

Appendix A.4.12.1

Barn Owl Survey Report

Barn Owl Survey to inform the constraints and option selection studies for the proposed N4 Carrick-on-Shannon to Dromod Project



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1. INTRODUCTION

The Barn Owl *Tyto alba* is a Red-listed Bird of Conservation Concern in Ireland due to extensive declines in their breeding population and range over recent decades (Gilbert *et al.* 2021). The Breeding Birds Atlas (2007-2011) highlighted a decline of 39% in the breeding range of Barn Owls in Ireland over the 40-year period since the original Breeding Birds Atlas of Britain and Ireland (1968 – 1972) (Sharrock, 1976, Balmer *et al.* 2013). The intensification of agriculture, in particular the reduction of prey rich foraging habitat, is likely to be the main driver of long-term Barn Owl population declines in Ireland (Taylor, 1994, Shawyer, 1998, Copland and Lusby, 2009). In addition, the loss of nesting sites, and the expansion of the major road network have also been recognised as factors which affect Barn Owl populations (Nagle, 2007, Lusby *et al.* 2021). The development of road infrastructure has the potential to affect the quality and quantity of available habitat for Barn Owls, cause displacement through disturbance and loss of nest sites and result in direct mortalities through vehicle collisions (Lusby *et al.* 2021). It is necessary to assess these potential impacts of National Road Projects on Barn Owl populations and to ensure appropriate protection for the species during the planning, construction and operation of National Road Projects in accordance with the ‘Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects’ (TII, 2021) as set out by Transport Infrastructure Ireland and within the relevant legislative requirements.

Barn Owl populations are sparsely distributed and appear to occur in low densities in the general vicinity of the N4 Carrick-on-Shannon to Dromod Project in County Leitrim. There are no confirmed Barn Owl sites in this area reported through BirdWatch Irelands national monitoring programme (Lusby *et al.* 2021). There is no confirmed breeding evidence of Barn Owls as reported in [Article 12](#) for the period 2013 to 2018 and no evidence of Barn Owl in this area reported by the Breeding Birds Atlas (2007-2011) (Balmer *et al.* 2013). There are a small number of records of Barn Owl in the area as recorded by the National Biodiversity Data Centre (<https://maps.biodiversityireland.ie/Species/11644>) and based on the widespread distribution of the population, their habitat preferences and nest site requirements, there is potential that breeding Barn Owl could occur in the study area for the proposed N4 Carrick-on-Shannon to Dromod Project.

1.1 Potential Impacts during the construction phase

The development of new road infrastructure has the potential to cause disturbance to or the displacement of breeding Barn Owls, particularly where nesting sites are directly affected (demolished, altered etc.) by construction and related disturbances or where construction works in close proximity to a breeding site can cause disturbance to a breeding pair. The potential for disturbance may vary depending on the scale of works, proximity of the works to the breeding site, the characteristics of the site (nest site type, nest location, level of existing disturbance activities) and the topography (TII, 2021). Identification of Barn Owl breeding sites in relation to new road infrastructure is essential to inform the potential impacts during the construction phase and the appropriate mitigation requirements as set out in the ‘Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects’.

1.2 Potential Impacts during the operational phase

Vehicle collisions during the operational phase of roads is a major cause of death for Barn Owls and has been implicated as a contributing factor in the decline of their populations in Europe. Due to their low flight and hunting behaviour, Barn Owls are particularly susceptible to vehicle collisions (Illner 1992, De Bruin 1994, Baudvin 1997, Massemin and Zorn 1998, Ramsden 2003, Boves and Belthoff 2012, Loss *et al.* 2014, Lusby *et al.* 2021). Several studies to assess avian mortality on roads have recorded Barn Owls as the most frequently affected raptor (Massemin and Zorn 1998, Shawyer and Dixon 1999, Lusby *et al.* 2021), or the most frequently affected bird species (Baudvin 1997, Boves and Belthoff 2012, Loss *et al.* 2014). The relative importance of road fatalities as a cause of death for Barn Owls appears to be increasing (Newton *et al.* 1997) and there are

significant concerns over the impacts of this form of mortality on Barn Owl populations throughout their range.

