.

This report noted that:

'The main causes of damage to this structure are the complete decay of timber lintols installed in the late medieval period and extensive robbing of masonry material. Most of the damage is at the windows and at the base of the walls. The decay of the timber elements has endangered the masonry above the windows and in some cases this has fallen. In all cases the masonry above the windows is in an extremely vulnerable condition and it is only a matter of time before it collapses. Paradoxically, the interventions which enlarged the windows also created many re-entrant corners (at sills, reveals etc) which facilitate breaking out stone for robbing. The mortar used in the refurbishments may also have been weaker than the original mortar. Stone has been removed from many of the interior sills and reveals. Stone has also been removed from the wall bases, especially at corners (south-east, north-east, north-west). There has also been some disintegration of masonry at the bases of the walls due to water action and intrusive vegetation. In some areas facing stones have become dislodged from the wall. The stub walls on the east and west left when the demolition of the southern part took place are in poor condition with overhanging and loose masonry and exposed mortar joints'.

The proposed Schedule of Works are set out below:

1. Identify and mark out a route from the road for passage of personnel, equipment and materials. Protect the surface with boarding appropriate sheeting.
2. Identify, mark out and protect a work and storage area in a suitable location beside the castle. The surface should be protected with boarding or suitable sheeting.
3. Treat with approved biocide and remove all vegetation on the wall faces and tops.

[5] Dermot Nolan & Associates (2025). Condition Report and Conservation/Repair Proposals for Newcastle Medieval Gatehouse Phase 1 Works CMF 2025. Report Dated Nov 2023/Jan 2025.

4. Clear all ground vegetation within the walls and in a strip 2m wide around the exterior. Expose fallen rubble for assessment and recovery. Note that the ground inside and in the general vicinity of the castle has become raised to some extent over the years.
5. West Wall
   The works to openings W1-W8 are specified on drawing no 2, together with masonry repairs, lime capping, plastering and pointing.
6. North Wall
   The works to openings N1-N4 are specified on drawing no 5, together with masonry repairs, lime capping, plastering, pointing and vegetation removal.
7. East Wall
   The works to openings E1-E4 are specified on drawing no 4, together with masonry repairs, lime capping, plastering, pointing and vegetation removal.
8. South Wall
   The works to openings S1-S3 are specified on drawing no 3, together with masonry repairs, lime capping, plastering, pointing and vegetation removal.
9. Under Croft
   The works to the under croft are specified on drawing number 1 and on Sketch Sections 'A' and 'B'

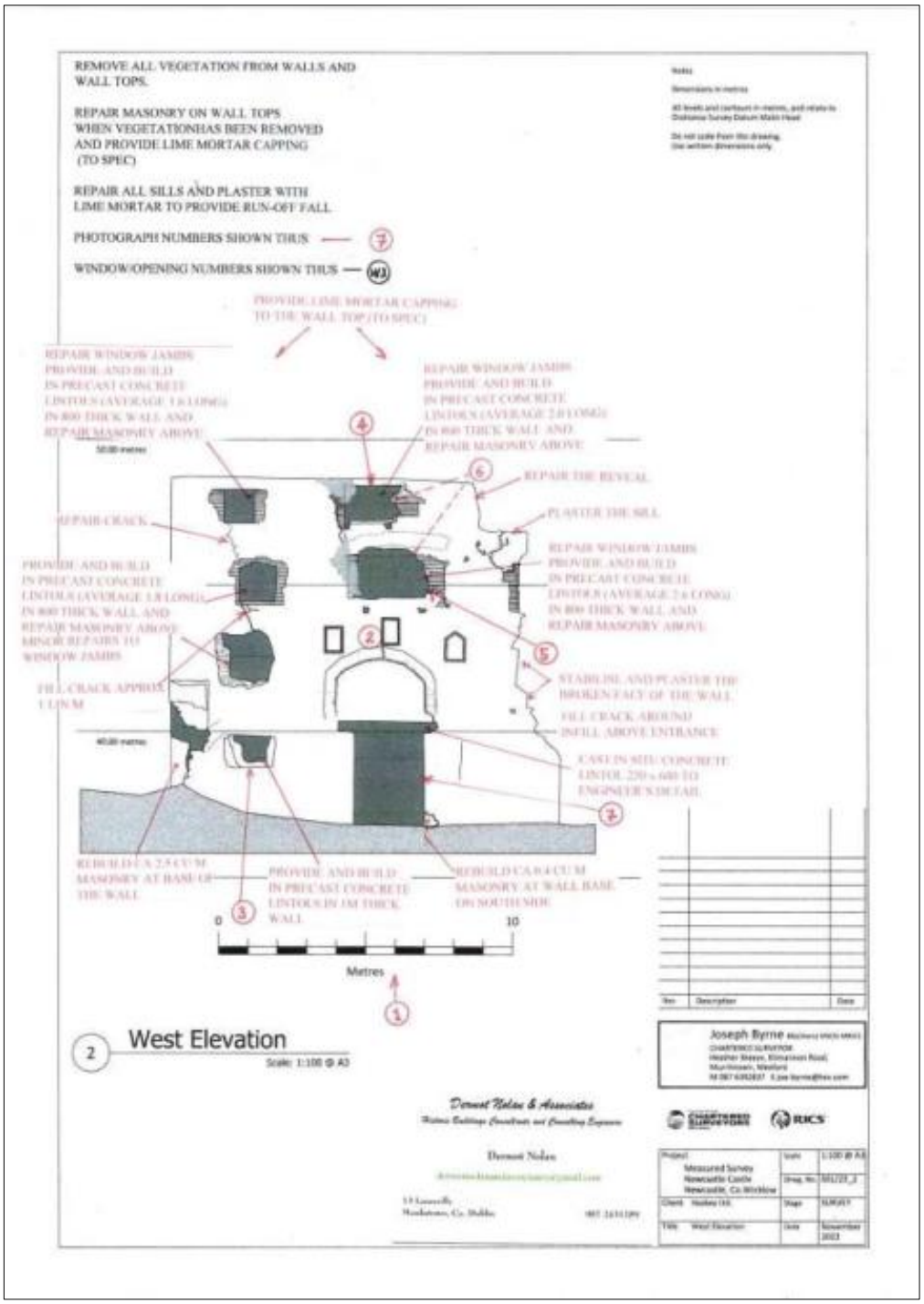

Figure 24. Proposed works to the west elevation.

