

5 BIODIVERSITY

5.1 Introduction

This chapter assesses the likely significant effects that the proposed housing development (the 'Proposed Development') may have on Flora and Fauna (and biodiversity) and mitigates any potential effects that are identified. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2012 the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and the EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC Habitats Directive among other relevant legislation. Where potential effects are identified, mitigation is prescribed and residual impacts on flora and fauna are assessed.

Between 2016 and 2019, a range of specialist ecological survey work has been undertaken to provide comprehensive information on all ecological aspects of the location of the Proposed Development and the surrounding area. These surveys included detailed assessment of the site in terms of protected habitats and species. The studies and survey work undertaken provide a comprehensive inventory of the flora and fauna of the study area.

The chapter is structured as follows:

- The Introduction provides a description of the legislation, guidance and policy context regarding Flora and Fauna.
- This is followed by a comprehensive description of ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- This is followed by an assessment of effects which are described with regard the development. Potential Cumulative effects in combination with other plans and projects is fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Ecology.

A full description of the proposed project and all proposed works is presented in Chapter 3 of this EIAR.

The following is a glossary to the technical terms used in this chapter:

- 'Key Ecological Receptor' (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
- "Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the

sensitivities of particular habitats and species and were assigned following best available guidance and adopting a precautionary approach.

5.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following is the key legislation applicable in respect of habitats and fauna in Ireland:

- Irish Wildlife Act 1976 to 2017.
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC).
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC).

The following legislation applies with respect to Invasive alien species:

- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) (as amended).

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment. They are among the recognised guidance in Environmental Impact Assessment and National Road Scheme assessments.

- *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal* (CIEEM, 2018).
- *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009).
- EPA (2017). *Draft revised guidelines on the information to be contained in Environmental Impact Statements*. Environmental Protection Agency.
- *Advice Notes for preparing Environmental Impact Statements* (Environmental Protection Agency, Draft September 2015)
- *Environmental Assessment and Construction Guidelines* (NRA, 2006).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Planning and Development Acts 2000 – 2017.
- Galway County Council (2017). County Development Plan 2015 – 2021.
- DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*. Department of the Environment, Community and Local Government (where relevant).
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*.

The Development Applications Unit (DAU) of the Department of Culture, Heritage & The

Gaeltacht was consulted. A letter in response was received on the 29th of January 2019. This initial correspondence was followed up with a meeting with the National Parks and Wildlife Service. A Stage 3 pre-submission consultation meeting was held with the NPWS on 27th of February 2019 to address the issues raised by the DUA. The consultation response received from the DAU and the minutes of the meeting with the NPWS are provided as Appendix 2-4. All comments raised by the DAU and NPWS have been considered in the preparation of this application.

5.3 Statement of Authority and Competence

Baseline ecological surveys were undertaken by Dr. Pamela Boyle (B.Sc, M.Sc, PhD), James Owens (B.Sc, MSc), David McNicholas (B.Sc, MSc, MCIEEM), Julie O’Sullivan (B.Sc, MSc) and Irene Sullivan (B.Sc) of McCarthy Keville O’Sullivan Ltd. This EIAR chapter has been prepared by David McNicholas (B.Sc, M.Sc, MCIEEM). David is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has over 8 years professional ecological consultancy experience. This report has been reviewed by Pat Roberts (B.Sc. Environmental Science, MCIEEM) who has over 13 years’ experience in management and ecological assessment.

5.4 Methodology

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those which exist in the absence of proposed activities (CIEEM, 2018).

The following sections outline the methodologies utilised to establish the baseline ecological condition of the proposed development site.

5.5 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Teagasc, EPA (Envision), Water Framework Directive (WFD) & Inland Fisheries Ireland (IFI).
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).
- Review of Irish Wetland Bird Survey (I-WeBs) surveys from proximal survey sites.
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Records from the National Parks and Wildlife Services (‘NPWS’) WS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Development is located.
- Review of NPWS Article 17 Metadata and GIS Database Files

5.6 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, initial site visits and stakeholder consultation; “Target

receptors” likely to occur in the zone of influence of the development were identified. Potential target receptors include habitats and species that are protected under the following legislation:

- Annexes of the EU Habitats Directive.
- Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the Zone of Influence.
- Species of Conservation Interest (SCI) of Special Protection Areas (SPA) within the Zone of Influence.
- Species protected under the Wildlife Acts 1976-2012.
- Species protected under the Flora Protection Order 2015.

5.7 Field Surveys

Initially, multidisciplinary ecological walkover surveys of the development site were undertaken on the 8th of September 2016 and the 16th of August 2017 by James Owens (BSc, MSc) and Dr. Pamela Boyle (BSc, Msc, PhD) of McCarthy Keville O’Sullivan Ltd.

Habitats were identified in accordance with the Heritage Council’s *‘Guide to Habitats in Ireland’* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in *‘Best Practice Guidance for Habitat Survey and Mapping’* (Smith *et al.*, 2011). Plant nomenclature for vascular plants follows *‘New Flora of the British Isles’* (Stace, 2010), while mosses and liverworts nomenclature follows *‘Mosses and Liverworts of Britain and Ireland - a field guide’* (British Bryological Society, 2010).

Dedicated habitat surveys of the proposed development were undertaken on the 8th of September 2016 and the 16th of August 2017. Habitats within the site were classified according to the guidelines set out in *‘A Guide to Habitats in Ireland’* (Fossitt, 2000), which classifies habitats based on the vegetation present and management history. The site was walked systematically and 2m x 2m relevés were conducted in areas of potentially sensitive habitat areas. The presence or signs of birds, mammals, amphibians and reptiles were noted during the visits.

The field surveys were conducted in September 2016 and mid-August 2017 which is within an adequate survey period for grassland habitat (May – June/Aug – Sept) (O’Neill *et al.*, 2013). Therefore, it is concluded that the habitats and species that could potentially be impacted by the proposed development were adequately assessed during the survey period and a thorough and comprehensive ecological assessment was achieved.

A more detailed assessment of the fen vegetation that is located to the west of the site was undertaken on the 13th of December 2018, and on the 9th of April 2019, and the results of these surveys are presented in Appendix 5-1. The detailed botanical data from the assessment of grasslands on the site is provided in Appendix 5-2.

The walkover survey was designed to detect the presence, or likely presence, of a range of protected habitats and species. Incidental sighting/observations of birds and additional fauna were noted during the site visit.

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed.

During the multi-disciplinary walkover survey a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

Otter was considered and surveyed for during the multi-disciplinary walkover surveys with no signs of the species or significant habitat recorded either within or adjacent to the site. Despite the lack of otter habitat, dedicated otter surveys were carried out on 22nd of February 2019 by Irene Sullivan (B.Sc.) and on the 9th of April 2019 by James Owens (B.Sc., M.Sc.), both of McCarthy Keville O’Sullivan Ltd. As the species is among the qualifying interests of the adjacent Galway Bay Complex SAC. The otter surveys were conducted as per NRA (2006) guidelines. This involved a search for otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the development site footprint, the otter surveys covered the adjacent fen and the shoreline and saltmarsh habitats of the most proximal part of Galway Bay Complex SAC.

A bat activity survey was undertaken on the 8th and 9th of April 2019 with reference to BCT guidelines (Collins, 2016). The objective was to identify and assess bat species composition and activity within the site. During the manual survey, transects were walked, recording bats in real time. Surveyors were equipped with an active full spectrum bat detector, a BatLogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behavior, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

Dusk surveys commenced 30 minutes before sunset and concluded 2.5 hours after sunset. Conditions were warm, dry and calm (optimal for bat survey). Dawn surveys commenced 1.5-2 hours before sunrise and were completed within 30 minutes of sunrise. Survey conditions are outlined in table 5.1.

Table 5.1: Bat Survey Conditions

Date	Time	Temperature	Rain	Wind (Beaufort Scale)	Cloud cover (%)
08/04/2019	19:47	12°	Dry	1-2	40%
	20:30	10°	Dry	2	40%
	20:45	9°	Dry	2	40%
	22:00	8°	Dry	2	50%
	22:20	8°	Dry	2	50%
	23:00	8°	Dry	2	50%
09/04/2019	04:50	10°	Dry	3	100%
	05:20	10°	Dry	1	100%
	05:45	10°	Dry	1	100%
	06:15	10°	Dry	1	100%
	06:30	10°	Dry	1	100%

All recordings were analysed using bat call analysis software, BatSound (Pettersson Elektronik AB, Uppsala, Sweden), Kaleidoscope Converter and Viewer, v.5.1.3 (Wildlife Acoustics, Maynard, MA, USA) or AnalookW 4.1 (Titley Scientific, Brendale, Australia). Bat species were identified using established call parameters, to identify individual

species or genera. In addition, any information on bat behavior contained within echolocation calls, e.g. social calls, feeding buzzes, were noted.

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2016).

- For the purposes of the manual activity survey, a bat pass was defined as one to several calls of a single species/species group, separated by an interval. During analyses, bat pass duplicates (within species, time and GPS coordinates) were removed to overcome any manual bias in the data, e.g. surveyors stopping to observe bats.
- For the purposes of the static detector surveys, a bat pass is defined as a recording of an individual species/species group's echolocation containing at least two echolocation pulses and of maximum 15s duration.

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic nature) was assessed.

In addition to the ecological surveys described above, detailed winter bird usage surveys were undertaken both within the site red line boundary and surrounding area (including both the nearby Inner Galway Bay SPA and Cregganna Marsh SPA). Prior to the commencement of surveys, an initial field visit was undertaken to assess the habitats on site and plan the surveys as well as to identify suitable vantage points. Surveys were undertaken at the site over six dates; 23rd of October 2018, 30th of November 2018, 16th of December 2018 and 30th of January 2019, 22nd of February and 21st of March.

The surveys were undertaken by appropriately qualified ornithologists/ecologists. All observations were recorded, and detailed point data was gathered for each species observation, with all bird species denoted using standard British Trust for Ornithology (BTO) codes and with the number of each species recorded next to each registration.

The species recorded in the surveys were those covered by Irish Wetlands Bird Survey (I-WeBS) counts, i.e. all divers, grebes, cormorant, shag, herons, swans, geese, ducks, rails, crakes, waders, gulls and kingfisher. However, in addition to this, all other bird species, including all common and widespread passerines, were also recorded from within the proposed development site. Any other non-avian ecological records that were identified during the bird surveys were reported and form part of the general ecological information included in the EIAR.

The winter bird surveys at nearby SPAs followed the Irish Wetland Bird Survey (I-WeBS) methodology; the simple 'look-see' method, whereby all birds present within a pre-defined area are counted (Gilbert *et al.*, 2011; Birdwatch Ireland, 2018). The surveys were conducted by appropriately skilled and experienced observers (Julie O'Sullivan with some assistance from Irene Sullivan). The surveys were carried out at suitable vantage points, located overlooking sections of SPAs in close proximity to the proposed development site and were chosen to have as large as possible a view of the identified wetland sites and potential adjacent daytime foraging habitat in the vicinity of the proposed development. Vantage points focused on areas which were deemed to be of likely significance to wintering waterbirds including Inner Galway Bay SPA, Cregganna Marsh SPA and fen habitats outside the western boundary of the development site.

Details of the surveys including survey methodology, dates, weather conditions and survey duration are provided in Table 5.2. A map of the vantage point locations used during the surveys are presented in the bird survey report that is provided as Appendix 5-3.

The proposed development site and the surrounding fields were scanned from suitable vantage points that gave unobstructed views of potentially suitable habitat and roosting locations for wintering waterfowl and waders within and adjacent to the study area in advance of walkover surveys. Walked transects were undertaken within the site boundary. Transects walked are shown in Appendix 5-3. During the surveys species of note were recorded both within and adjacent to the development site.