Mortality on roads is a significant cause of death for Barn Owls in Ireland. Vehicle collision on roads (n=312) was the primary cause of mortality recorded for Barn Owls in Ireland between 2008 and 2017, representing just under three quarters (74%) of all recorded mortalities (n=423) (Lusby *et al.* 2021). This is consistent with assessments of Barn Owl mortality causes throughout their range (Taylor 1994, Newton *et al.* 1997). Research carried out by BirdWatch Ireland and Transport Infrastructure Ireland showed that the majority of road fatalities on Irish roads are juveniles which are killed during the post-breeding dispersal phase in late autumn and winter. Barn Owl mortality occurs disproportionately on major roads in Ireland compared to other road classes. The number of Barn Owls killed on motorways is 15 times higher than on national roads and over 500 times higher than on secondary routes relative to route length. A mortality rate of 51 and 60 Barn Owls per 100km per year on two major roads (the M8 Motorway and the Tralee Bypass) was estimated and showed that Barn Owls are the most frequently killed bird on major roads in Ireland based on the number of recorded fatalities and population densities per species (Lusby *et al.* 2021). A greater vulnerability to vehicle collision for Barn Owls on major roads in Ireland can be explained by several factors. Barn Owls are attracted to hunt along the verges of major roads, in addition to the expansive dispersal movements of juveniles and the extensive home ranges of adult Barn Owls, all of which can increase the likelihood of their encountering major roads (Lusby *et al.* 2021.)

The study by BirdWatch Ireland and Transport Infrastructure Ireland (Lusby *et al.* 2021) demonstrated that the factors which determine the occurrence of road fatalities operate at two scales - the road scale and the broad scale at the landscape level. At the road scale, the proportion of grass and herbaceous cover in roadside verges is the most important factor which influences the occurrence of Barn Owl mortality. This indicates that Barn Owls are attracted to hunt in roadside verges which subsequently increases their risk of mortality. This is supported by the fact that verge habitats provide an important refuge for small mammal populations and are actively selected for foraging by Barn Owls. At the landscape scale, the distribution of elevated areas influences the movement and dispersal patterns of Barn Owls, which in turn can affect the locations that birds encounter roads and thus mortality spatial patterns. Both of these factors, at the road and landscape scale in combination, influence Barn Owl deaths on roads, and road mortality patterns, clustering and the presence of mortality hotspots vary between roads depending on these influences (Lusby *et al.* 2021). Despite the fact that mortality on roads is a major cause of death for Barn Owls in Ireland, there was no observed effect of road networks on the nesting distribution of Barn Owls (Lusby *et al.* 2021). The number of Barn Owl breeding pairs were similar or higher in areas surrounding major roads to areas unaffected by major road infrastructures (Lusby *et al.* 2021). Therefore, major road developments do not necessarily cause the displacement of Barn Owl pairs in close proximity to the road. The response of individual Barn Owls confirmed that major road infrastructure are not barriers to the movement of birds and that individuals can regularly encounter and cross major roads without negative effects. An assessment of Barn Owl foraging behaviour and movement in relation to roads showed that individual birds spent more time in proximity to major roads than expected and spent more time hunting along or in close proximity to major roads than elsewhere in their home range (Lusby *et al.* 2021). This confirms that major roads can provide some benefits to Barn Owls in the form of the provision of suitable habitat. The findings of this study indicate that the main negative effects of major roads on Barn Owl populations are from direct mortality through vehicle collisions or direct disturbance to breeding sites and not by other means such as displacement of pairs not directly affected by the construction of the road, or through a reduction of breeding range or suitable habitat.

1.3 Mitigation for Barn Owls

The requirement for and the application of specific mitigation measures to reduce the negative impacts of roads on Barn Owls are set out in the 'Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects' (TII, 2021). The mitigation measures are designed to reduce the direct effects, disturbance and displacement of breeding Barn Owls during the construction phase

of National Road Projects and to reduce incidents of mortality of Barn Owls during the operational phase of National Road Projects (TII, 2021). The specific mitigation requirements should be informed by an assessment of the potential and likely impacts of the proposed road on Barn Owl populations and an understanding of the distribution of Barn Owl breeding sites in relation to the proposed road.