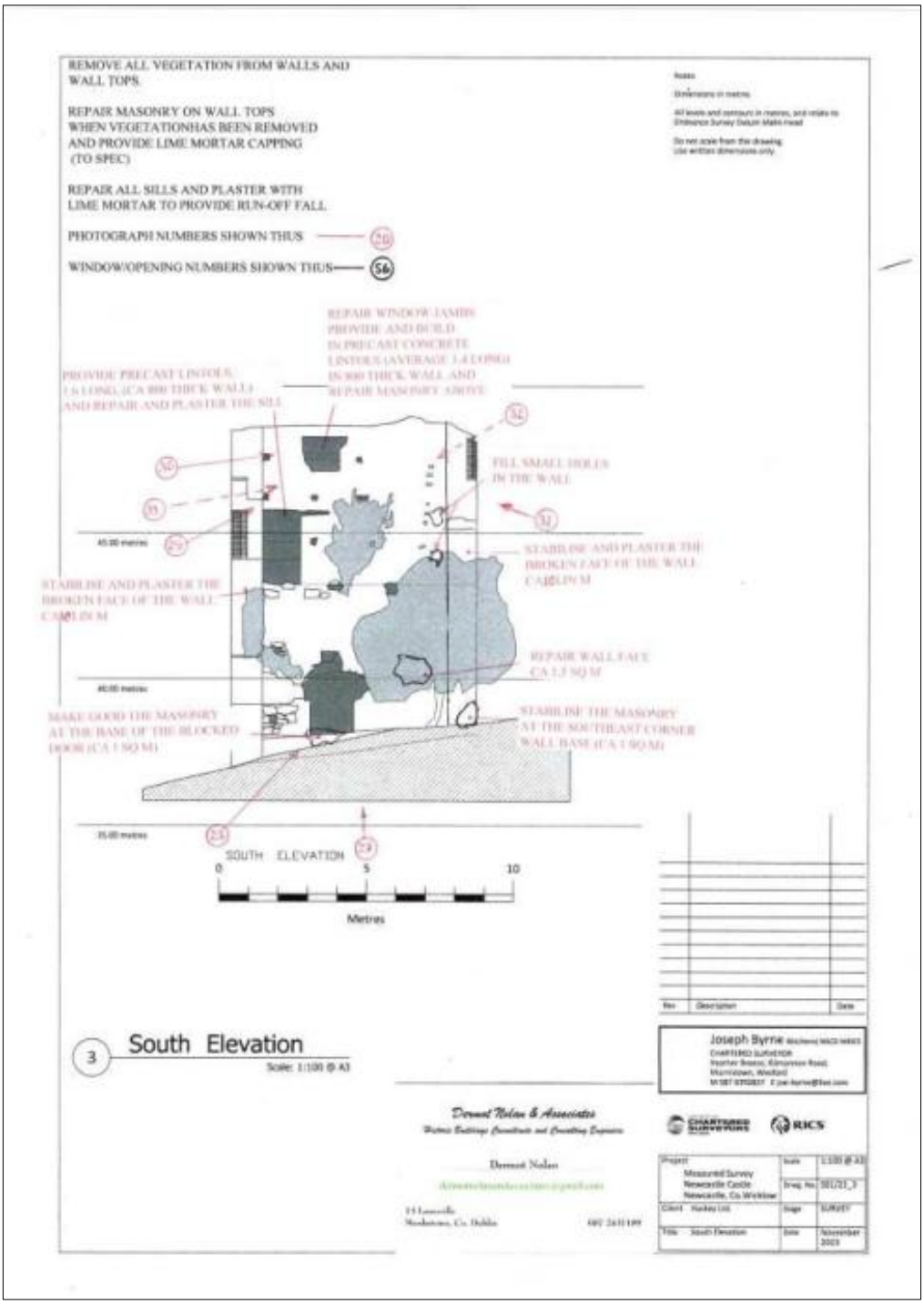

Figure 25. Proposed works to the south elevation.

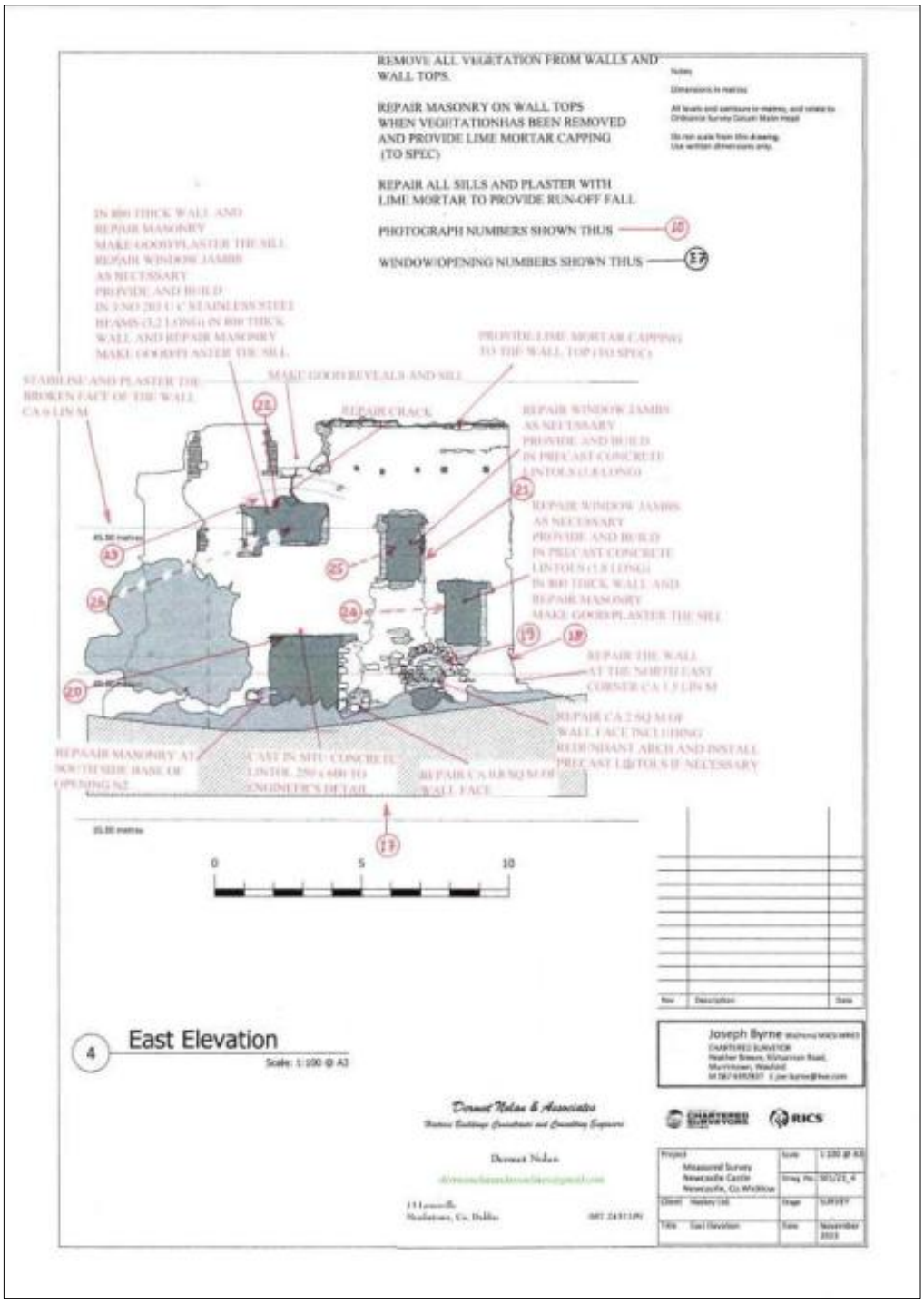

Figure 26. Proposed works to the east elevation.