All bird species were denoted using standard British Trust for Ornithology (BTO) codes and with the number of each species recorded next to each registration. The results of surveys are provided in Section 5.12 of this report.

Table 5.2: Bird Survey details for Moneyduff

Date	Survey Method	Survey duration (hrs)	Weather and Tidal Conditions
23/10/2018	Walkover survey	01:00	Wind speed and direction: Fresh Breeze; visibility: Good (>2km); Cloud cover 66-100%; Cloud height >500m; Rain: no rain; Frost: None; Snow: None. Low tide.
	IWeBS – Inner Galway Bay SPA	01:30	
	IWeBS – Cregganna Marsh SPA	01:00	
30/11/2018	Walkover survey	01:00	Wind speed and direction: Fresh Breeze; visibility: Good (>2km); Cloud cover 33-66%; Cloud height >500m; Rain: Light showers; Frost: None; Snow: None High tide.
	IWeBS – Inner Galway Bay SPA	01:30	
	IWeBS – Cregganna Marsh SPA	01:00	
16/12/2018	Walkover survey	01:00	Wind Speed and Direction: gentle Breeze; Visibility: Good (>2km); Cloud Height: >500m; Cloud Cover %: 66-100 Rain: Light Showers; Frost: None; Snow: None. Low tide.
	IWeBS – Inner Galway Bay SPA	01:30	
	IWeBS – Cregganna Marsh SPA	01:00	
30/01/2019	Walkover survey	01:00	Wind Speed and Direction: Calm; Visibility: Good (>2km); Cloud Height: >500m; Cloud Cover %: 0-33 Rain: None; Frost: None; Snow: None. High tide.
	IWeBS – Inner Galway Bay SPA	01:30	
	IWeBS – Cregganna Marsh SPA	01:00	
22/02/2019	Walkover survey	01:00	Wind Speed and Direction: light breeze; Visibility: Good (>2km); Cloud Height: >500m; Cloud Cover %: 0-33 Rain: occasional showers; Frost: None; Snow: None. Low tide
	IWeBS – Inner Galway Bay SPA	01:30	
	IWeBS – Cregganna Marsh SPA	01:00	
21/03/2019	Walkover survey	01:00	Wind Speed and Direction: Calm; Visibility: Good (>2km); Cloud Height: >500m; Cloud Cover %: 66-100 Rain: None; Frost: None; Snow: None. High tide.
IWeBS – Inner Galway Bay SPA	01:30		
IWeBS – Cregganna Marsh SPA	01:00		

5.8 Methodology for Assessment of Effects

5.8.1.1 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of nature conservation value that relate to a geographical framework (e.g. international, through to local). This assessment utilises the geographical framework described in *Guidelines for Assessment of Ecological Impact of National Road Schemes* (NRA 2009). The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

Locally Important (lower value) receptors include habitats and species that are widespread and of low ecological significance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

5.8.1.2 Characterising Ecological Impacts and Effects

Effects identified have been described in accordance with (EPA, 2017) impact assessment criteria presented in table 5.3. The criteria for characterising magnitude and scale of ecological impacts are further contextualised based on CIEEM guidelines (CIEEM, 2018) in table 5.4.

The following terms were utilised when quantifying duration:

- Temporary – up to 1 year
- Short-term – 1 to 7 years
- Medium term – 7 to 15 years
- Long term – 15 to 60 years
- Permanent – over 60 years

Table 5.3: Criteria for assessing impact quality based on (EPA, 2017)

Effect Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances.
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem or by causing nuisance.

Table 5.4: Criteria for characterising magnitude and scale of ecological impacts (CIEEM, 2018)

Characteristic	Definition
Positive or Negative	Positive impact – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment. Negative impact – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
Extent	The spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions.
Magnitude	Magnitude refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
Duration	Impacts and effects may be described as short, medium or long-term and permanent or temporary and are defined in months/years. Duration is defined in relation to ecological characteristics.
Frequency and Timing	The number of times an activity occurs will influence the resulting effect. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

5.8.1.3 Significance of Effect

The criteria for assessing impact significance based on EPA guidelines is outlined in table 5.5 (EPA, 2017).

Table 5.5: Criteria for assessing impact significance based on (EPA, 2017)

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible Effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant Effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines the following key elements should also be examined when determining the significance of effects:

- The likely effects on 'integrity' should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009)
- A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018)

Integrity

In the context of EclA, 'integrity' refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued. Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

5.8.1.4 Mitigation

The development has been designed to specifically avoid, reduce and minimise effects on all KERs. Where potential effects on KERs are predicted, mitigation has been prescribed to avoid, reduce and abate such effects.

Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KERs.

The potential effects of the proposed development were considered and assessed to ensure that all effects on KERs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures / best practice.

5.8.1.5 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes best practice and mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visits during all seasons between 2016 & 2019.

No significant limitations in the scope, scale or context of the assessment have been identified.

5.9 Baseline Conditions and Receptor Evaluation

5.10 Desk Study

5.10.1.1 Designated Sites

The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) which were transposed into Irish law as S.I. No. 94/1997 *European Communities (Birds and Natural Habitats) Regulations 1997*, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011-*European Communities (Birds and Natural Habitats) Regulations 2011*. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European Sites'.

Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. **Annex I** of the Directive lists habitat types whose conservation requires the designation of **Special Areas of Conservation (SAC)**. Priority habitats, such as Turloughs, which

are in danger of disappearing within the EU territory are also listed in Annex I. **Annex II** of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of **SAC**. **Annex IV** lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and **Annex V** lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both **Annex II** and **Annex IV**.

Special Protection Areas

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (**Article 2**). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (**Article 3**).

A subset of bird species have been identified in the Directive and are listed in **Annex I** as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. **Special Protection Areas** (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (**Article 4**).

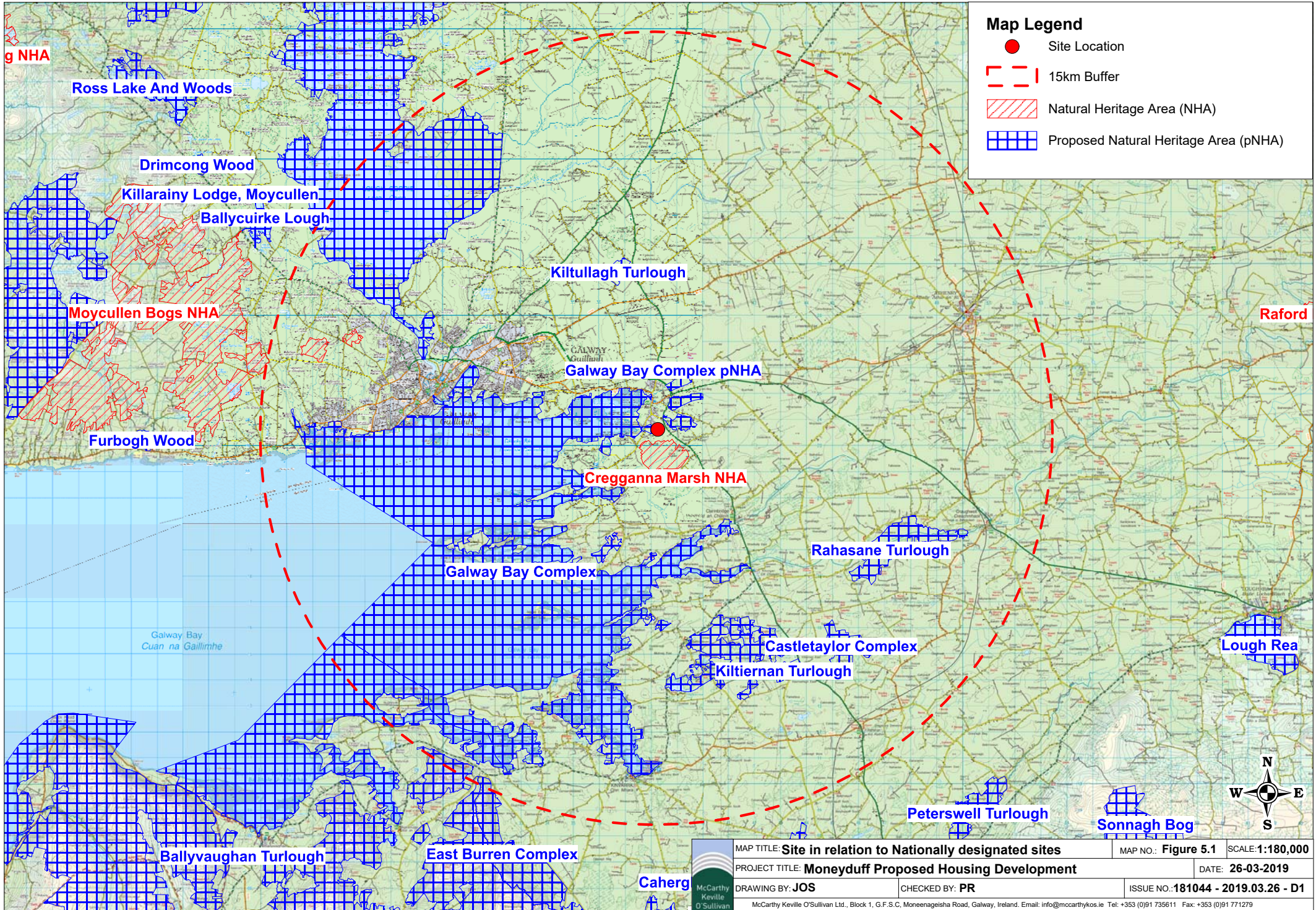
Nationally Designated Sites

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that were designated for the protection of flora, fauna, habitats and geological sites under the Wildlife (Amendment) Act 2000. These sites do not form part of the Natura 2000 network and the AA process, or screening for same, does not apply to NHAs or pNHAs.

5.10.1.1.1 Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Development

Nationally Designated Sites

Using GIS software (MapInfo v10.0), sites designated for nature conservation within the vicinity of the proposed development were identified. Initially, sites within a 15 km radius of the proposed works were identified. Designated sites located outside the 15km buffer zone were also taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified. The potential for the proposed development to result in effects on all these designated sites was considered in the completion of this assessment. The 15km buffer distance was extrapolated from DoEHLG Guidance on Appropriate Assessment (2010). The Nationally designated sites are listed in Table 5.6 and displayed in Figure 5.1.