1.4 Relevant legislation

All wild bird species in Ireland are protected under both national legislation and European legislation. The legislative framework under the Wildlife Acts 1976 (as amended) provides for the protection of all wild birds and their nests, eggs and young (www.npws.ie/legislation). It is an offence to intentionally cause disturbance at a nest site or to breeding Barn Owls.

The European Communities (Birds and Natural Habitats) Regulations (2011-2015) transpose the EU Birds Directives (79/409/EEC) into Irish law. Article 5 of the EU Birds Directive prohibits 'deliberate killing by any method, deliberate destruction of, or damage to, their nests and eggs or removal of their nests, deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of the Directive'.

1.5 Relevant guidance

The assessment methodology is based primarily upon TII (2021) 'Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects'. This document specifies the Standards for the treatment of Barn Owls during the planning, construction and operation of National Road Projects to ensure appropriate protection for Barn Owls and consistency of approach during the different stages of National Road Projects in accordance with the relevant legislative requirements. Specifically, these Standards require appropriate surveying, reporting and assessment of impacts of National Road Projects on Barn Owls in Phase 2, Options Selection and Phase 3, Design and Environmental Evaluation of National Road Projects to include the preparation of the EIAR and standards for mitigation and post-construction monitoring.

2. SURVEY METHODOLOGY

2.1 Defining the zone of influence

The zone of influence was defined by creating a buffer of 5km surrounding the proposed study area for the N4 Carrick-on-Shannon to Dromod Project. This zone of influence was informed by the ‘Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects’ which requires assessment of the potential impacts to Barn Owl within a 5km radius of the alternatives and options (TII, 2021). The extent of the zone of influence for Barn Owl surveys and for assessing the impacts to Barn Owls is based on the home range ecology of the species to incorporate all nest sites which may be potentially impacted by the development of a National Road Project (within 5km from potential alternatives and options) (Lusby *et al.* 2021).