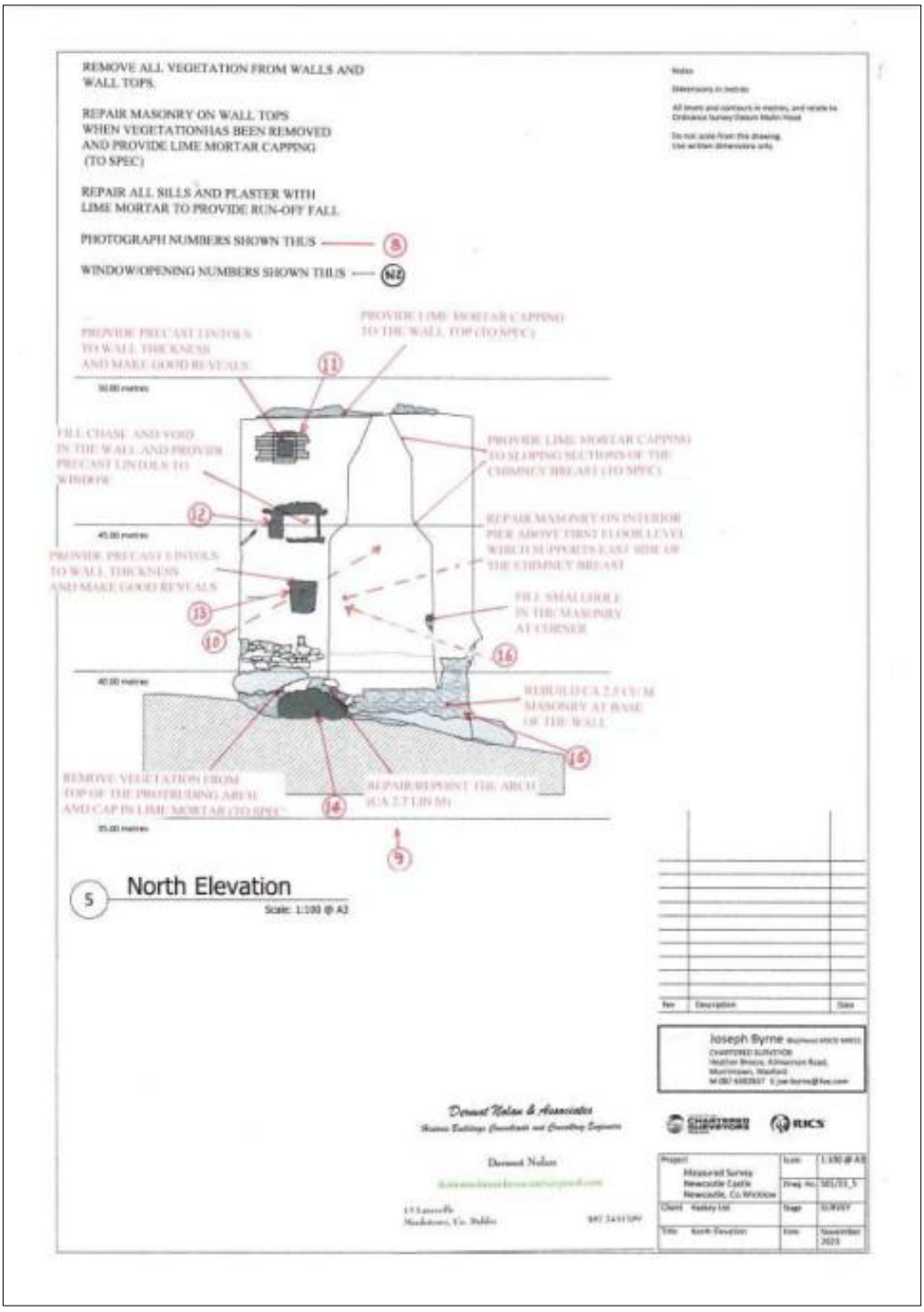

Figure 27. Proposed works to the north elevation.

5. MEASURES TO PROTECT/CONSERVE/ENHANCE BIODIVERSITY

The general recommendations made in the ecological report prepared in 2023 have been considered and are being implemented at Newcastle. These are presented again below.

Any work undertaken within the vicinity of the castle should be mindful of the natural heritage and character of the place and should enhance the character and setting of the monument. Equally, any habitat work must be mindful of the state of the stonework of old walls. Collaboration will be important.

5.1 Tree & Vegetation Protection

If any test trenching or excavation works are to take place any near trees or shrubs protective fencing should be erected in advance of any construction works commencing outside the drip-line of the canopy of retained trees to prevent damage by machinery, compaction of soil, etc. in accordance with BS 5837:2012. This should be signed off on by a qualified arborist or ecologist to ensure it has been erected properly before any machinery is allowed in the vicinity/work commences.

5.2 Protection of Breeding Birds and Breeding Bird Habitats

If any vegetation clearance works are proposed (for example from a built heritage perspective) this will be undertaken outside of the breeding bird season from March 1st to August 31st (in accordance with the Wildlife (Amendment) Act (2000)) to avoid direct impacts on breeding birds.

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1 March to 31 August. **No clearance of vegetation suitable for nesting birds within the site (shrubs, bramble tangles, etc.) should take place during this period. Should such clearance be required than the area proposed for clearance should be inspected by an ecologist to ascertain if any nesting birds are present.**

It is recommended that the elder tree adjoining the castle is conserved in situ if possible. Unlike other larger trees elder remains a relatively small tree/shrub and the root system of elder is unlikely to cause any stability issues or risk of undermining the castle structure.

If this tree must be removed to allow the erection of scaffolding for the works it can simply be trimmed down to the base (coppiced) and then allowed to regrow.

5.3 Grassland Management

The field in which the castle is located was grazed by horses in both 2023 and 2025. In 2023 some parts of the sward were overgrazed and poached whilst other areas were left untouched and were rank. It was recommended that the grazing programme for the field should be reviewed and ideally the land should be rested during the summer months to allow the vegetation to recover.

When the property was first visited in January 2023 the horses had access to the monument and on the recommendation of the archaeologists an electric fence was erected to exclude the animals from the immediate environs of the castle.

This allowed the recovery of vegetation in this area over the summer and provided habitat for invertebrates that need areas of long vegetation in which to complete their lifecycles. It also enabled a botanical survey of these ungrazed areas to be completed.

Plate 23. Winter grazed field.

5.4 Bat Roost - Bat Derogation Licence – Advisory Note 2023

The 2023 preliminary bat survey noted that bats are very likely to be confirmed roosting within the castle given the species present (which are crevice dwelling species) and the observed time of emergence, and therefore the monument has been treated since then as a confirmed bat roost.

The conservation team were advised that a bat derogation licence from NPWS would therefore be required for any works that could disturb the bats.

This must be applied for and granted in advance of any permissions or funding for the works to take place.

The bat derogation licence normally has a period of validity for the works – this depends on what type of roost is encountered and what the proposed works are. The aim of this is to avoid impacting the bats during the most vulnerable periods in their life cycle – breeding or hibernation.

5.5 Potential Impacts of the Proposed Building Conservation Works

5.6 Bat Derogation Licence Application 2025

This report forms part of the application for a Derogation Licence for these works.

The bat derogation licence must undergo three tests for approval as follows:

- Test 1: Reason for the Derogation
- Test 2: Absence of Alternative solutions
- Test 3: Impact of a Derogation on Conservation Status

A bat derogation licence will be sought for conservation works under the following reason:

"In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment"

A conservation management plan has been developed for Newcastle Castle (Whitty *et al.* (2024)). The structural surveys of the castle completed in 2023/2025 have identified that the masonry above the windows is in an extremely vulnerable condition and it is only a matter of time before it collapses. The loss of stone elsewhere in the castle was also noted – particularly at the wall base. The plan sets out to repair and stabilise these areas with appropriate interventions.

These works will conserve this National Monument for future generations. These conservation works have potential impacts on roosting bats which utilise the structure.

A Do Nothing approach is not favourable as if no works are proposed the castle will continue to deteriorate. The purpose of the works is to secure the surviving historic masonry for the long-term. It is currently in poor condition and will continue to deteriorate without intervention. The increased frequency of heavy rainfall events resulting from global warming will accelerate this deterioration.

The proposed conservation works and mitigation measures set out below ensure the protection of the bats during the works and the long-term conservation of their roosting locations within the structure as well as the structure itself. All three species of bats utilising the stricture are widespread species in Ireland and are listed as 'Least Concern' on the Ireland Red List No. 12: Terrestrial Mammals (Marnell et al., 2019), meaning they are not in any threatened category.

The proposed conservation works at Newcastle Castle will not be detrimental to the maintenance of populations of these species at a favourable conservation status in their natural range as required under Section 54 (2) of the European Communities (Birds and Natural Habitats) Regulations. A range of roosting locations will be retained within the structure to provide continued access to roosting sites for bats.

5.7 Resurvey of Potential Bat Roosts prior to Works

There are a series of suitable crevices, holes and areas of dense ivy on the castle. These offer roosting potential for bats and should not be refilled, repointed or otherwise repaired or restored without consultation with a suitable qualified bat specialist.

These works will need to be conducted outside the bat breeding season as shown on **Figure 28** below.

Plate 24. Any conservation works to the castle need to be mindful of its natural heritage also.

Once the bat derogation licence is granted and the works are due to commence any features within the castle which have been identified as having potential for roosting bats will be re-examined prior to any works commencing to ensure that bats have not taken up residence within same in the intervening period.

Once a scaffold tower or similar has been erected they will be inspected using an endoscope by a bat specialist to determine if any bats are present. Suitable bat access points will be shown to the project stone mason and the potential for their retention discussed.

Any areas which do not require pointing from a structural perspective can then be lightly blocked with hessian cloth to ensure that bats cannot re-enter these crevices during the works.

This will then be removed as repointing takes place or on completion leaving these crevices accessible to bats in the future.

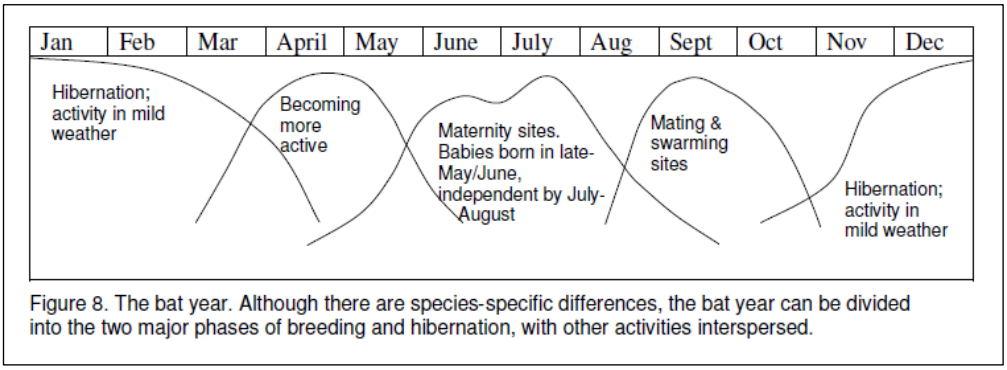

Figure 8. The bat year. Although there are species-specific differences, the bat year can be divided into the two major phases of breeding and hibernation, with other activities interspersed.