Map Legend

- Site Location
- 15km Buffer
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

	MAP TITLE: Site in relation to Nationally designated sites	MAP NO.: Figure 5.1	SCALE: 1:180,000
	PROJECT TITLE: Moneyduff Proposed Housing Development	DATE: 26-03-2019	
	DRAWING BY: JOS	CHECKED BY: PR	ISSUE NO.: 181044 - 2019.03.26 - D1
	<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		

Table 5.6: Nationally designated sites in the Zone of Influence

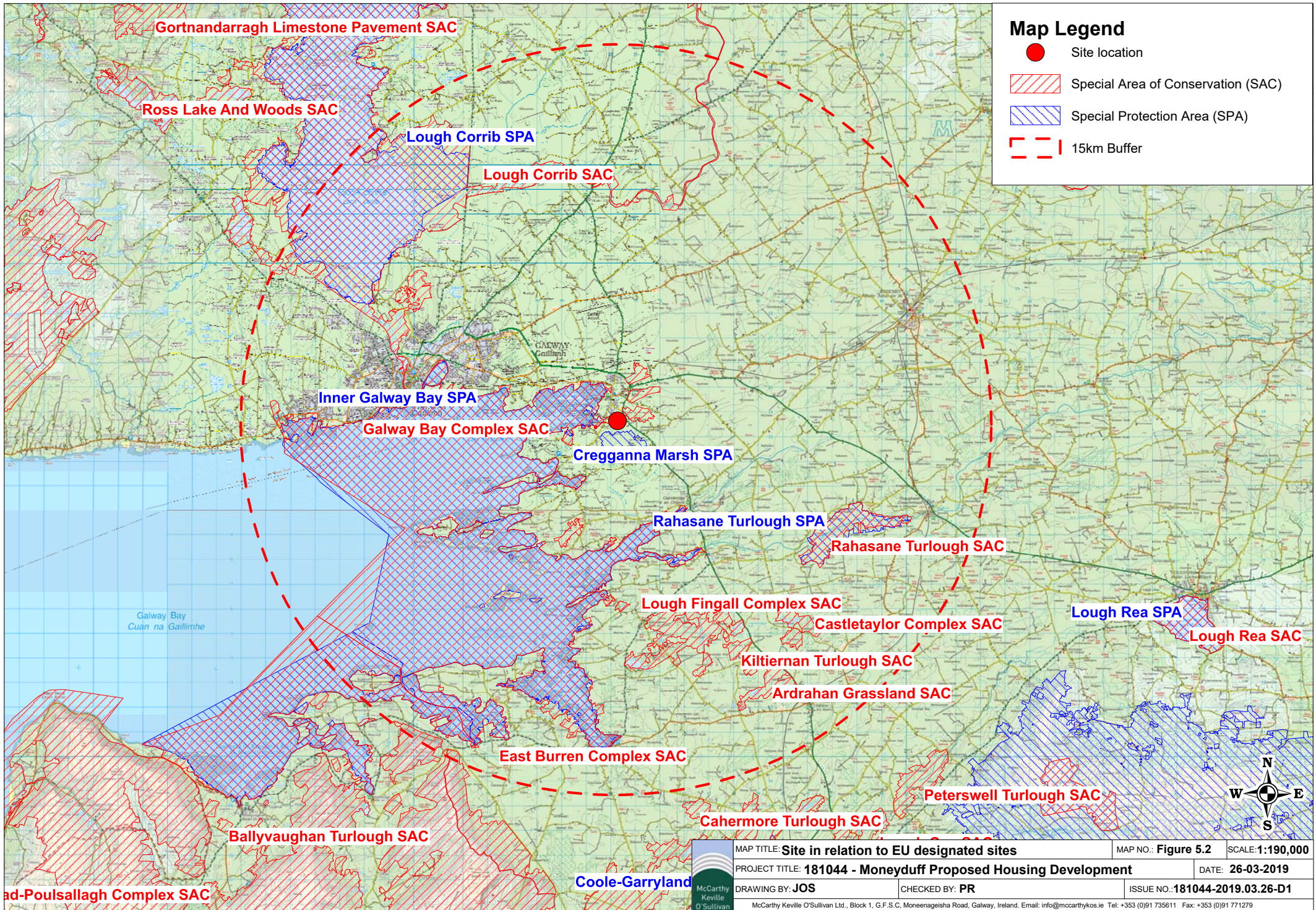
Designated Site	Distance from Proposed Development
Natural Heritage Areas (NHA)	
Cregganna Marsh NHA	0.26km
Moycullen Bogs NHA	11.3km
Proposed Natural Heritage Areas (pNHA)	
Galway Bay Complex	0 metres/ immediately adjacent
Kiltullagh Turlough	5.4km
Lough Fingall Complex	7.3km
Lough Corrib	8.8km
Rahasane Turlough	8.9km
Castletaylor Complex	9.6km
Kiltiernan Turlough	9.8km
East Burren Complex	14.5km

European Sites

Using GIS software, European sites designated for nature conservation within the vicinity of the proposed development were identified. Initially, sites within a 15 km radius of the proposed works were identified as per DoEHLG Guidance (2010). European Sites located outside the 15km buffer zone were also taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified. The designated sites are listed in Table 5.7 and displayed in Figure 5.2. The potential for the proposed development to result in effects on all these designated sites was considered in the completion of this assessment. The site location in relation to both EU and Nationally designated sites, at a smaller scale, is provided in Figure 5.2a.

Table 5.7: European designated Sites within 15km of the proposed development

Designated Site	Distance from Proposed Development
Special Areas of Conservation (SAC)	
Galway Bay Complex SAC (000268)	0 metres/ immediately adjacent
Lough Fingall Complex SAC (000606)	7.3km
Lough Corrib SAC (000297)	8.2km
Rahasane Turlough SAC (000322)	8.9km
Castletaylor Complex SAC (000242)	9.6km
Kiltiernan Turlough SAC (001285)	9.8km
Ardrahan Grassland SAC (002244)	10.9km
East Burren Complex SAC (001926)	14.5km
Special Protection Area (SPA)	
Inner Galway Bay SPA (004031)	0.34km
Cregganna Marsh SPA (004142)	0.26km
Rahasane Turlough SPA (004089)	8.84km
Lough Corrib SPA (004042)	10.5km



Map Legend

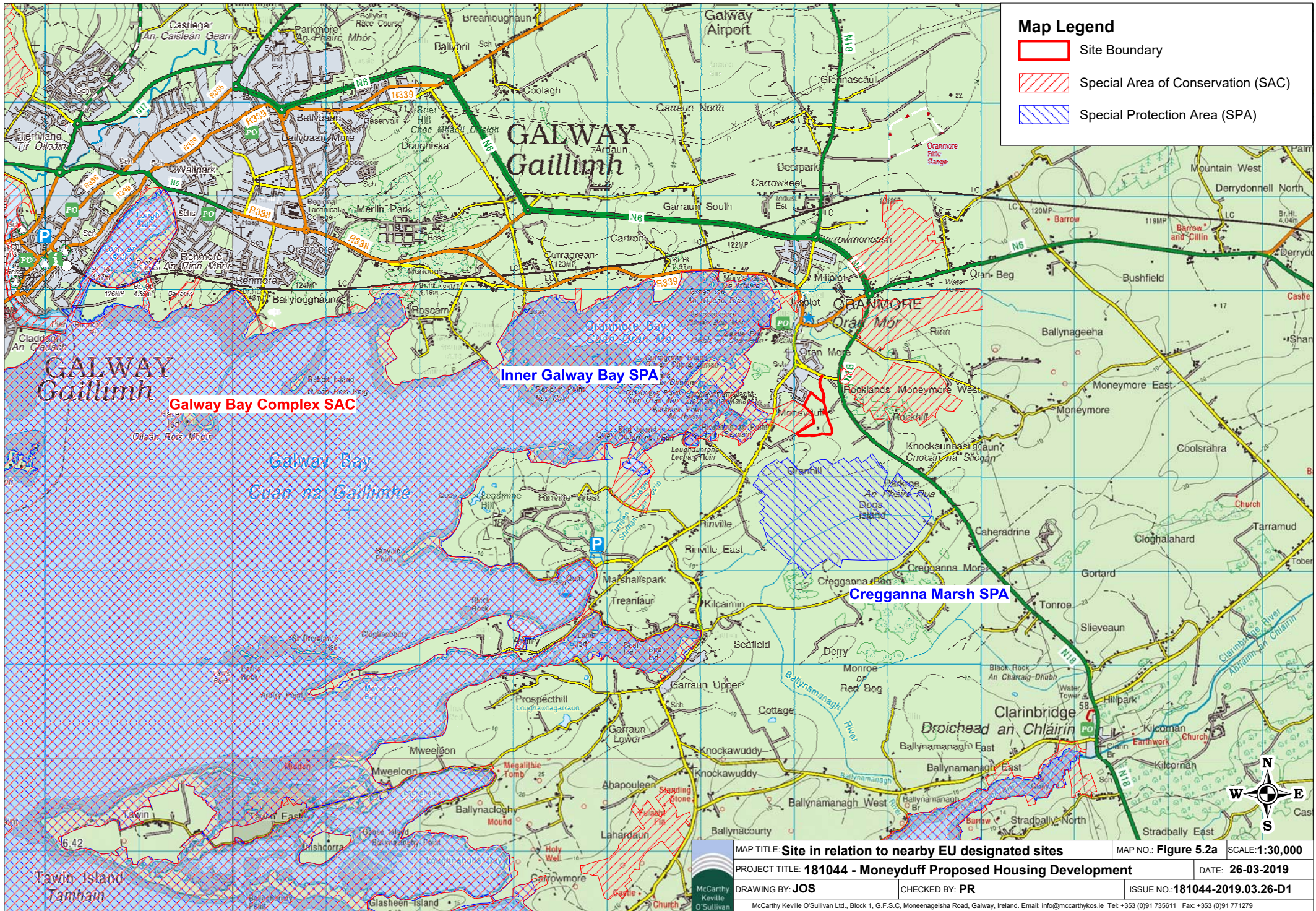
- Site location
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- 15km Buffer



MAP TITLE: Site in relation to EU designated sites	MAP NO.: Figure 5.2	SCALE: 1:190,000
PROJECT TITLE: 181044 - Moneyduff Proposed Housing Development	DATE: 26-03-2019	
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ad-Poulsallagh Complex SAC

McCarthy Keville O'Sullivan



5.10.1.2 Bird Atlases

A number of sources were assessed to determine the likely usage of the site by both breeding and wintering bird species, including Bird Atlases, National Biodiversity Data Centre (NBDC), BirdWatch Ireland and Conservation Objectives Supporting Documents from the National Parks and Wildlife Service (NPWS) for nearby Special Protection Areas (SPAs). The following sub sections provide a breakdown of the sources used and results obtained.

5.10.1.2.1 Breeding and Wintering Bird Atlases

The *Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland* (Balmer *et al.*, 2013) provides the most up-to-date information regarding the distribution and relative abundance of bird species in Britain and Ireland, based on surveys carried out between 2007 and 2011.

The atlases show data for breeding and wintering birds respectively in individual 10 km by 10 km squares (hectads). Table 5.8 shows species that have been recorded within the relevant tetrad (M32W & M32R) on National Biodiversity Data Centre (NBDC) datasets that are listed in Annex I of the EU Birds Directive or on the BoCCI Red List. In addition, Table 5.8 shows those species found in the relevant hectad (M32), which are recorded as breeding in the most recent atlas. Birds listed under Annex I are offered special protection by the EU Birds Directive. Those listed on the Birds of Conservation Concern in Ireland (BoCCI) Red List meet one or more of the following criteria:

- IUCN: Global conservation status (Critically Endangered (CE), Endangered (E) or Vulnerable (V), but not Near Threatened. These species are recognised as the highest priorities for action at a global scale and are thus priorities at an all-Ireland level.
- European conservation status. The conservation status of all European species was assessed most recently by Birdlife International (2004), one of the main changes in the revision being to include the IUCN criteria. These species are those of global conservation concern (including those classified as Near Threatened) and are Red-listed.
- The Irish breeding population has undergone significant historical decline since 1800.
- The Irish breeding population or range has declined by 50% or more in the thirteen years from 1998-2011 (BDp1) or the 25 years from 1980-2013 (BDp2).
- The Irish non-breeding population has undergone a significant decline of 50% in the last 25 years.
- The Irish breeding range has undergone a decline of 70% or more in the last 25 years.

Four species listed under Annex I of the EU Birds Directive have been recorded within the relevant tetrad (M32W & M32R). A further six red-listed birds of conservation concern have been recorded breeding within the relevant hectad (Table 5.8). It should be noted that these species are predominantly associated with coastal and marine habitats and are unlikely to occur within the habitats found on site.