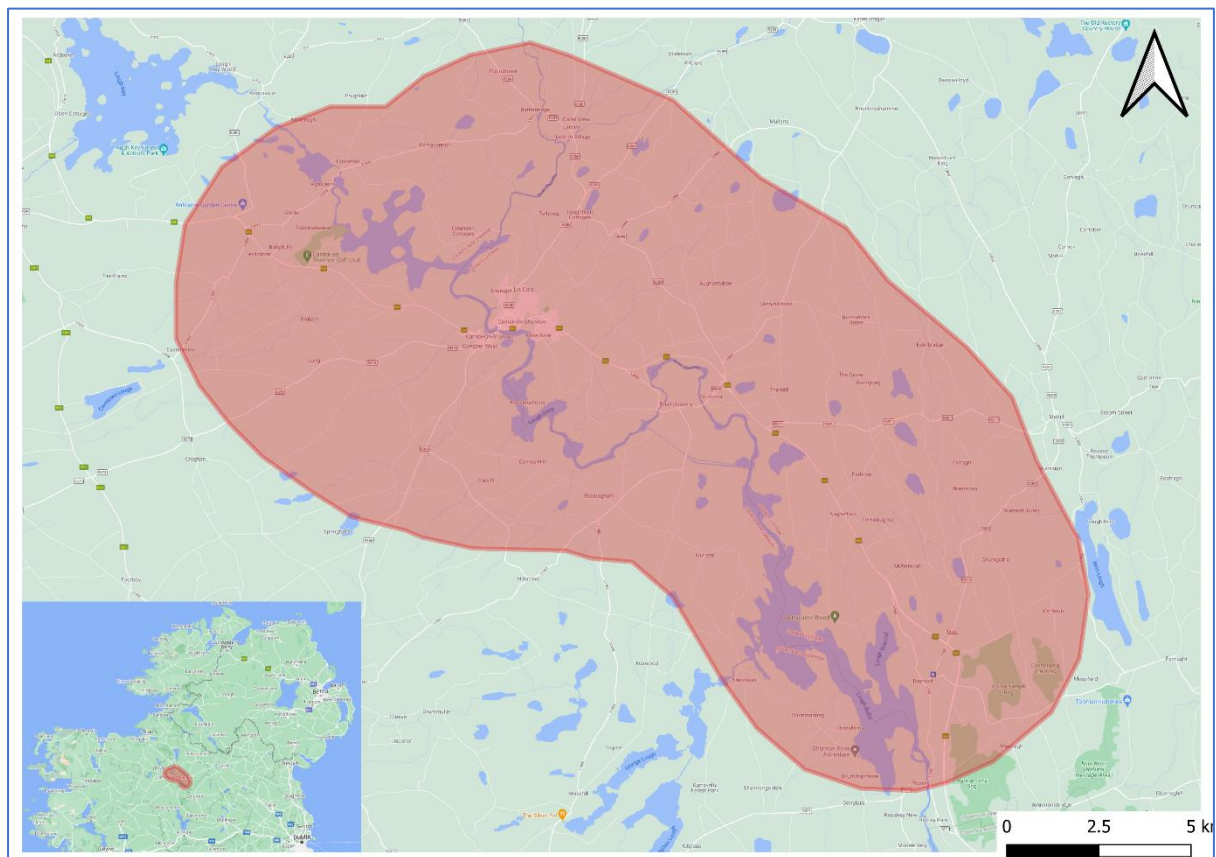


Figure 1: The Barn Owl survey area which extends for 5km surrounding the N4 Carrick-on-Shannon to Dromod Project Study Area

2.2 Collating information on Barn Owl within the survey area

Information on the presence and distribution of Barn Owl within the survey area (a 5km radius surrounding the study area) was collated from available sources, including published sources, survey reports (Lusby *et al.* 2021), through consultation with BirdWatch Ireland and collating reports of the species in the relevant area.

2.3 Identification of potentially suitable sites to inform field surveys

An assessment was undertaken between the 23rd of March and the 29th of March 2021 to identify all potentially suitable structures for Barn Owl within the defined survey area (5km radius surrounding the study area). The suitability of all buildings and other potentially suitable structures within this area were visually assessed from public roads to determine whether the site was potentially suitable or unsuitable for breeding Barn Owl based on the criteria outlined in TII Standards (TII, 2021). This assessment was carried out to identify all sites which could be used by breeding Barn Owl to inform the field surveys and to minimise contact with landowners and ensure adherence to Covid-19 Government restrictions and social distancing requirements in place at this time. Buildings or other structures which were not visible from public roads were visually assessed using a drone (under licence 22(9)(d) issued by the National Parks and Wildlife Service for use of this survey technique specifically for Barn Owl). The location details of all sites determined to be potentially suitable for Barn Owl were recorded. The landowners of these sites were identified, and a letter was issued by the Local Authority (in April 2021) to the relevant landowner to request permission to conduct a more thorough investigation of the site, including an inspection for signs of Barn Owl and/or a nocturnal survey.

2.4 Barn Owl surveys

Field surveys were conducted between the 5th of July and the 21st of July 2021 to confirm Barn Owl occupancy and breeding status at all sites identified as potentially suitable for which permissions to access were granted. The survey methodology employed followed the methods as defined by TII Standards (TII, 2021) and under licence to the National Parks and Wildlife Service (Licence No: 33/2021). All sites which were accessible received a day-time inspection to determine suitability for breeding Barn Owl based on nesting opportunities available and to search for signs to indicate the presence of Barn Owls. For sites at which a day-time inspection could not effectively determine the presence of Barn Owls, a nocturnal survey was conducted to confirm Barn Owl occupancy. All information on Barn Owl sightings and reports were collated to identify potential areas where tree nesting Barn Owls may occur within the survey area. At all sites or areas where evidence of Barn Owls was confirmed, a nocturnal survey was carried out to determine the breeding status of the site. There were no nest visits undertaken as part of this survey and no activities which could cause disturbance to breeding Barn Owl or other species of wildlife inhabiting the sites inspected.