Figure 28. The Bat Year (Source: NPWS Bat Mitigation Guidelines).

Table 2. The applicability of survey methods. (Source: NPWS Bat Mitigation Guidelines).

Season	Roost Type	Inspection	Bat detectors and emergence counts
Spring (Mar – May)	Building	Suitable (signs, perhaps bats)	Limited, weather dependent
	Trees	Difficult (best for signs before leaves appear)	Very limited, weather dependent
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June-August	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited; use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September – November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited, weather dependent; use sunrise survey?
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December - February)	Building	Suitable (signs, perhaps bats))	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

5.8 Provision of Bat and Bird Boxes

The roosting and nesting opportunity for bats and birds could be increased in the vicinity of the castle as part of the conservation works.

It is recommended that a series of artificial boxes are erected on trees surrounding the castle or on walls – a mixture of boxes should be provided. These should be specified by an ecologist and erected under their supervision.

These will need to be reviewed by the conservation engineer and archaeologist to ensure that there are no conflicts or archaeological risk arising from same.

5.9 Restoration of Native Species

The conservation and protection of the areas of native tree and shrub species such as bramble, hawthorn, blackthorn, dog rose and elder is recommended. These species and areas offer cover for small mammals, breeding habitat for birds and foraging habitat for all wildlife including bats. It is recommended that an increase in native species within the property is completed to improve its biodiversity value.

Suggested locations for the establishment of native shrubs species in the form of a hedgerow or thicket planting of shrubs are shown below on **Figure 29** below.

These will need to be reviewed by the archaeologist to ensure that there are no conflicts or archaeological risk arising from same. The purpose of this planting is to restore ecological connectivity around the monument and to increase habitat for all wildlife.

If thorny shrubs are used they would also improve the security of the property in the long term.

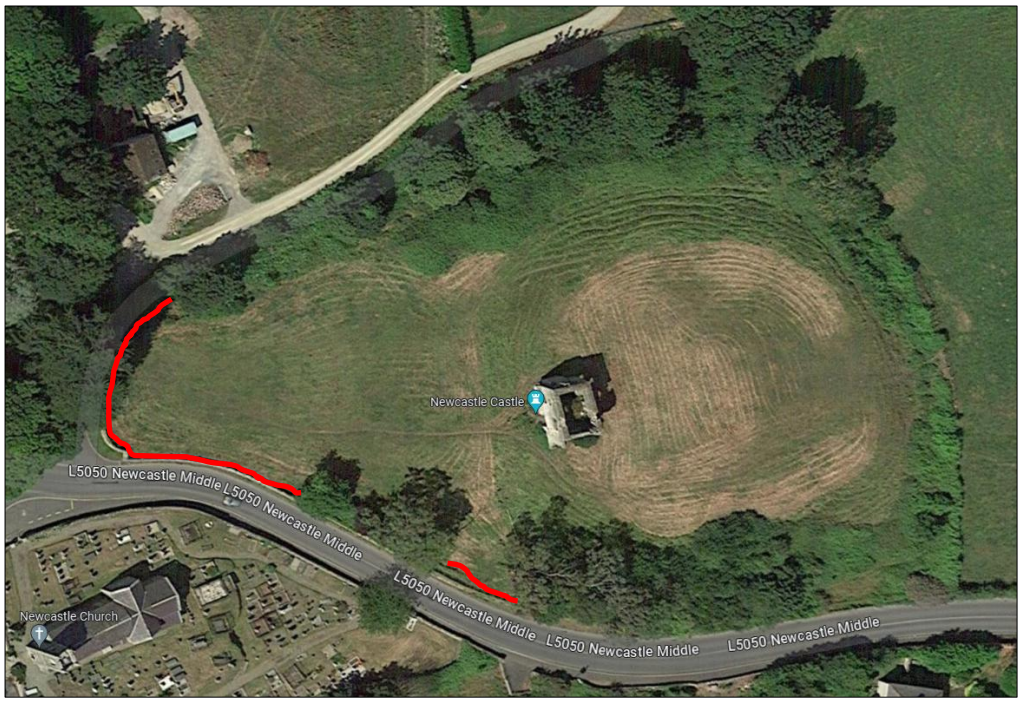

Figure 29. Proposed native shrub/hedgerow establishment areas.

Suitable shrub/small tree species include:

- Hawthorn (*Crataegus monogyna*),
- Blackthorn (*Prunus spinosa*),
- Guelder rose (*Viburnum opulus*),
- Spindle (*Euonymus europaeus*),
- Elder (*Sambuccus nigra*),
- Hazel (Corylus avellana),
- Wych elm (*Ulmus glabra*),
- Crab apple (*Malus sylvestris*),
- Dog rose (*Rosa canina*).

Suitable tree species include;

- Pedunculate Oak (*Quercus robur*),
- Sessile oak (*Quercus petraea*),
- Whitebeam (*Sorbus aria*),
- Silver birch (*Betula pendula*),
- Downy birch (*Betula pubescens*),
- Willows (*Salix cinerea*, *Salix caprea*, *Salix aurita*).

All species should be of certified Irish genetic provenance as they are best adapted to Irish growing conditions – nurseries that supply the Forest Service native woodland scheme grow stock form Irish collected seed.

5.10 Lichen Survey

A survey of the lichens on the stonework of the castle will be completed once the scaffolding is erected allowing access to the structure.

Plate 25. The conservation of vegetation on the castle should be retained where possible.

5.11 Conservation of Vegetation on Stonework

A population of mosses, liverworts, lichens, ferns and other plants are present on the stonework of the castle and should be conserved during any works. Where such stones need to be removed and reset/ reconstructed they can be kept with the mosses/lichens intact and then reinstated with this vegetation facing outwards so they can still recolonise the structure.

5.12 Invasive Species

Any machinery or plant brought to the monument must be fully cleaned prior to use to ensure that it does not inadvertently introduce any invasive species to the area.

A plan to remove and control the invasive species recorded during the site visits – old man's beard and Montbretia should be developed and implemented.

4.11 Lighting

There is some dark sky around the castle but there is lighting around the nearby church and in the locality, while houses and the village of Newcastle are all well-lit, which will reduce the availability of feeding areas for bats (**Figure 30**).

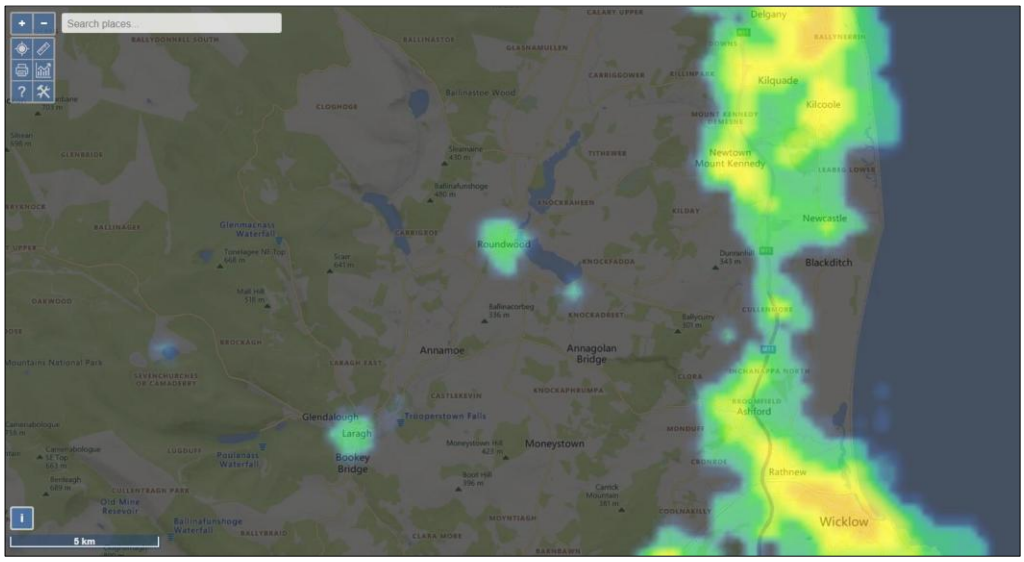

Figure 30. Light pollution in Newcastle Village.