Table 5.8: Bird Atlas and NBDC Bird Data (Tetrad M32W & M32R)

Common name	Scientific name	Bird Atlas (Hectad (M32))		Designation
		Breeding 2008-2011	Wintering 2007-2011	
Greenland White-Fronted Goose	<i>Anser albifrons</i>	No	Present	Protected EU Birds Directive Annex I Bird Species
Dunlin	<i>Calidris alpina</i>	Present (non-breeding)	Present	
Little Egret	<i>Egretta garzetta</i>	Confirmed	Present	
Common Tern	<i>Sterna hirundo</i>	Confirmed	No	
Northern Pintail	<i>Anas acuta</i>	No	Present	Birds of Conservation Concern – Red list
Common Redshank	<i>Tringa totanus</i>	Present (non-breeding)	Present	
Northern Lapwing	<i>Vanellus vanellus</i>	Confirmed	Present	
Eurasian Curlew	<i>Numenius arquata</i>	Present (non-breeding)	Present	
Herring Gull	<i>Larus argentatus</i>	Present (non-breeding)	Present	
Black-Headed Gull	<i>Larus ridibundus</i>	Confirmed	Present	
Barn Owl	<i>Tyto alba</i>	Confirmed	No	

5.10.1.3 National Biodiversity Data Centre

A search of the NBDC records for the relevant hectad, M32, provided details on a number of flora and fauna species of conservation concern. These are provided in Table 5.9. Bird species reported in the preceding sections are not included in this Table.

Table 5.9: National Biodiversity Database Records

Species	Scientific Name	Red List Status	Habitats Directive
Smooth Newt	<i>Lissotriton vulgaris</i>	LC	WA
Common Frog	<i>Rana temporaria</i>	LC	Annex V
Common Lizard	<i>Zootoca vivipara</i>	LC	WA
Dingy Skipper	<i>Erynnis tages</i>	NT	Annex II
Marsh Fritillary	<i>Euphydryas aurinia</i>	VU	Annex
Brown Long-Eared Bat	<i>Plecotus auritus</i>	LC	Annex IV, WA.
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	LC	Annex II, Annex IV, WA
Leisler's Bat	<i>Nyctalus leisleri</i>	NT	Annex IV, WA
Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	LC	Annex IV, WA
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	LC	Annex IV, WA
Eurasian Badger	<i>Meles meles</i>	LC	WA
Eurasian Pygmy Shrew	<i>Sorex minutus</i>	LC	WA
Red Squirrel	<i>Sciurus vulgaris</i>	LC	WA
European Otter	<i>Lutra lutra</i>	NT	Annex II, Annex IV, WA
Hedgehog	<i>Erinaceus europaeus</i>	LC	WA
Pine Marten	<i>Martes martes</i>	LC	Annex V, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Wildlife Acts – Irish Wildlife Acts (1976, 2017).

5.10.1.4 NPWS Records

The NPWS webmapper tool (www.npws.ie) has one record for Small White Orchid (*Pseudorchis Albida*) within the 10 km square M32 in the townland of Doughiska, dating from 1993. This species is protected under the Flora Protection Act. There were no other records for this hectad on the NPWS website.

5.10.1.5 Bat Records

A search of the Bat Conservation Ireland (BCI) Database for all bat records for the area within and surrounding the proposed development site was conducted on the on the 11th of March 2019. The BCI database can be searched in relation to identified Roosts, Survey Transects and Other Observations. Searches can be conducted for refined areas e.g. 1km buffer of a specific location or for wider areas including hectads and entire grid squares. Roost data details identified roosts and bat species recorded utilising the roost sites. Transect survey data include results of the BCI Car Based Bat Monitoring Scheme, All Ireland Daubenton's Bat Waterways Survey and additional surveys completed by private organisations and individuals.

A search of a 1km buffer from the proposed development site yielded no results. A search of a 10km buffer from the proposed development site resulted in 16 roost records, along with 37 ad hoc observations for bat species. These roosts contained brown long eared bats (*Plecotus auritus*), lesser horseshoe bat (*Rhinolophus hipposideros*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Natterer's bat (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*), Whiskered bat/Brandt's bat (*Myotis mystacinus/brandtii*) and Daubenton's bat (*Myotis daubentonii*). Seven transect records returned records for Daubenton's bats, Leisler's bats, common pipistrelle, soprano pipistrelle and unidentified bats. The information provides for a good baseline understanding of bat species in the area and indicates that the region has been previously surveyed for bats. The records identify the wider area of the proposed development as being used by foraging and commuting

bat species but no bat roost within 1km of the site of the proposed development was identified.

5.10.1.6 Other Taxa

The proposed development site does not fall within any sensitivity area for freshwater pearl mussel (*Margaritifera margaritifera*). The nearest such area is located over 15km north west of the Study Area and is in a separate water catchment. NBDC records suggest that marsh fritillary (*Euphydryas aurinia*), is known to occur within the hectad (M23). Other species, including pine marten, common frog and otter are likely to be recorded in the wider area, based on the results of the NBDC data search.

5.10.1.7 Invasive Species

The NBDC database contained limited records of invasive species within the relevant Hectad (M32). Table 5.10 provides all records of invasive species recorded within the hectad.

Table 5.10: NBDC records for Invasive Species

Common Name	Scientific Name
Brown Rat	<i>Rattus norvegicus</i>
House Mouse	<i>Mus musculus</i>
American Mink	<i>Mustela vison</i>

5.10.1.8 Water Quality

The proposed development site is located entirely within the Galway Bay South East catchment and Carrowmoneash (Oranmore) sub-catchment under the Water Framework Directive (WFD). The Water Framework Directive (WFD) Coastal Waterbody risk score for this section of Galway Bay has been assessed as “not at risk” and the water quality is classed as “unpolluted”. The proposed development site does not contain any mapped watercourses and no watercourses were identified within the site during site visits. The Millplot Stream, located to the west of the proposed site, flows west away from the development site to Oranmore Bay in excess of 295m downstream. The Water Framework Directive (WFD) Ground Waterbody Approved risk score for the area (Clarinbridge) has been assessed as “at risk”.

5.10.1.9 Conclusions of the Desk Study

The desktop study has provided good information about the existing environment in hectad M32, within which the proposed development is located. The mammal species recorded within the relevant tetrad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland. Bat records within 10km of the proposed development site revealed that the wider area has been studied for bats and that a number of bat roosts for a variety of species have been recorded in the wider area. This suggests that the area offers potential for foraging and commuting bat species. A number of protected bird species have been previously recorded within the hectad M32. The proposed development is located within close proximity to the Inner Galway Bay SPA (approximately 340m to the west, but is separated from this site by a fen/wetland area), the Cregganna Marsh SPA (approximately 260 metres to the south) but is separated from it by existing housing developments and their associated infrastructure and a public road. A number of these species are generalist species and occur throughout a wide range of habitats.

5.11 Results of Ecological Surveys

5.11.1 Description of Habitats within the Ecological Survey Area

A total of six habitats were recorded within and directly adjacent to the site of the proposed development (Table 5.11). Habitats within and surrounding the site of the proposed development are provided in Figure 5.3.

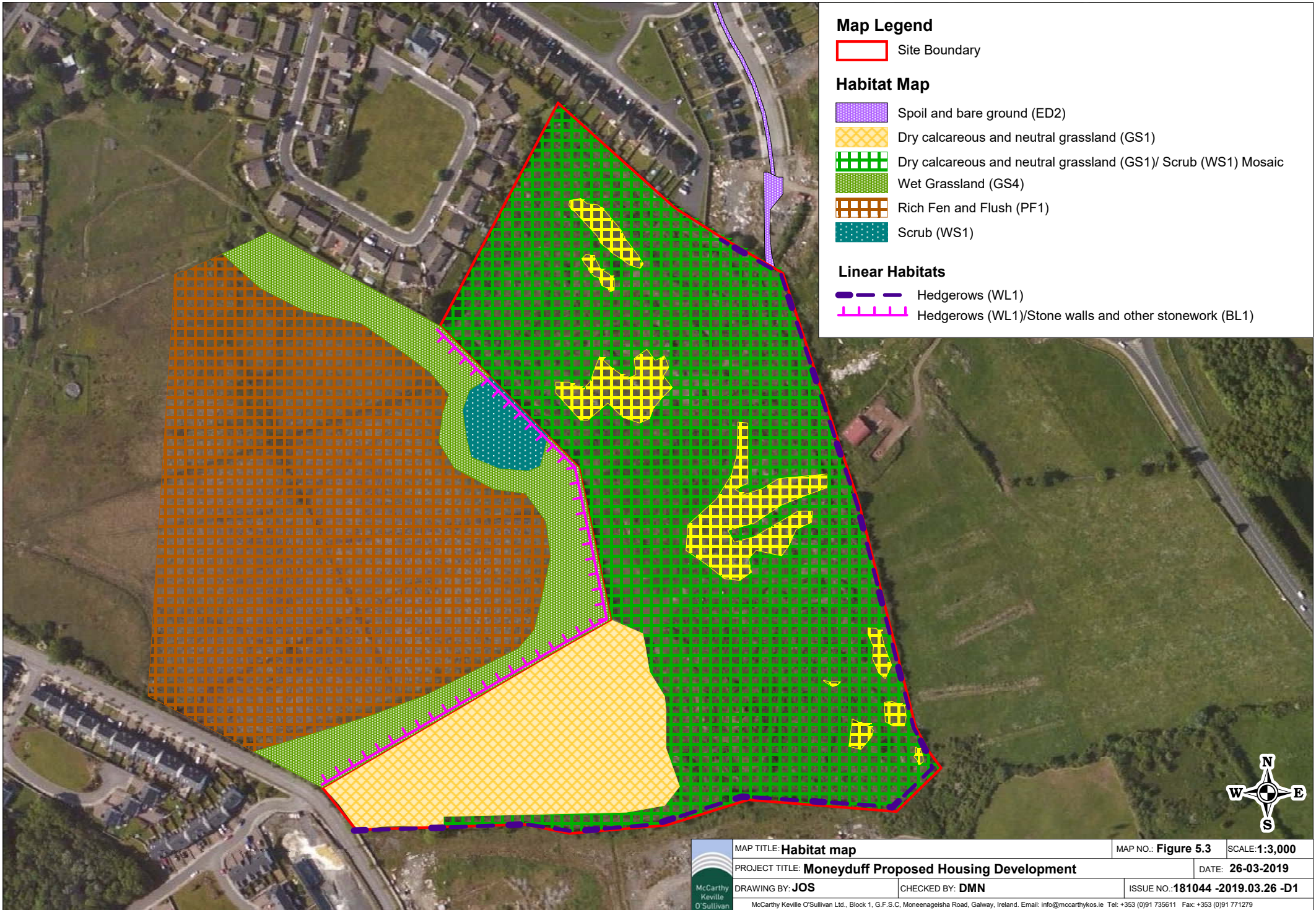
Table 5.11: Habitats recorded within the proposed development boundary (Fossitt, 2000).

Habitat	Code
Scrub	WS1
Dry calcareous and neutral grassland	GS1
Hedgerow	WL1
Stone walls and other stonework	BL1
Spoil and bare ground	ED2
Wet grassland	GS4
Rich Fen & Flush	PF1

The site is subject to grazing management. However, no animals were present at the site on the days of the site surveys. This field appears to have been subject to some reclamation in recent years and is heavily grazed, supporting a short sward with some areas of bramble (*Rubus fruticosus* agg.) and blackthorn (*Prunus spinosa*) scrub.

The larger eastern section of the site was found to be predominantly overgrown by **Scrub (WS1)** species including blackthorn (*Prunus Spinosa*), bramble (*Rubus fruticosus* agg.) and bracken (*Pteridium aquilinum*) with some ash (*Fraxinus excelsior*), willow (*Salix* spp.), whitebeam (*Sorbus aria*) and alder (*Alnus glutinosa*) trees becoming established across the site. Plate 5.1 provides an example of scrub habitat within the site.