3. RESULTS

3.1 Collating information on Barn Owl within the survey area

The desk-based review did not identify any Barn Owl breeding sites within the survey area. There was no information on Barn Owls (sightings, reports etc.) obtained during the course of the field surveys and through communications with landowners in the survey area.

3.2 Identification of potentially suitable sites to inform field surveys

The initial assessment identified 95 sites which were potentially suitable for breeding Barn Owl within a 5km radius surrounding the project study area (Figure 2).

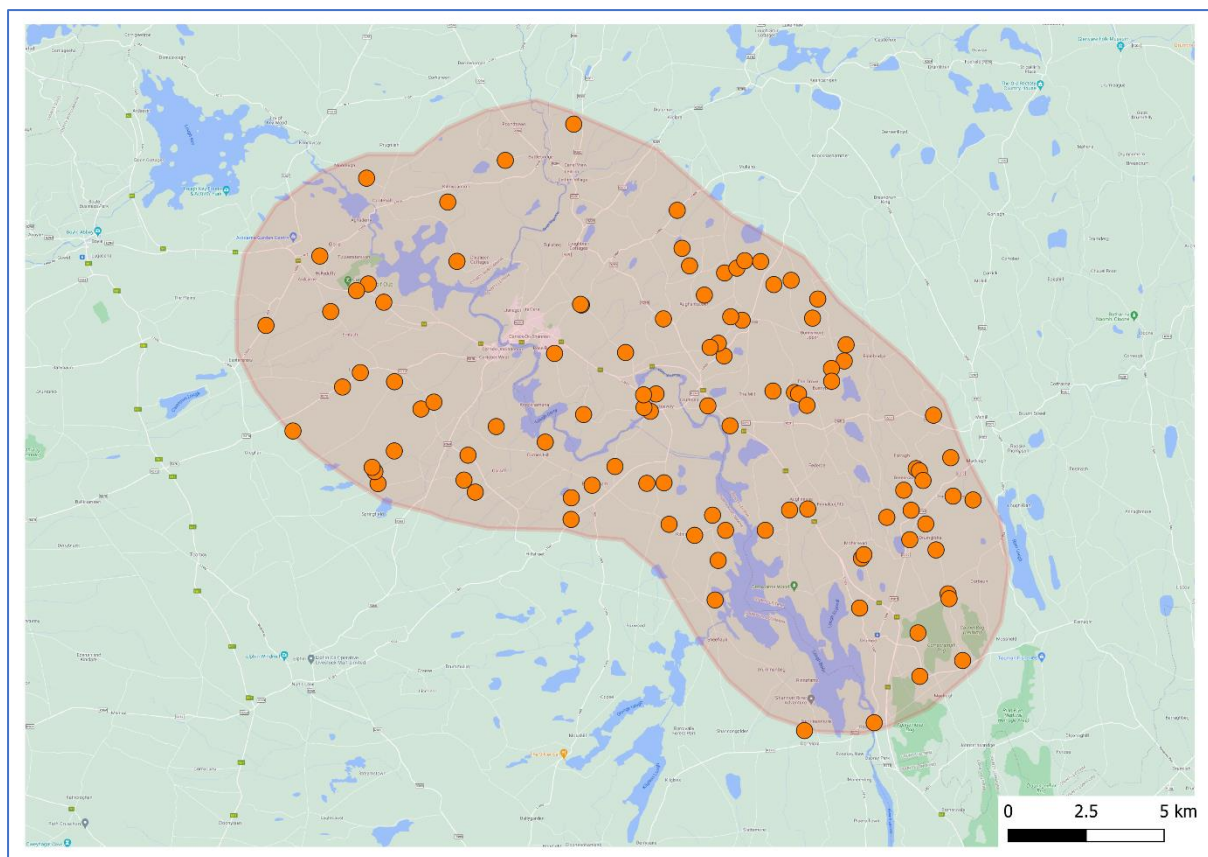


Figure 2: All sites identified as potentially suitable for Barn Owl (n = 95) on the initial inspection and which formed the basis of the Barn Owl surveys