The castle should not be illuminated.

4.12 Creation of Nesting/roosting Opportunity within Restored/repaired Stonework

Where parts of the stonework of the castle are to be rebuilt/repaired provision for nesting birds/roosting bats can be incorporated into the stonework without compromising the structure or longevity of the repair.

These can be reviewed and agreed by the bat specialist/ecologist with the project conservation engineer and archaeologists at the time of repair.

Figures 31 and **32** below give an idea of how to accommodate same for bats within the stonework.

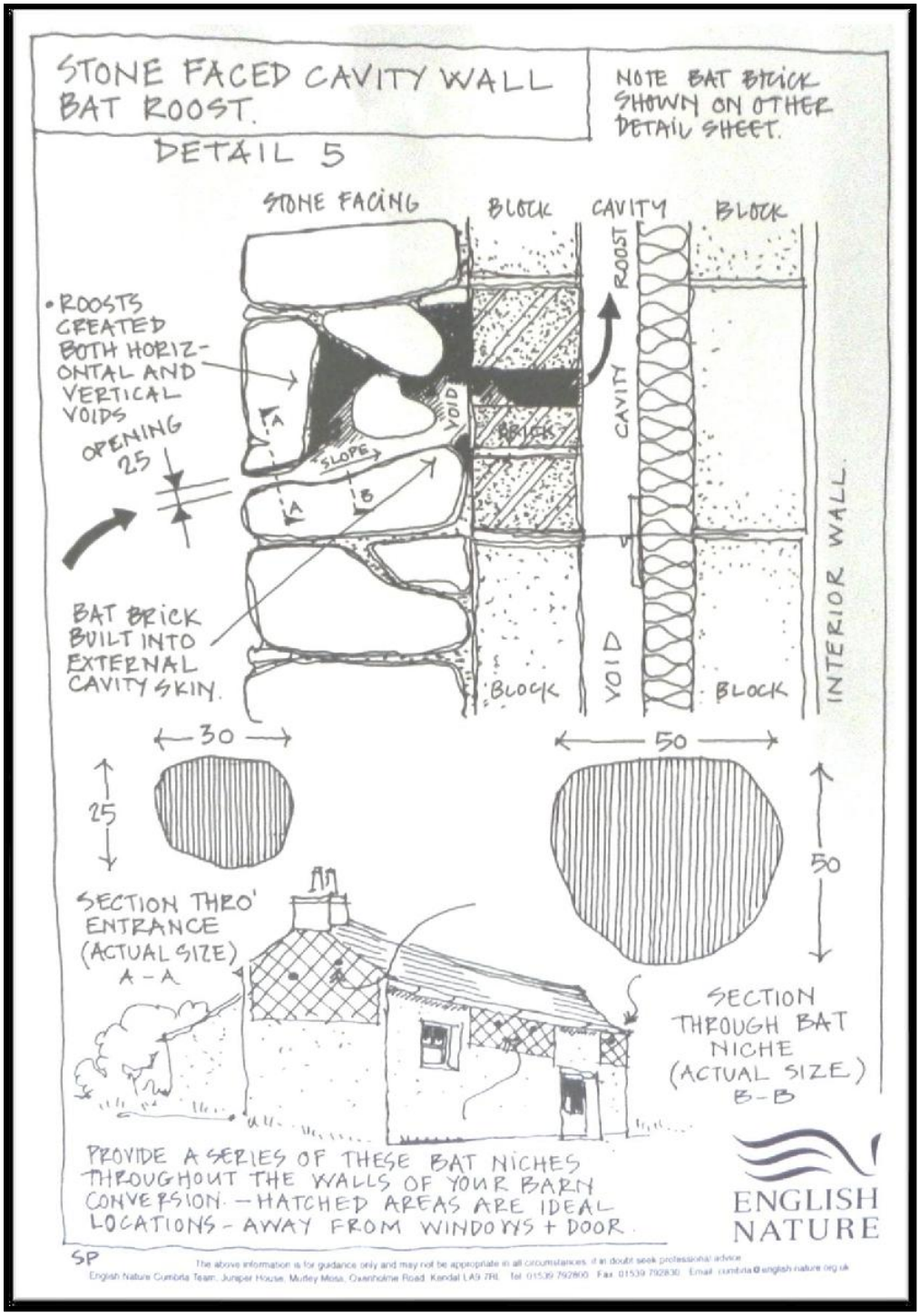

Figure 31. Accommodating roosting spaces for bats in stonework.

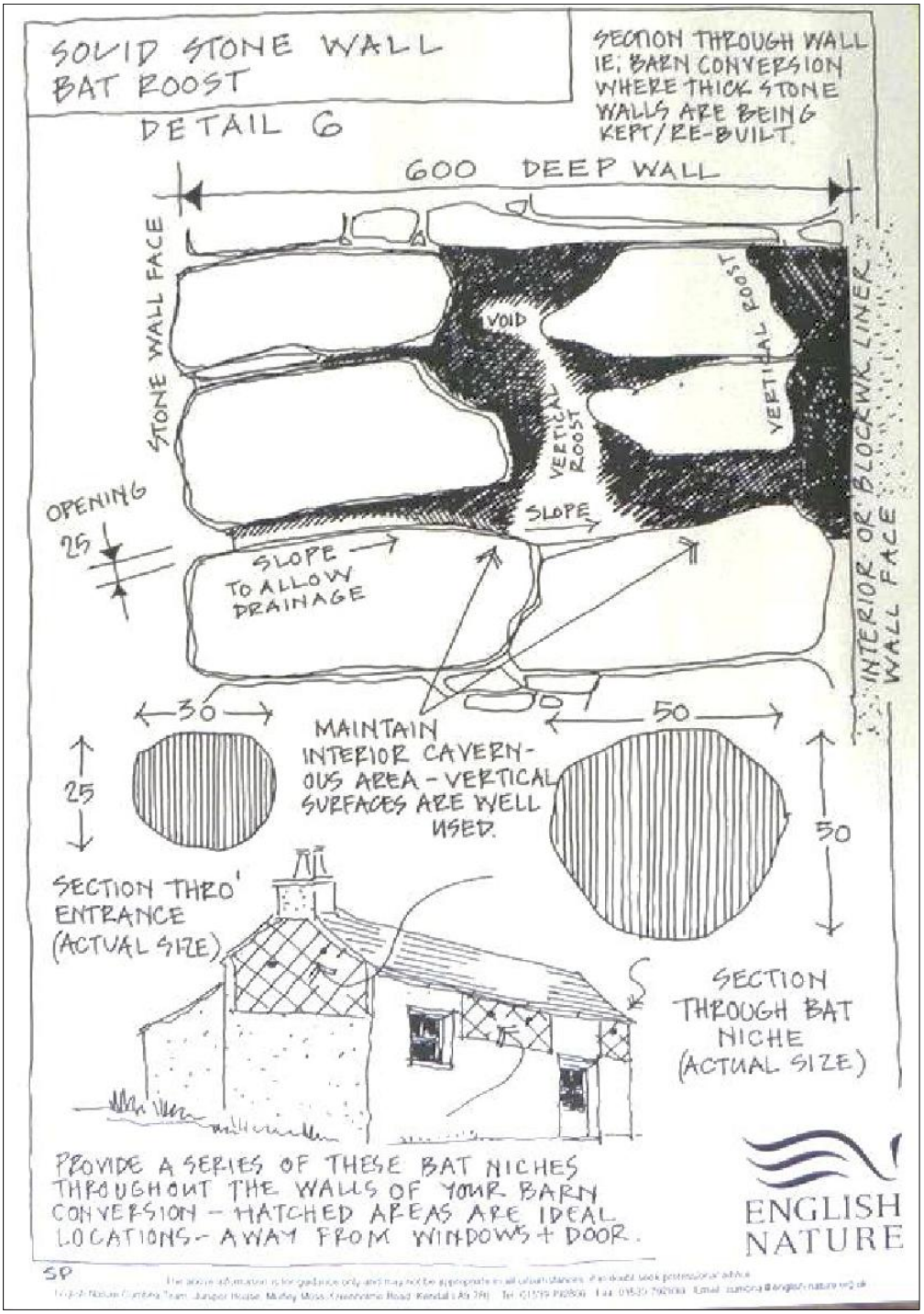

Figure 32. Accommodating roosting spaces for bats in stonework.