Interspersed throughout the areas of scrub were grassland habitats classified as **Dry Calcareous and Neutral Grassland (GS1)** on thin soils with some bare limestone rock visible in parts. Common species included common knapweed (*Centaurea nigra*), oxeye daisy (*Leucanthemum vulgare*), selfheal (*Prunella vulgaris*), red clover (*Trifolium pretense*), crested dog's-tail (*Cynosurus cristatus*) and sweet vernal-grass (*Anthoxanthum odoratum*). This habitat corresponds to the Annex I habitat "Semi-natural dry grasslands (*Festuco-Brometalia*) [6210]" (O'Neill et al., 2013). This community type is characterised by a wide variety of grasses and herbs, in which there is a moderate representation of calcicolous species (i.e. species with a preference for calcium rich soils). Details of the vegetation composition are provided in Appendix 5-2 of this EIAR. Nine discreet mappable areas of this habitat type were identified within the site from the 2016 and 2017 surveys period. This equates to approximately 0.89 hectares or 10.3% of the development area. The areas mapped during the site visits range from 0.003 – 0.33 hectares in size. The 2017 survey found that all the areas classified in 2016 still correspond to Annex I habitat and found that an additional three areas also conformed to this Annex I quality habitat. Similar habitat also occurred interspersed within the areas of scrub. Plate 5.2 & Plate 5.3 provide examples of semi-natural dry grassland to the east and south east of the site with surrounding encroaching scrub. The distribution of Annex I semi-natural dry grassland is shown in Figure 5.3. The southwestern portion of the site comprises a mosaic of **Wet Grassland (GS4)** and **Dry Calcareous and Neutral Grassland (GS1)** and is grazed by horses and cattle.



Map Legend

Site Boundary

Habitat Map

- Spoil and bare ground (ED2)
- Dry calcareous and neutral grassland (GS1)
- Dry calcareous and neutral grassland (GS1)/ Scrub (WS1) Mosaic
- Wet Grassland (GS4)
- Rich Fen and Flush (PF1)
- Scrub (WS1)

Linear Habitats

- Hedgerows (WL1)
- Hedgerows (WL1)/Stone walls and other stonework (BL1)



	MAP TITLE: Habitat map	MAP NO.: Figure 5.3	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development		DATE: 26-03-2019
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.03.26 -D1
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A small area within the northern part of the site, that will form part of the site access road, comprises *Spoil and Bare Ground (ED2)*.



Plate 5.1: Example of scrub habitat within the site.



Plate 5.2: Example of semi – natural dry grassland in the eastern and south eastern sections of the site with surrounding encroaching scrub.



Plate 5.3: Example of scrub encroaching on semi – natural dry grassland habitat to the east of the site.

In addition to the habitats recorded within the site boundary, as provided in Table 5.11, habitats in the wider area comprised of *Buildings and Artificial Surfaces (BL3)* to the south and north, *Semi-improved Agricultural Grassland (GA1)* to the east, *Hedgerows (WL1)*, *Treelines (WL2)* and *Rich Fen (PF1)* to the west.



Plate 5.4: Example of Buildings and Artificial Surfaces (BL3) surrounding the north of the site



Plate 5.5: Example of Buildings and Artificial Surfaces (BL3) surrounding the south and southwest of the site

An Alkaline fen (**Rich Fen PF1**) habitat is present adjacent to the western boundary of the site and within the boundary of Galway Bay Complex SAC (Plate 5.6 and Plate 5.7). This fen was the subject of dedicated botanical surveys, the results of which are presented in Appendix 5-1. This habitat has been degraded by artificial drainage (Plate 5.7) but still supports Annex I Alkaline Fen (7230) habitat. A thin strip of wet grassland (GS4) surrounds the fen and buffers it from the site of the proposed development (Plate 5.6). Sections of this grassland correspond to the Annex I habitat Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*) (6410). There is a network of drainage ditches (FW4) (Plate 5.7) within the fen. These provide hydrological connectivity with Galway Bay to the west.



Plate 5.6: Photo of Feb (PF1), left of photo, and wet grassland (GS4), right, bordering the west of the development boundary.



Plate 5.7 Photo of drainage within the Feb (PF1), outside the west of the development boundary.

5.11.2 Significance of Habitats

The field surveys found no evidence of botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC) or listed in the Irish Red Data Books. All plant species recorded are common in the Irish landscape and no invasive species were recorded on the site.

The surveys found that the site supports discontinuous sections of EU Habitats Directive Annex I habitat – *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco – Brometalia)*. These were dispersed throughout the site, primarily within fields in the eastern, northeastern and southeastern sections of the development boundary (see Figure 5.3 and Figure 5.4). The total combined area of Annex I habitat covers a small proportion of the site, 0.89 hectares or 10.3% of the development area (8.7ha). These areas occur in disjointed patches which are threatened by scrub encroachment. Given the nature and extent of scrub encroachment surrounding the smaller areas, they are not considered to be ‘viable areas’ of Annex I habitat (NRA, 2009b) and are continually decreasing in size through lack of management. The habitat patches are assigned **Local Importance (Higher Value)** because of their fragmentation and degradation through scrub encroachment.

The Hedgerows (WL1) and Scrub (WS1) represent semi-natural habitats which provide cover and commuting corridors for a variety of local flora and fauna and are of **Local Importance (Higher Value)**. Wet grassland (GS4) habitat and dry calcareous and Neutral Grassland (GS1) mosaic that is located in the southwest corner of the site is of **Local Importance (Lower Value)**.


The fen habitat outside of the site boundary to the west of the site is within the boundary of Galway Bay Complex SAC and is a designated qualifying interest of the SAC. Although degraded it corresponds to Annex I ‘Alkaline Fen’ habitat and is of **International Importance**.



Map Legend

 Site Boundary

Annex I Habitat

 Semi-natural dry grasslands and scrubland facies (6210)



	MAP TITLE: Distribution of Annex I Grassland within the site	MAP NO.: Figure 5.4	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development	DATE: 26-03-2019	
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.03.26 -D1
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5.12 Fauna in the Existing Environment

5.12.1.1 Mammals

During the extensive walkover surveys undertaken at the site, no significant evidence of mammal species was recorded on the site or surrounding area. Fox scat was recorded both on the site and in the adjacent fen. No signs of badger, pine marten or stoat was recorded. However, it is likely that mammals such as fox (*Vulpes Vulpes*) and small mammal species including pygmy shrew (*Sorex minutus*) and wood mouse (*Apodemus sylvatica*) utilise the site on occasion.

Dedicated otter surveys were carried out in February 2019 and April 2019. The areas covered during the otter surveys are illustrated in Figure 5.5. No evidence of otter was recorded within the development site during the dedicated otter surveys carried out in 2019, or during any of the field surveys carried out in 2017 – 2019.

There is no suitable habitat for otter within the proposed development site. The habitats within the footprint of the development are dominated by dry habitats, including scrub and dry calcareous grassland habitats. The site does not offer any suitable refugia for resting otter and these habitats are sub optimal for foraging otter. No couches, holts or layups were recorded within the development site.

The habitats within the site, in particular hedgerows and treelines are likely to provide suitable commuting and foraging habitat for bat species in the wider area. However, no suitable structures or features for roosting bats were located within the site.

5.12.1.2 Bat Survey

Bat activity was low within the proposed development site. No bat roosting opportunities were identified within or adjacent to the proposed development site. Bat foraging and commuting activity was largely restricted to the treelines and hedgerows along the site boundaries. Three bat species were recorded during the bat survey; common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler's bat (*Nyctalus leisleri*). Only 11 bat passes were recorded during the survey, associated with a small number of individual bats. The transects surveyed within the development site are displayed in Figure 5.6a and the bat survey results are presented in Figure 5.6b.

5.12.1.3 Birds

The site of the proposed development was assessed for its suitability to support protected bird species. The scrub and hedgerow habitats on the site provide potential habitat for a range of common farmland bird species but do not provide significant habitat for the species for which the nearby SPAs are designated or for any other species listed on Annex I of the EU Birds Directive or on the BOCCI Red List. The wetlands to the north (fen habitat within the SAC but not within any SPA) are dominated by dense rushes and do not provide significant habitat for wildfowl such as Greenland white fronted goose (*Anser albifrons flavirostris*) that is the qualifying interest of the nearby Cregganna Marsh SPA. No EU Annex I or red listed bird species were recorded during the multidisciplinary walkover surveys and no significant habitat for birds was recorded.

However, following the precautionary principle, monthly bird surveys were undertaken monthly between October 2018 and March 2019. The results of these surveys are provided below and in Appendix 5-3. Surveys were carried out on the development site and the surrounding habitats including the adjacent fen. In summary, the site of the



Map Legend

- Site Boundary
- Otter Survey Transects



	MAP TITLE: Otter Survey Transects		MAP NO.: Figure 5.5	SCALE: 1:3,000	
	PROJECT TITLE: Moneyduff Proposed Housing Development			DATE: 02-04-2019	
	DRAWING BY: JOS		CHECKED BY: DMN		ISSUE NO.: 181044 -2019.04.02 -D1
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Map Legend

- Site Boundary
- ↔ Bat Transects - Dawn Survey
- ↔ Bat Transects - Dusk Survey



	MAP TITLE: Bat Survey Transects		MAP NO.: Figure 5.6a	SCALE: 1:3,000	
	PROJECT TITLE: Moneyduff Proposed Housing Development			DATE: 09-04-2019	
	DRAWING BY: JOS		CHECKED BY: DMN		ISSUE NO.: 181044 -2019.04.09 -D1
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Map Legend

Site Boundary

Bat Species

- Common Pipistrelle
- Leisler's Bat
- Soprano Pipistrelle



	MAP TITLE: Bat Survey Results		MAP NO.: Figure 5.6b	SCALE: 1:3,000	
	PROJECT TITLE: Moneyduff Proposed Housing Development			DATE: 09-04-2019	
	DRAWING BY: JOS		CHECKED BY: DMN	ISSUE NO.: 181044 -2019.04.09 -D1	
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proposed development did not support significant wintering bird populations. None of the SCI species for any nearby SPAs were recorded utilising the site or in the surrounding fen during the surveys undertaken. Surveys of the most proximal sections of the Cregganna Marsh SPA and the Inner Galway Bay SPA were undertaken as part of the bird survey. No Greenland white fronted geese were recorded at any location during the surveys completed. A number of the SCI species, for which the Inner Galway Bay SPA has been designated, were recorded within the SPA during winter bird surveys (see Appendix 5-3). However, these individuals were recorded at a distance removed from the site of the proposed development and to the west of the Maree road. Species including curlew (*Numenius arquata*), grey heron (*Ardea cinerea*) and black-headed gull (*Chroicocephalus ridibundus*) were recorded flying over the site of the proposed development but were not recorded utilising it. Snipe (*Gallinago gallinago*) were recorded within grassland habitats of the development site.

The following sections provide the results of each of the site visits undertaken. The number of individual birds and any significant flocks is provided for each survey date.

Species records for Moneyduff

Table 5.12 provides an overview of the target species and species of conservation interest recorded during the surveys carried out between October and March 2019. Non-target bird species recorded within the development site are presented in Table 5.13, along with their Birds of Conservation Concern in Ireland (BoCCI) status. None of the SCIs of Inner Galway Bay SPA were recorded roosting or feeding within the proposed development site during walkover surveys. There were six observations of Special Conservation Interest species associated with the Inner Galway Bay SPA; including three observations of Curlew flying over the site during surveys in October and November and two observations of Black-headed Gull flying over the development site; and an individual grey heron was recorded in flight over the development site in February 2019. A peregrine was recorded hunting over the south eastern boundary of the development site. Twelve snipe were recorded within the grassland surveys during October, November, January, February and March surveys.