3.3 Barn Owl surveys

Field surveys were carried out between the 5th of July and the 21st of July 2021. Of the 95 sites identified as potentially suitable for Barn Owl within the survey area, it was not possible to access ten sites to assess the suitability for and presence of Barn Owls. In all ten cases where the sites were not accessible, it was not possible to identify the relevant landowner to obtain permissions to access. It was possible to assess the suitability for and presence of Barn Owl at the other sites which were identified as potentially suitable for Barn Owl (n = 85). A day-time inspection to determine the suitability of the site and to search for signs to indicate

the presence of Barn Owl was carried out at all 85 sites. Following on from this, nocturnal surveys were undertaken at 25 sites where it was required to employ this method to determine Barn Owl occupancy and breeding status.

Field surveys confirmed that 35 of the sites were not suitable for breeding Barn Owl. The day-time inspection confirmed that 18 sites were suitable for breeding Barn Owl and provided suitable nesting opportunities for the species. These sites consisted of six derelict cottages, six derelict two-storey houses, four farm buildings and two ruined mansions. A further 32 sites were deemed to have potential nesting opportunities for Barn Owl, which included 22 derelict cottages, five farm buildings, three derelict two-storey houses, one ruined workhouse and one gate lodge.

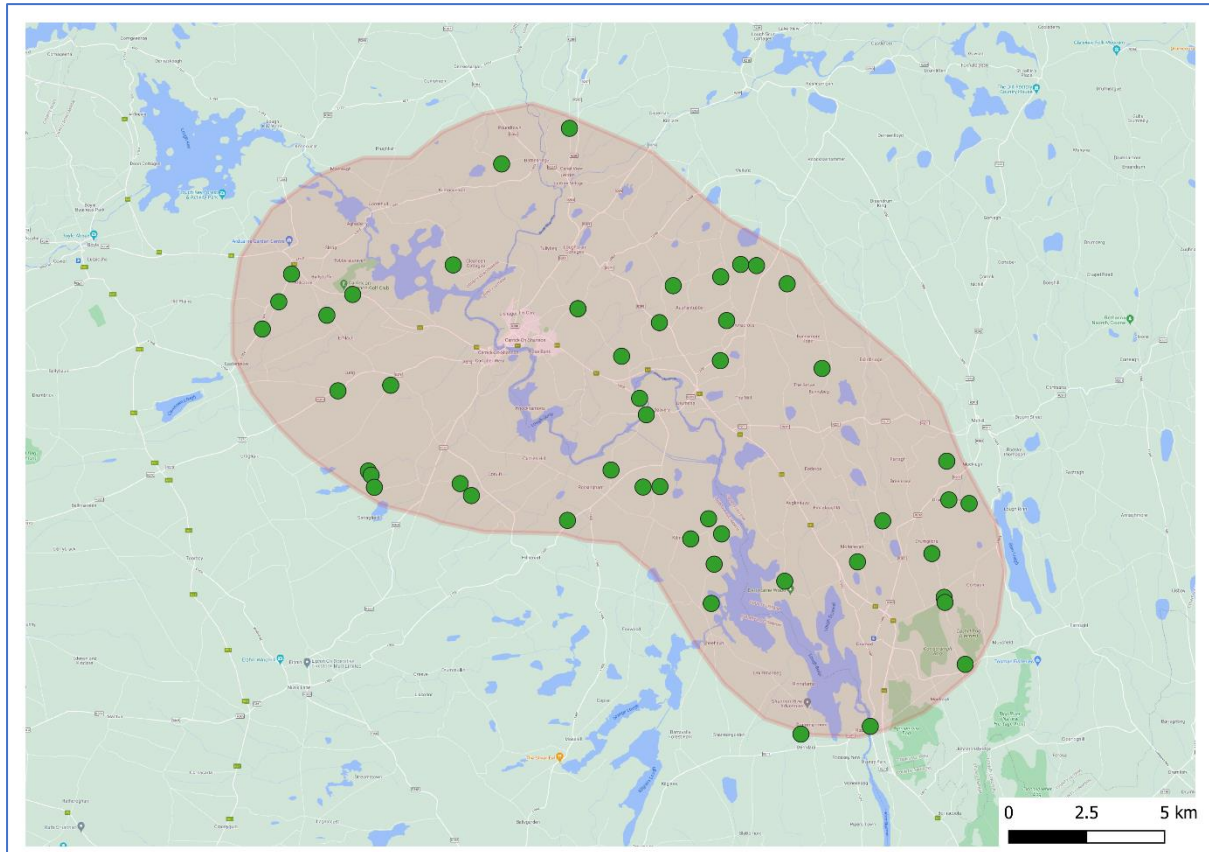


Figure 3: All sites deemed to be suitable for breeding Barn Owl (n = 50) within the survey area

Based on the survey, the presence of Barn Owl within the survey area was not confirmed. Despite the availability of suitable and potentially suitable sites throughout the survey area, and extensive searches of these sites both via day-time inspections and nocturnal surveys, there were no evidence of Barn Owl recorded. It should not be ruled out that Barn Owls which are established outside the survey area may occupy and use the survey area for foraging or other purposes. During the dispersal phase, juvenile Barn Owls may be present in the survey area, and there is the potential for breeding Barn Owls to establish in the future.

4. POTENTIAL IMPACTS TO BARN OWL IN RELATION TO THE PROPOSED ALTERNATIVES OPTIONS

The potential impacts of the proposed alternatives and options to Barn Owl during the construction phase and operational phase is rated based on the Multi Criteria Analysis set out in the 'Project Appraisal Guidelines for National Road Units 7.0 (PE-PAG-02031)' and informed by the information gathered on Barn Owl in the survey area for the N4 Carrick-on-Shannon to Dromod Project, as defined below.

4.1 Potential Impacts during the construction phase