Barn owls, which are an iconic farmland bird, and are a red listed species, are beginning to make a recovery in the landscape of County Wicklow. Owls have been seen in the general environs of The Murrough and farmland on the east Wicklow coast and the erection of a barn owl box within the castle could help with their recovery and breeding success. Both indoor and outdoor barn owl boxes are available from the Wicklow Barn Owl Project and should be erected and sited under the direction of an ecologist to maximise their potential use.

4.13 Measures for Butterflies in the Newcastle Castle area

On the island of Ireland, 18% of butterflies and 8% of macro-moths are threatened with extinction.

Butterflies present in Newcastle Village include;

- Comma (*Polygonia c-album*)
- Common Blue (*Polyommatus icarus*)
- Green-veined White (*Pieris napi*)
- Holly Blue (*Celastrina argiolus*)
- Large White (*Pieris brassicae*)
- Orange-tip (*Anthocharis cardamines*)
- Painted Lady (*Vanessa cardui*)
- Peacock (*Inachis io*)
- Red Admiral (*Vanessa atalanta*)
- Ringlet (*Aphantopus hyperantus*)
- Small Tortoiseshell (*Aglais urticae*)
- Small White (*Pieris rapae*)
- Speckled Wood (*Pararge aegeria*)

We need to consider the life cycle of butterflies and some other principles to conserve them in our landscape, gardens and parish. This is shown on **Figure 33** below.

Therefore we need to think about:

- Providing food plants for caterpillars
- Nectar supply for adult butterflies
- Keeping ivy (both immature and mature) on trees and walls
- Providing shelter for butterflies – roosting habitat
- Providing overwintering habitats for butterflies
- Do not buy a "butterfly kit" with caterpillars or release adult butterflies

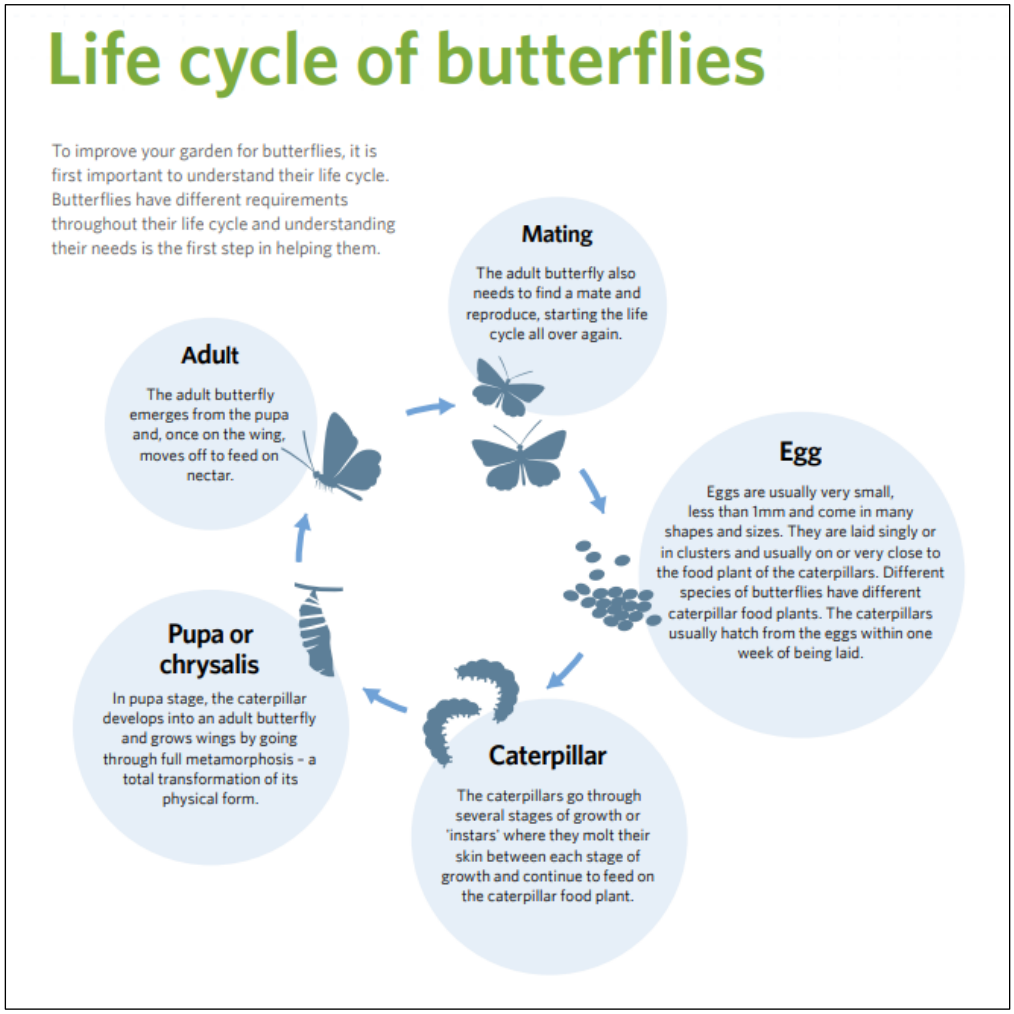

Figure 33. The life cycle of butterflies.

A list of the food plants used by the various species of butterfly is outlined below on **Figure 34**. Some of these plants are present in the vicinity of the Newcastle Castle (ivy, bird's-foot trefoil, grasses, nettles, thistle, etc.) but some are lost here on account of the current grazing pressure coupled with application of fertiliser and the reseeding of grassland habitat; more could become established if the grassland management here was altered and if additional native shrubs were established.

Butterflies roost on the underside of leaves, in long grass, rock crevices or similar sheltered places. Butterflies roost with their wings closed, often their wings camouflage with their background to protect them from predators while they sleep. If we mow and tidy away everywhere in our gardens and in our landscape there is nowhere for them to roost.

Butterfly	Caterpillar foodplant
Brimstone	Buckthorn (*Rhamnus cathartica*) and Alder Buckthorn (*Frangula alnus*)
Clouded Yellow*	Clovers (*Trifolium* spp.)
Comma	Nettle (*Urtica dioica*)
Common Blue	Bird's-foot-trefoil (*Lotus corniculatus*)
Green-veined White	Garlic Mustard (*Alliaria petiolate*), Cuckooflower (*Cardamine pratensis*), Water- cress (*Rorippa-nasturtium aquatica*) and other members of the Brassicaceae family
Holly Blue	Holly (*Ilex aquifolium*) and Ivy (*Hedera helix*)
Large White	Brassicaceae family
Meadow Brown	Grasses: Fescues (*Festuca* spp.), Meadow-grasses (*Poa* spp.) and Bents (*Agrostis*)
Orange-tip	Cuckooflower (*Cardamine pratensis*) and Garlic Mustard (*Alliaria petiolate*)
Painted Lady*	Thistles (Cirsium spp. and Carduus spp.)
Peacock	Nettle (*Urtica dioica*)
Red Admiral*	Nettle (*Urtica dioica*)
Ringlet	Grasses: Cock's-foot (*Dactylis glomerata*), False Brome (*Brachypodium sylvaticum*), Tufted Hair-grass (*Deschampsia cespitosa*) and Common Couch (*Elymus repens*)
Silver-washed Fritillary	Common Dog-violet (*Viola riviniana*)
Small Copper	Common Sorrel (*Rumex acetosa*) and Sheep's Sorrel (*R. acetosella*)
Small Heath	Fine grasses, especially fescues (*Festuca* spp.), Meadow-grasses (*Poa* spp.)
Small Tortoiseshell	Nettle (*Urtica dioica*)
Small White	Brassicaceae family and nasturtiums (*Tropaeolum*)
Speckled Wood	Feed a on a variety of grasses but most commonly on: False Brome (*Brachypodium sylvaticum*), Cock's-foot (*Dactylis glomerata*) and Yorkshire Fog (*Holcus lanatus*)
Wood White	Meadow Vetchling (*Lathyrus pratensis*), Bitter-vetch (*Lathyrus linifolius*), Tufted Vetch (*Vicia cracca*) and Common Bird's-foot-trefoil (*Lotus corniculatus*)

Figure 24. The food plants butterflies need for their caterpillars to complete their lifecycles on.