Table 5.12. Target bird survey results for Moneyduff

Common Name	Number of Individuals	Notes	Date	Conservation status
Curlew (<i>Numenius arquata</i>)	2	Two individuals recorded in flight outside of the site boundary, over the fen west of the site, heading west.	23/10/2018	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Curlew (<i>Numenius arquata</i>)	1	One individual recorded in flight over site heading west, over fen habitat.	29/11/2018	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	1	One individual recorded flying north-east over the development site.	29/11/2018	Birds of Conservation Concern – Red list

Common Name	Number of Individuals	Notes	Date	Conservation status
				SCI of Inner Galway Bay
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	1	One individual recorded flying west over the development site.	30/01/2019	Birds of Conservation Concern – Red list SCI of Inner Galway Bay
Peregrine (<i>Falco peregrinus</i>)	1	Hunting over south-east corner of the development site.	29/11/2018	Annex I
Snipe (<i>Gallinago gallinago</i>)	3	Three individuals flushed from grassland habitats.	23/10/2018	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	3	Three individuals flushed from grassland habitats.	29/11/2018	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	1	Individual flushed from grassland.	30/01/2019	Birds of Conservation Concern – Amber list
Snipe (<i>Gallinago gallinago</i>)	4	Four individuals flushed from grassland habitats.	22/02/2019	Birds of Conservation Concern – Amber list
Grey Heron (<i>Ardea cinerea</i>)	1	One individual recorded in flight over south-western portion of the site, flying in a south-westerly direction	22/02/2019	SCI of Inner Galway Bay
Herring Gull (<i>Larus argentatus</i>)	1	Individual spotted flying over the site.	22/02/2019	Birds of Conservation Concern – Red list
Snipe (<i>Gallinago gallinago</i>)	1	Individual flushed from grassland habitat.	21/03/2019	Birds of Conservation Concern – Amber list

Table 5.13: Non-target bird species (recorded within the development site)

Common Name	Scientific Name	BoCCI Status	Date recorded
Blackbird	<i>Turdus merula</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019
Blue tit	<i>Parus caeruleus</i>	Green	23/10/2018 29/11/2018 22/02/2019 21/03/2019
Chaffinch	<i>Fringilla coelebs</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019
Dunnock	<i>Prunella modularis</i>	Green	23/10/2018 29/11/2018
Goldfinch	<i>Corvus monedula</i>	Green	23/10/2018
Great Tit	<i>Parus major</i>	Green	22/02/2019 21/03/2019
Hooded Crow	<i>Corvus cornix</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019
Jackdaw	<i>Corvus monedula</i>	Green	23/10/2018 29/11/2018 22/02/2019 21/03/2019
Lesser redpoll	<i>Carduelis flammea cabaret</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019
Linnet	<i>Carduelis cannabina</i>	Amber	23/10/2018
Long Tailed-tit	<i>Aegithalus caudatus</i>	Green	23/10/2018
Magpie	<i>Pica pica</i>	Green	23/10/2018 29/11/2018 22/02/2019 21/03/2019
Meadow Pipit	<i>Anthus pratensis</i>	Red (breeding)	22/02/2019
Mistle thrush	<i>Turdus viscivorus</i>	Amber (Breeding)	23/10/2018 29/11/2018 22/02/2019 21/03/2019
Robin	<i>Erithacus rubecula</i>	Amber (breeding)	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019

Rook	<i>Corvus frugilegus</i>	Green	23/10/2018 29/11/2018 22/02/2019 21/03/2019
Song thrush	<i>Turdus philomelos</i>	Green	16/12/2018 22/02/2019
Starling	<i>Sturnus vulgaris</i>	Amber (breeding)	29/11/2018
Wood pigeon	<i>Columba palumbus</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019
Wren	<i>Troglodytes troglodytes</i>	Green	23/10/2018 29/11/2018 16/12/2018 22/02/2019 21/03/2019
Stonechat	<i>Saxicola rubicola</i>	Amber (breeding)	22/02/2019

Species records for Inner Galway Bay SPA

A section of Inner Galway Bay SPA, approximately 370m west of the development site was surveyed. The vantage point overlooked an area of saltmarsh and mudflat in order to record bird distribution during high and low tide and to determine whether birds listed as Qualifying interests of the Inner Galway Bay SPA may utilize habitats within the development site. During the surveys there were no movements of wintering wildfowl and waders between this SPA and the site. Table 5.14 provides an overview of the species recorded.

Table 5.14: Bird survey results for Inner Galway Bay SPA.

Common Name	Number of Individuals	Notes	Date and Tidal conditions
Curlew	3	Mudflat – roosting/feeding	23/10/2018 (Low tide)
Curlew	2	Saltmarsh – flying over	
Mute Swan	3	Mudflat – roosting/feeding	
Mallard	2	Mudflat – roosting/feeding	
Teal	9	Mudflat – feeding	
Lapwing	50	Flying over	29/11/2018 (High tide)
Curlew	4	Flying over	
Black-headed Gull	5	Flying over	
Teal	15	Mudflat – roosting/feeding	
Mallard	3	Mudflat – roosting/feeding	
Redshank	1	Mudflat – roosting/feeding	
Greenshank	4	Mudflat – roosting/feeding	
Dunlin	45	Mudflat – roosting/feeding	16/12/2018 (Low tide)
Curlew	1	Flying over	
Lapwing	200	Flying over	
Teal	15	Mudflat – roosting/feeding	
Redshank	16	Mudflat – roosting/feeding	
Herring gull	4	Mudflat – roosting/feeding	30/01/2019 (High tide)
Curlew	2	Mudflat – roosting/feeding	
Redshank	16	Mudflat – roosting/feeding	
Dunlin	34	Mudflat – roosting/feeding	

Common Name	Number of Individuals	Notes	Date and Tidal conditions	
Teal	47	Mudflat – roosting/feeding	22/02/2019 (Low tide)	
Black-headed Gull	1	Flying over		
Grey Heron	1	Mudflat – roosting/feeding/ flying over.		
Little egret	1	Mudflat – roosting/feeding		
Black-headed Gull	5	Mudflat – roosting/feeding		
Curlew	3	Mudflat – roosting/feeding		
Redshank	12	Mudflat/bay – roosting/feeding		
Teal	45-50	Mudflat/bay – roosting/feeding		
Wigeon	50-60	Mudflat/bay – roosting/feeding		
Shoveller	1	Mudflat/bay – roosting/feeding		
Mallard	10	Mudflat/bay – roosting/feeding		
Snipe	1	Flushed during otter survey where tributary stream enters bay		
Teal	23	Mudflat – roosting/feeding		21/03/2019 (High tide)
Redshank	46	Mudflat – roosting/feeding		
Curlew	1	Saltmarsh – roosting/feeding		
Wigeon	1	Mudflat – roosting/feeding		
Oystercatcher	1	Flying over bay		

5.12.2 Species Records for Cregganna Marsh SPA

Cregganna Marsh SPA, approximately 390m south of the development site was surveyed, to determine whether Greenland White-fronted Geese, listed as Qualifying interests of Cregganna Marsh SPA, were moving between the SPA and the proposed development site. Table 5.15 provides an overview of the species recorded. Greenland White-fronted Geese were not recorded at Cregganna Marsh SPA during any of the surveys.

Table 5.15: Bird survey results for Cregganna Marsh SPA.

Common Name	Number of Individuals	Notes	Date
Hen Harrier	1	Female Hunting over grassland and marsh habitats to the north of the SPA	23/10/2018
Whooper Swan	4	In flight over marsh	29/11/2018
Little Egret	1	In flight over marsh	
Peregrine	1	Hunting over marsh	
Lapwing	250	Large flock in flight over grassland to the north west of the SPA. Roosting in fields to the north west of the SPA	
Teal	1	Calling	30/01/2018

Common Name	Number of Individuals	Notes	Date
Peregrine	1	Flying over	30/01/2018
Grey Heron	1	In flight over the marsh.	22/02/2019
Mallard	1	Rose in flight from feeding/roosting within the marsh.	
Little Egret	1	In flight over marsh.	
Mallard	2	Flying over marsh	21/03/2019

The surveys undertaken over the winter 2018 - 2019 season provide an understanding of the usage of the development site by wintering bird species. A total of 25 bird species were recorded within or immediately adjacent to the proposed development site during winter site visits. The majority of the bird species recorded within the site boundaries during the site visit were an assemblage of common birds that are typical of the scrub, grassland and urban habitats in the area. Only one Annex I bird species, peregrine, was recorded hunting over the proposed development site on one occasion.

There were only six observations of Special Conservation Interests (SCIs) of Inner Galway Bay SPA in flight over the development site, during the October, November, January and February surveys, including three curlew, two black-headed gulls and one grey heron. No SCIs of Inner Galway Bay SPA were recorded roosting or feeding within the proposed development site during the surveys.

There were no observations of Greenland white-fronted goose, listed as a Special Conservation Interest for Cregganna Marsh SPA, either within the proposed development site or within Cregganna Marsh during the winter surveys.

Based on the findings of the field study, and the habitat composition, this site does not provide a significant area of suitable wintering habitat for wintering wildfowl or waders listed as SCIs for Inner Galway Bay SPA and Cregganna Marsh SPA. Habitats within the development site are predominantly comprised of calcareous grassland, scrub and hedgerow habitats, evaluated as Low Importance (local value). Species listed are unlikely to depend on the habitats within the development site.

Greenland white-fronted goose, an SCI of Cregganna Marsh SPA, traditionally winter on peatland habitats; however, in recent times are mostly seen in areas of intensively managed pasture. Waders listed as SCIs of Inner Galway Bay SPA, including ringed plover, golden plover, lapwing, dunlin, bar-tailed godwit, curlew, turnstone and redshank are generally associated with coastal habitats. Golden plover are regularly found in large, densely-packed flocks, and in a variety of habitats, both coastal and inland. Dunlin are generally found in coastal habitats, however the species is occasionally found inland in the vicinity of lakes and turloughs. Curlew winter on a wide range of wetland habitats, both coastal and inland, and are commonly seen feeding in damp fields. Lapwing wintering distribution in Ireland is widespread. This species utilises a variety of habitats including major wetlands, pasture and rough land adjacent to bogs. Redshank winters all around the Irish coast favoring mudflats, large estuaries and inlets, however, small numbers also occur at inland lakes and rivers.

Waterfowl listed as SCIs of Inner Galway Bay SPA, including light-bellied brent goose, wigeon, teal, shoveler and red-breasted Merganser are generally associated with a variety of coastal, marine and inland freshwater habitats. Common tern and sandwich terns are associated with coastal and marine habitats, marshes and lake islands. Common gull and black-headed gull are very adaptable and utilise a wide variety of habitats including urban, coastal, marine and wetland habitats. Similarly, cormorant and grey heron can be found in a wide variety of coastal, marine and wetland habitats. None of these habitats occur within the development boundary or in the adjacent lands and there is therefore no potential for any loss of supporting habitat for SCI species for which surrounding SPAs have been designated.

5.12.2.1 Marsh Fritillary

NBDC records show that marsh fritillary (*Euphydryas aurinia*), is known to occur within the hectad (M23). Devil's bit scabious (*Succisa pratensis*) (the foodplant of marsh fritillary) was recorded during the ecological walkover survey in September 2016 and August 2017 but it was not a dominant feature in the vegetation. Dedicated surveys for the larval webs of the species were undertaken in both 2016 and 2017 in the form of a thorough search of any areas of Devil's bit scabious. The species was not recorded during either survey. These surveys were undertaken in August and September, within the optimal survey period of the species (NRA, 2009).