There were no Barn Owl nest sites identified in the survey area including on or in the immediate vicinity of project study area which would be impacted by the construction of any of the alternatives and options. There is one site (derelict cottage) identified as having potential nesting opportunities for Barn Owl located within 100m of the option corridors, all other sites identified as potentially suitable for breeding Barn Owl are located more than 100m from the proposed option corridors. Based on this evidence the impacts of construction on Barn Owls in relation to the proposed option corridors is considered to be 'Not significant or neutral'. The site locations will be reviewed and potential impacts identified during Phase 3 of the project.

4.2 Potential Impacts during the operational phase

4.2.1 Barn Owl distribution and abundance

Based on the findings of Lusby *et al.* (2021) in relation to the effect of new road infrastructure on Barn Owl breeding densities and distribution, and the fact that there were no breeding or active sites identified within 5km of the study area, it is considered that the N4 Carrick-on-Shannon to Dromod Project will have a 'Not significant or neutral' impact on Barn Owl distribution and abundance within the survey area.

4.2.2 Barn Owl road mortality

It is considered likely that Barn Owl road deaths would occur during the operational phase if a new road is constructed, which is informed by data on the extent and patterns of mortality on similar road types in Ireland (Lusby *et al.* 2021). Although there were no breeding sites or sites occupied by Barn Owl recorded by the survey within a 5km radius of the proposed option corridors, this does not preclude Barn Owls moving into the survey area both during and outside of the breeding season. The majority of Barn Owl road fatalities in Ireland are juveniles which are killed during the post-breeding dispersal phase in late autumn and winter. As juveniles can travel extensive distances, the young which disperse from breeding sites throughout the country can be affected by roads, regardless of proximity of nesting sites to roads (Lusby *et al.* 2021). Therefore, based on the Barn Owl population densities in the general vicinity of any new road infrastructure and at the County level (Balmer *et al.* 2013; Lusby *et al.* 2021) and the records of Barn Owl road mortalities in the north-west, it is predicted that the level of mortality along any of the proposed option corridors would be low and therefore considered to be 'moderately negative'. The relevant mitigation measures as set out in the 'Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects' during the Design and Environmental Evaluation Phase to reduce the risk and extent of vehicle collision will be applied as required.

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