Butterflies can enter diapause (overwinter) in all four stages, but the majority will overwinter in their caterpillar stage. Before diapause, butterflies produce a form of internal antifreeze to protect them from the cold weather. Because diapause is triggered by shorter day lengths and lower temperatures, they generally overwinter outside.

The habitats that butterflies need for overwintering, as shown on **Figure 35** below, in one of their immature stages are:

- Leaf litter

- Thick/uncut vegetation
- Log piles

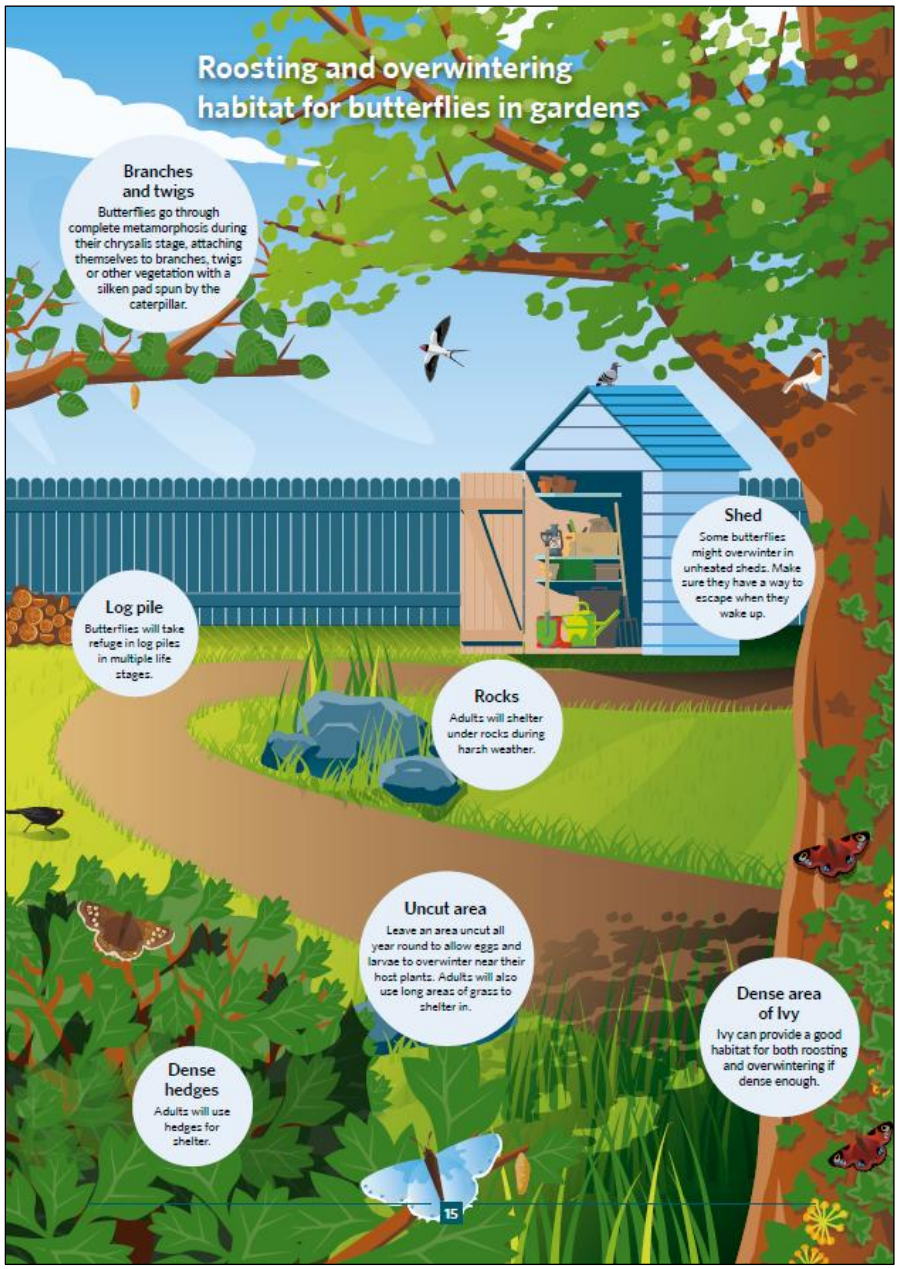

Figure 35. Roosting and overwintering habitat for butterflies.

The lands surrounding Newcastle Castle can easily be managed in a way that provided butterflies with what they need for all their life stages.

4.14 Conservation of Deadwood

A number of trees along the southern boundary of the castle field have died. These are not within falling distance of the road or pose a risk to the monument and from a biodiversity perspective they should be conserved in situ as standing deadwood. Fallen trees in the field also can be left in situ as fallen deadwood. Both fallen and standing deadwood provide a diverse range of habitats for invertebrates, fungi, mosses, etc. with some species specialising on different species and types.

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7. APPENDIX I: SITE SYNOPSES FOR DESIGNATED SITES

SITE SYNOPSIS

Site Name: The Murrough Wetlands SAC

Site Code: 002249

The Murrough is a coastal wetland complex which stretches for 15 km from Ballygannon to north of Wicklow town and, in parts, extends inland for up to 1 km. A shingle ridge stretches the length of the site and carries the mainline Dublin Wexford railway.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1210] Annual Vegetation of Drift Lines
- [1220] Perennial Vegetation of Stony Banks [
- 1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [7210] Cladium Fens*
- [7230] Alkaline Fens.

On the seaward side of the shingle bank which runs along The Murrough Wetlands SAC site drift line vegetation includes species such as Sea Rocket (*Cakile maritima*), Sea Sandwort (*Honkenya peploides*), Sea-holly (*Eryngium maritimum*) and Yellow Horned-poppy (*Glaucium flavum*). The rare and legally protected Oysterplant (*Mertensia maritima*) (Flora (Protection) Order, 1999) has been recorded on the gravelly shore in the past but is now considered to be extinct from this locality.

Low sand hills occur at Kilcoole, with Marram (*Ammophila arenaria*) and Lyme-grass (*Leymus arenarius*). In other areas and further inland a rich grassy sward, which is most extensive at the south of the site, has developed. Typical species include Sweet Vernal-grass (*Anthoxanthum odoratum*), Crested Dog's-tail (*Cynosurus cristatus*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Burnet Rose (*Rosa pimpinellifolia)* and Pyramidal Orchid (*Anacamptis pyramidalis*). A community dominated by Silverweed (*Potentilla anserina*) and Strawberry Clover (*Trifolium fragiferum*) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a gorse (*Ulex* sp.) heath has developed on the stony ridge.

Saltmarsh is present within the site in two distinct areas. At the southern end of the site is found Broad Lough. This is a brackish, partly tidal lake, and has a well-developed saltmarsh community which includes Saltmarsh Rush (*Juncus gerardi*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Sea Purslane (*Halimione portulacoides*) and Common Scurvygrass (*Cochlearia officinalis*). Common Reed (*Phragmites australis*) is abundant along the western shore, along with some Sea Club-rush (*Scirpus maritimus*). Saltmarsh is also present in the northern end of the site in the vicinity of The Breaches. Though this has been greatly affected by drainage in the late 1980s and early 1990s, localised Sea Couch (*Elymus pycnanthus*) still occurs. The

grassland which was created and improved as a result of the drainage is now influenced by seepage and flooding of saline waters.