5.12.2.2 Other Faunal Taxa

No evidence of any other protected faunal taxa was recorded on the site of the proposed development. No watercourses were present on the site and the habitats are typical of low intensity grazing and agricultural abandonment. Such conditions do provide suitable habitat for a wide range of invertebrate species that add to the biodiversity of the area.

5.12.3 Significance of the Fauna

The field surveys found no evidence of the site of the proposed development providing significant habitat for any faunal taxa. The site and surrounding area do provide habitat and structural diversity for a wide range of common bird, small mammal and invertebrate species and provide biodiversity in the local context. This assemblage of species is assigned **Local Importance (Higher Value)**.

The bird species recorded within the site and in the fen area along with the bat populations that use the site for foraging are also assigned **Local Importance (Higher Value)** on the basis that they enhance the biodiversity of the site. The site is of little significance for other mammalian species.

The bird populations of SCI species within the SPAs are separated from the proposed development by existing houses, roads and other infrastructure. The bird surveys undertaken did not record any significant usage of the site or the areas surrounding it. However, they have been assigned **International Importance** where they occur in the wider area due to their designation as SCI species or the respective SPAs.

5.13 Likely and Significant Effects on Flora and Fauna

Ecological evaluation and assessment of effects within this chapter follows a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009a). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The assessment of effects also follows the guidance outlined in EPA (2017) and CIEEM (2018).

This assessment of effects is structured as follows:

- Assessment of 'Do nothing' Impact
- Assessment of effects relation to sites designated for nature conservation
- Assessment of effects in relation to receptors of Local Importance Lower Value
- Assessment of effects in relation to Key Ecological Receptors
- Summary of potential effects associated with Proposed Development infrastructure

5.13.1 Do Nothing Effect

If the proposed development was not to go ahead, it is likely that the development site would remain under its current management regime, periodically grazed or abandoned. It is likely that in the absence of grazing, the site will become further encroached by scrub, which will lead to a loss of habitat and species diversity within the site.

5.13.2 Impacts During Construction Phase

5.13.2.1 Potential Impacts on Habitats

The development footprint, associated landscaping and amenity areas will cover much of the area within the red line boundary. The footprint is primarily situated within habitats dominated by scrub and rank grassland vegetation.

5.13.2.1.1 Loss of Habitat – Grasslands and Scrub

Permanent Moderate Negative Effect at a Local Level

The majority of the habitat within the footprint of the proposed development comprises scrub and rank calcareous grassland habitats. However, as described in Section 5.4.1 and in Appendix 5-2, the proposed development will result in permanent loss of 0.89 hectares of grassland, which corresponds to Annex I habitat – Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco – Brometalia*) [6210] (non-priority variant). This habitat is represented in a number of small patches throughout the site.

The loss of Annex I habitat is assigned moderate significance because it only effects 10.3% of the development area and is very fragmented and subject to encroachment of scrub and rank grasses. Similarly, it has been assigned a Local Importance (Higher Value) because of its fragmented nature, small size and ongoing reduction in size and quality due to scrub encroachment and lack of management. Whilst 0.89 hectares of the site correspond to the Annex I habitat, the majority of the recorded habitat occurs in very small patches that are surrounded by large areas of scrub and rank grasses. The two large areas combine to total an area of 0.51 hectares. The remaining small fragmented areas are classified as a component of the scrub and rank grassland habitat. The areas of Annex I habitat throughout the site are shown on the habitat map (Figure 5.3) and in Figure 5.4.

Loss of semi-natural dry grasslands habitat type to the footprint of the proposal is considered to be a **permanent moderate negative effect at a local level**, in the absence of mitigation.

Mitigation

A habitat management plan has been prepared for the site to facilitate positive habitat and biodiversity enhancement measures and to mitigate against the loss of grassland, hedgerow and treeline habitats. This plan is provided as Appendix 3-4 of this EIAR.

As shown in the landscaping masterplan for the proposed housing development (Figure 18223-3-100), the development includes the planting and management of calcareous grassland as an integral part of its design. The native wildflower meadows will be primarily located along the western boundary of the site, adjacent to the neighbouring lands within the SAC. Another area will be located within the green space an archaeological protection zone around Moneyduff Castle. These areas are shown on Figure 5.7. This area comprises approximately 0.7 hectares.

The areas that will be used to create and retain semi-natural grassland support a suitable substrate and profile for semi-natural dry calcareous and neutral grassland management and enhancement. The following measures will be implemented during the construction phase of the development for the protection of the area adjacent to the development footprint:

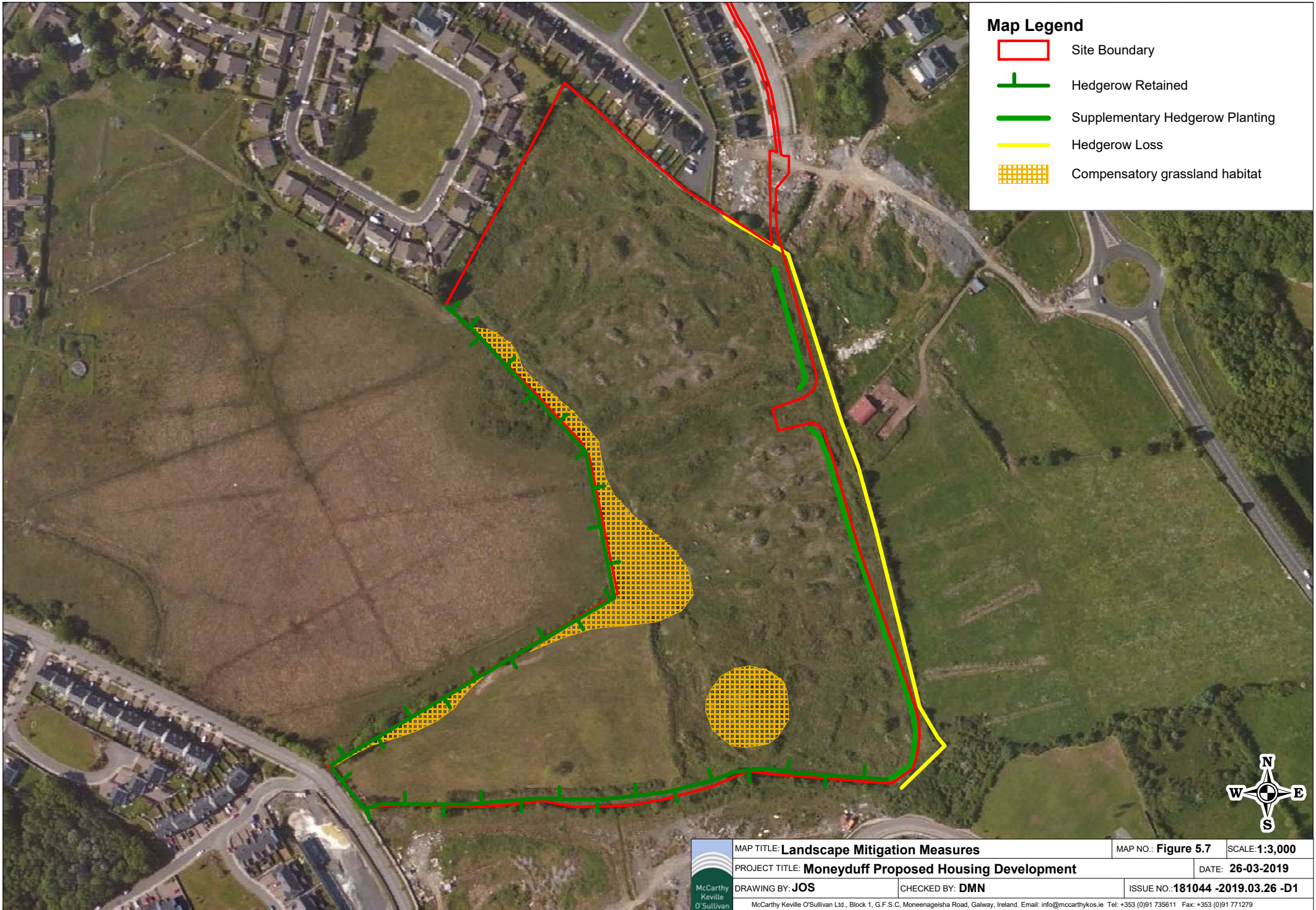
- The site boundary will be securely fenced off prior to construction activities to avoid potential for compaction of the existing soil as well as preventing any changes in the geological composition of the substrate (i.e. maintaining a calcareous substrate on which the grassland area is to be managed). There will be no construction access outside these fenced areas.
- Construction activity will follow best practice to avoid run off or any impacts of construction in the areas outside the site.
- Stripped topsoil from areas of calcareous grassland within the development footprint will be stored for use within the grassland management area of the development.

The lands are not currently within a formal management regime and are therefore becoming encroached by scrub. Consequently, the current lack of management of the site is likely to result in the long-term deterioration in quality of the calcareous grassland and the further encroachment of scrub through succession. For this reason, the lands set aside for grassland management will be managed in accordance with the best practice management measures set out below. The management measures are based on guidance from "United Utilities, 2011, Sustainable Catchment Management Programme: Volume 6 *Restoration Of Upland Hay Meadows, Species-Rich Grasslands And Rush Pastures*". Such measures are considered appropriate for the habitat recorded on site.





In general, the objectives for management within the grassland areas are to increase botanical diversity (especially wildflowers), reduce the dominance of grasses in the sward and preventing scrub establishment. A number of case studies have been reviewed in order to determine the best management approach. However, grassland creation and management will vary from site to site and thus require site specific management measures. In addition, each management plan may require alteration as the project progresses depending on revegetation success, species composition or the presence of undesirable species (overabundance of *Rumex* or *Cirsium* spp).

The main targets are to:

- Maintain low soil Phosphate index and appropriate pH through retaining the existing substrate and soil within the site,



Map Legend

-  Site Boundary
-  Hedgerow Retained
-  Supplementary Hedgerow Planting
-  Hedgerow Loss
-  Compensatory grassland habitat

	MAP TITLE: Landscape Mitigation Measures	MAP NO.: Figure 5.7	SCALE: 1:3,000
	PROJECT TITLE: Moneyduff Proposed Housing Development	DATE: 26-03-2019	
	DRAWING BY: JOS	CHECKED BY: DMN	ISSUE NO.: 181044 -2019.03.26 -D1
	<small>McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611 Fax: +353 (0)91 771279</small>		

- Achieve increases in abundance of calcareous grassland indicator species,
- Achieve cover of wildflowers between 20% and 90%, with 50-60% flowering in May-August,
- Keep bare ground to between 1% and 5%,
- Keep undesired species cover below 5% (United Utilities, 2011).

Although these targets have been based on case studies of similar projects, the ongoing monitoring programme for the site, post-construction, will need to adapt to the site specific geological, hydrological and climatic factors.

Mowing regime

In order to achieve the above targets, the following measures will be incorporated into the management of the grassland:

- Cutting will not take place before characteristic annual, biennial or short-lived perennial plant species which depend on seed production have set seed (for example yellow rattle (*Rhinanthus minor*). Sustained early grass cutting is known to reduce species richness in such grasslands (Smith 1994). For this reason, mowing will be undertaken in August of each year. This will also maintain the nature conservation value of the grassland.
- Ensure an occasional late mowing (late August/September) (e.g. 1 year in 5), where practical. This will promote late-flowering species such as devil's bit scabious (*Succisa pratensis*) (Crofts, and Jefferson, (eds), 2009).
- Discourage mowing machinery access to grassland when ground conditions are wet, otherwise rutting will occur which will damage the sward and create areas which could be invaded by undesirable species.
- Grass cut each year will always be removed and not left to decay on site. Where vegetation is left on site, changes in the botanical composition of the grassland may ensue. Excess vegetation left on site may also suppress low growing species and reduce species-richness. The removal of vegetation off the grassland will also help to impoverish the soil/ reduce nutrients and thereby suppress competitive grass species and enhance floral diversity. (Crofts, and Jefferson, (eds), 2009).
- There will be no use of herbicides or artificial fertilisers during the management of the grassland.