Fen vegetation is well developed in the Murrough wetlands, with both alkaline and calcareous fen with Great Fen-sedge (*Cladium mariscus*) represented. The fens occur mostly between Five Mile Point and Six Mile Point, especially in the townland of Blackditch and also in the Leamore and Grange areas. The alkaline fen is dominated by Black Bog-rush (*Schoenus nigricans*), with Marsh Pennywort (*Hydrocotyle vulgaris*), Purple Moor-grass (*Molinia caerulea*), Devil's-bit Scabious (*Succisa pratensis*), Heather (*Calluna vulgaris*), Cross-leaved heath (*Erica tetralix*), and a wide variety of orchids also present. The rare, Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*) has also been recorded here. Great Fen-sedge occurs in mosaic with several vegetational elements but chiefly with alkaline fen. Its many forms can range from pure stands of Great Fen-sedge, through to occurring as a dominant with Greater Tussock-sedge (*Carex paniculata*) and Blunt-flowered Rush (*Juncus subnodulosus*). Cladium fen also occurs at Blackditch within stretches of swamp woodland or fen carr dominated by Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Downy Birch (*Betula pubescens*).

A fine wet woodland occurs at Blackditch. Downy Birch is the dominant species, with some Alder (*Alnus glutinosa*), willows (*Salix* spp.) and Ash (*Fraxinus excelsior*) also present. The ground flora of this wooded area is often quite dense. This wood also contains a rich invertebrate community with at least eight rare or notable species of fly (Order Diptera) occurring, including *Syntormon setosus*, a species unknown elsewhere in Britain or Ireland.

A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (*Juncus* spp.), to those of sedges (*Carex* spp.), with other areas supporting a mixture of sedges and Yellow Iris (*Iris pseudacorus*). A wide variety of grasses and herbs are also found. These include Meadowsweet (*Filipendula* ulmaria), Silverweed and Common Spike-rush (*Eleocharis palustris*). The scarce Red Data Book species Marsh Pea (*Lathyrus palustris*) occurs in one area. The marshes merge into wet grassland in many areas. Where grazing pressure is low, a herb-rich sward occurs with species such as Ragged-Robin (*Lychnis flos-cuculi*), Cuckooflower (*Cardamine pratensis*), Meadowsweet and Heath Spotted Orchid (*Dactylorhiza maculata*) occurring. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as Greater Spearwort (*Ranunculus lingua*), Bogbean (*Menyanthes trifoliata*) and the scarce Reed Sweet-grass (*Glyceria maxima*).

The Murrough is an important site for wintering waterfowl and breeding birds. Species listed on Annex I of the E.U. Birds Directive include Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Kingfisher and Little Tern. Average peak winter counts from 1994/95 - 1997/98 showed the site to have an internationally important population of Brent Goose (1,318, higher than in the early 1990s), nationally important populations of Wigeon (1,518), Teal (772) and Lapwing (3,140), and regionally or locally important populations of Whooper Swan (80), Little Grebe (22), Shelduck (95), Gadwall (9), Mallard (391), Shoveler (22), Golden Plover (615), Curlew (605) and

Redshank (181). Greylag Goose numbers were nationally important in the early 1990s but these numbers have dropped off. The average peak is now 213.

Little Tern breed on the shingle beach near The Breaches and this is the largest colony on the east coast (approx. 50 pairs in 1993, an average of 37 pairs over the ten year period 1988-1998). Redshank, Oystercatcher, Ringed Plover and Water Rail also breed. The reedbeds at Broad Lough provide habitat for Reed Warbler and the rare Bearded Tit has bred here.

Otter has been reported regularly from the Murrough. This is a Red Data Book Species and is also listed on Annex II of the Habitats Directive.

Recent farming and drainage practices and afforestation have greatly reduced the area and quality of the wetlands habitats - the area between Kilcoole and Newcastle is particularly affected. In 1997 there was some levelling of the sand hills below Killoughter Station. Pollution, reclamation and further drainage would adversely affect this site. A section of the wetlands at Blackditch, which includes alkaline and Cladium fen, has been acquired by BirdWatch Ireland and is being managed for nature conservation.

This site is of importance as it is the largest coastal wetland complex on the east coast of Ireland. Although much affected by drainage, it still contains a wide range of coastal and freshwater habitats, including six listed on Annex I of the E.U. Habitats Directive, some of which contain threatened plants. Areas on the site contain a rich invertebrate fauna, including several rarities. It is an important site for both wintering and breeding birds and supports a variety of species listed on Annex I of the E.U. Birds Directive.

4.01.2014

SITE SYNOPSIS

Site Name: The Murrough SPA

Site Code: 004186

The Murrough SPA comprises a coastal wetland complex that stretches for 13 km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south, and extends inland for up to 1 km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line.

Beside the shingle shore is a stony ridge supporting perennial vegetation. Driftline vegetation on the seaward side includes species such as Sea Rocket (*Cakile maritima*), Sea Sandwort (*Honkenya peploides*), Sea Holly (*Eryngium maritimum*) and Yellowhorned Poppy (*Glaucium flavum*). Low sand hills occur at Kilcoole, with Marram (*Ammophila arenaria*) and Lyme-grass (*Leymus arenarius*). In other areas and further inland a rich grassy sward, which is most extensive in the south end of the site, has developed. A community dominated by Silverweed (*Potentilla anserina*) and Strawberry Clover (*Trifolium fragiferum*) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a Gorse (*Ulex*) heath has developed on the stony ridge.

At the southern end of the site, Broad Lough, a brackish, partly tidal lake, has a well-developed saltmarsh community. Common Reed (*Phragmites australis*) is abundant along the western shore, along with some Sea Club-rush (*Scirpus maritimus*). Saltmarsh is also present in the northern end of the site in the vicinity of the Breaches. An area of fen occurs at Five Mile Point. Here, Black Bog-rush (*Schoenus nigricans*) is dominant. Fen Sedge (*Cladium mariscus*) is present where the ground is wetter. This merges into areas dominated by Common Reed. A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (*Juncus* spp.), to those of sedges (*Carex* spp.) with other areas supporting a mixture of sedges and Yellow Iris (*Iris pseudacorus*) also occurring. The marshes merge into wet grassland in many areas and where grazing pressure is low, a herb-rich sward occurs. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as Greater Spearwort (*Ranunculus lingua*), Bogbean (*Menyanthes trifoliata*) and Reed Sweet-grass (*Glyceria maxima*).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Red-throated Diver, Greylag Goose, Light-bellied Brent Goose, Wigeon, Teal, Black-headed Gull, Herring Gull and Little Tern. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The shingle ridge at Kilcoole is a traditional nesting area for Little Tern, and the site now supports one of the largest colonies in the country. Numbers vary between years, with 36 pairs recorded in 1995 and 106 pairs in 2006. A tern

protection scheme and research programme, co-ordinated by BirdWatch Ireland and the National Parks and Wildlife Service, has been in operation since 1985. Breeding success varies from year to year, largely due to predation by foxes, crows and other species.

During the winter this site is important for a number of waterbirds - all population sizes are the mean of peak counts for the 5 years, 1995/96 – 1999/2000. Light-bellied Brent Goose occurs here in internationally important numbers (859). Other species that visit here in nationally important numbers are Red-throated Diver (32), Greylag Goose (300), Wigeon (1,209), Teal (644), Black-headed Gull (997) and Herring Gull (506). Other species that are known to occur here are Little Grebe, Grey Heron, Cormorant, Mute Swan, Whooper Swan, Greenland White-fronted Goose, Shelduck, Gadwall, Shoveler, Mallard, Golden Plover, Ringed Plover, Lapwing, Dunlin, Curlew, Greenshank and Redshank.

Short-eared Owl is recorded here during the winter. Little Egret has bred locally in recent years and this site is a main feeding area, with several birds present regularly. While formerly a rare bird in Ireland, Little Egret is now well-established with most birds occurring in the south-east and south (Counties Wexford, Waterford and Cork). The Murrough is presently at the edge of the species' range. This site is one of the few sites in Ireland where Reed Warbler breeds regularly. It is considered that 1-4 pairs bred each year during the 1980s and early 1990s, with a minimum of 6 birds in song in 1993. An absence of records since 1996 may be due to under-recording. Kingfisher regularly uses the site. Sandwich Tern are recorded from the site during the autumn.

The Murrough SPA is an important site for wintering waterbirds, being internationally important for Light-bellied Brent Goose and nationally important for Red-throated Diver, Greylag Goose, Wigeon, Teal, Black-headed Gull and Herring Gull. It is probably the most important site in the country for nesting Little Tern. The regular occurrence of Red-throated Diver, Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Little Tern, Sandwich Tern, Short-eared Owl and Kingfisher is of note as these species are listed on Annex I of the E.U. Birds Directive. Part of the Murrough SPA is a Wildfowl Sanctuary.

15.5.2015