Facilitating Community Access to the Grassland

In order to maintain a managed appearance of the site for the local community, a narrow strip, approximately 1 metre wide, will be mown along each side of the public footpaths bordering the grassland (see Plate 5.8). In addition, a single mown path can be mown through the grassland to facilitate easy public access through the meadow, thereby allowing amenity access/participation and ensuring public buy-in. In addition, this will avoid trampling of the grassland and ensure localised access through the feature.



Plate 5.8. Mown path through grassland to facilitate local community access and avoid tramping (Source: Albert Bridge, (2019)).

The implementation of the measures described above will be overseen by a suitably qualified ecologist both during construction and for a period of at least 10 years following construction. Full details of the supervision and monitoring that has been committed to in the management plan are provided in the Table 4.1 of Appendix 3-4.

Residual Effect

With the implementation of mitigation measures, the proposal will result in permanent not significant negative effect at the local level. In addition, there is a commitment to the implementation of the measures that are set out in the habitat management plan including both the establishment and maintenance of the grasslands. A commitment is also made to monitor the development of the grasslands on an ongoing basis following construction. These measures are an integral part of the planning permission and as such, confer protection on the habitat where currently none exists. The habitat is currently deteriorating in both area and quality due to lack of management.

5.13.2.1.2 Loss of habitat – Hedgerow

Permanent Slight Negative Effect at the Local Level

The project has been specifically designed to avoid the loss of the hedgerow and tree line that forms the western boundary of the site. Similarly, the hedgerow along the southern boundary of the site will be retained and protected in full. The project will inevitably result in the loss of approximately 422m of hedgerow habitat that is located along the eastern boundary. The loss of this hedge is necessary to facilitate the necessary change in ground level at this location. Hedgerow habitats are widespread in the local area. The loss of a relatively small area of this locally common habitat, is not likely to affect the long-term presence or viability of these habitat types locally.

Loss of hedgerow/treeline habitats to the footprint of the proposal is considered to be a **permanent slight negative effect at the local level**, in the absence of mitigation/compensation.

Mitigation

The hedge along the eastern boundary that will be lost to facilitate the change in ground levels associated with the proposed development at this location will be mitigated by replacing it with a new hedge that will mark the eastern boundary of the development throughout the operation of the scheme. In addition, planting is proposed to enhance the tree line that is to be retained along the western boundary and in a small area along the southern boundary. The areas where hedgerow will be lost and replaced is shown on Figure 5.7 along with all areas that will be retained and enhanced.

Planting will use native species found in the wider area. Tables 5.16 to 5.18 provide a summary of the species to be used on site for planting as described in the Landscape Management Plan. The planting of native species will benefit local wildlife by providing additional feeding and breeding habitat. Species such as burnet rose, oak, hawthorn or guelder rose will provide winter berries/ fruit that will support a wide variety of wintering birds and small mammals. All the boundary treatments will plant only native species. Species used for landscaping within the development will not necessarily be native but have been chosen for their value as pollinators, which enhance the biodiversity value of the completed development.

Table 5.16: Parkland and Street Tree Planting Species

Scientific name	Common name	Size
<i>Betula pendula</i>	Birch	8-10cm
<i>Tilia cordata</i>	Lime	8-10cm
<i>Quercus petraea</i>	Sessile oak	18-20cm
<i>Sorbus aria</i>	Whitebeam	8-10cm
<i>Sorbus aucuparia</i>	Rowan	8-10cm

Table 5.17: Native Hedgerow Supplementary Planting

Scientific name	Common name	Size
<i>Crataegus monogyna</i>	Hawthorn	60-90cm
<i>Euonymus europaeus</i>	Spindle	60-90cm
<i>Prunus padus</i>	Bird cherry	60-90cm
<i>Prunus Spinosa</i>	Blackthorn	60-90cm
<i>Quercus petraea</i>	Sessile oak	6-8cm girth
<i>Sambucus nigra</i>	Elder	60-90cm
<i>Rosa canina</i>	Dog rose	60-90cm
<i>Viburnum opulus</i>	Guelder rose	60-90cm

Table 5.18: Native Woodland Tree and Understory Planting

Scientific name	Common name	Size
<i>Alnus glutinosa</i>	Alder	10-12cm
<i>Betula pebescens</i>	Downy birch	10-12cm
<i>Pinus sylvestris</i>	Scot's pine	1m high rootball
<i>Quercus petraea</i>	Sessile oak	10-12cm girth
<i>Ulmus 'Lobel'</i>	Elm	10-12cm girth
<i>Corylus avellana</i>	Hazel	60-90cm
<i>Ilex aquifolium</i>	Holly	20-30cm

New planting will be checked annually for damage and dead branches will be removed and weeds cleared. No cutting of hedgerows for maintenance within the land management area will occur during the bird breeding season 1st March – 31st August in any year, to prevent impacts on nesting bird species. All wild birds, their eggs, young and nests are protected under the Wildlife Act 1976-2017.

Residual Effect

With the implementation of mitigation measures, the proposal will result in permanent not significant loss of hedgerow habitat at the local level.

5.13.2.1.1 Loss of habitat – Scrub

Permanent Not Significant Negative Effect at the Local Level

The proposed development will lead to the loss of approximately 6.92ha of scrub and rank grassland habitat within the site of the proposed development. This habitat has been the subject of very low levels of management with the grassland becoming increasingly rank and overgrown with scrub over time. No mitigation is proposed for this loss of habitat.

5.13.2.2 Impacts on Fauna

5.13.2.2.1 Disturbance to Fauna

SCI Species of Galway Bay Complex SAC, Inner Galway Bay SPA and Cregganna Marsh SPA

No Effect Predicted at International Level

Galway Bay Complex SAC is located adjacent to the western extent of the site of the proposed development. otter (*Lutra lutra*) and harbour seal (*Phoca vitulina*) are the only two species faunal species of Qualifying Interest for the SAC.

Harbour Seal is a strongly marine species and no suitable habitat for the species exists in over 350 metres from the proposed development. Any such habitat is separated from the site of the proposed development by a tree line, extensive fen area, main road and salt marshes. There is no potential for disturbance effects on this species.

Otter is not strongly associated with the marine environment but is associated with the aquatic environment. No suitable habitat for otter exists on the site of the proposed development and the fen that is located to the west provides few aquatic features such as drainage ditches and thus provides little suitable habitat for the species. None of the other surrounding lands provide any suitable habitat for the species. No signs of the species were recorded either on the site or on the adjacent lands during the dedicated otter surveys that were undertaken. The site is separated from any potential

otter habitat by a tree line and the proposed grassland habitat that will be retained and enhanced. There is no potential for significant disturbance to this species.

Inner Galway Bay SPA lies more than 300 metres to the west of the development (separated by hedgerows, marsh/wet grassland and a main road/Maree Road). None of the listed SCI species of Inner Galway Bay SPA were recorded utilising habitats within the development site during the field surveys carried out from November 2018 – March 2019. The site of the proposed development did not support significant wintering bird populations. None of the SCI species for any nearby SPAs were recorded roosting or feeding within the development site or in the surrounding wetlands during the surveys undertaken. Whilst no significant disturbance to these SCI bird species is anticipated during construction an assessment of the distance at which birds respond to human disturbance (flight initiation distance or FID) was undertaken for each of the SCI species. Flight initiation distances for each of the SCI species listed for Inner Galway Bay SPA are provided in Table 5.19 based on a review of the most recent literature. Livezey et al. (2016) ^[2] provides a literary review with regard to bird flight initiation distances in response to anthropogenic disturbance. The study compiles a database of published alert distances (distances at which birds exposed to an approaching human activity exhibit alert behavior), flight initiation distances (distances at which birds exposed to an approaching human activity initiate escape behavior), and minimum approach distances (distances at which humans should be separated from wildlife) by taxonomic order. This table demonstrates that the proposed development is well outside the disturbance distance for any SCI species of Inner Galway Bay SPA. The most sensitive species are potentially disturbed at 71metres. The proposed development is over 340 metres from the SPA and separated from it by tree lines and the main Marree road. No disturbance effects on the SCI species of Inner Galway Bay are anticipated.

^[2] Livezey, K.B., Fernández-Juricic, E. and Blumstein, D.T., 2016. Database and metadata of bird flight initiation distances worldwide to assist in estimating human disturbance effects and delineating buffer areas. *Journal of Fish and Wildlife Management* 7, pp.1-11

Table 5.19: Disturbance Distance of SCI species of Inner Galway Bay SPA

SCI Species of Inner Galway Bay	Population type	Inner Galway Bay SPA subsite assessment survey 2009/2010: Total numbers	Minimum Approach Distance to pedestrian disturbance by taxonomic order (Livezey et al., 2016)	Mean Flight Initiation Distance (Metres) for non-nesting birds
Common Gull	Wintering	High	22.3m	59.9m in response to pedestrian disturbance (Møller & Erritzøe, 2010)
Great Northern Diver	Wintering	Not recorded	Not listed	76.8m in response to human recreational activity (Jiang and Møller, 2017). A study of the disturbance response of great northern diver to boat traffic in Inner Galway Bay, found that Great Northern Divers in the area around Galway harbour do not show any significant response to normal ship and boat traffic with no Great Northern Divers flushed by the survey boat, even though the boat passed within 10 to 20 m of some birds (Gittings et al. 2015).
Cormorant	Reproducing	High	32.1m	23.5m, in response to motorized vehicle, and 74m, in response to pedestrian disturbance in non- nesting birds (Guay et al., 2014)
Grey Heron	Not listed	Very high	46.8m	47.36m in response to pedestrian disturbance (Møller & Erritzøe, 2010)
Light-bellied Brent Goose	Wintering	Not recorded	71.0m	105m in response to pedestrian disturbance (Smit & Visser, 1993); 23.5m in response to pedestrian disturbance (Møller & Erritzøe, 2010)
Wigeon	Wintering	Very high	71.0m	91m (Holloway, 1997)
Teal	Wintering	Very high	71.0m	58m in response to pedestrian disturbance (Møller, 2008b); 39.23m in response to pedestrian disturbance (Møller & Erritzøe, 2010)
Shoveler	Wintering	Low	71.0m	Flush distance 100m in response to vehicles and walking (Pease, 2005).
Red-breasted Merganser	Wintering	Moderate	71.0m	Flush distance 28m in response to human recreational activity (Knapton, 2000).
Ringed Plover	Wintering	Not recorded	42.2m	22.5m in response to pedestrian disturbance (Møller, 2008b); 121m in response to pedestrian disturbance (Smit & Visser, 1993)
Golden Plover	Wintering	Very high	42.2m	

Table 5.19: Disturbance Distance of SCI species of Inner Galway Bay SPA

SCI Species of Inner Galway Bay	Population type	Inner Galway Bay SPA subsite assessment survey 2009/2010: Total numbers	Minimum Approach Distance to pedestrian disturbance by taxonomic order (Livezey et al., 2016)	Mean Flight Initiation Distance (Metres) for non-nesting birds
Lapwing	Wintering	Very high	42.2m	41.32m (Møller, 2008b), 39.47m (Møller AP. 2008c) in response to pedestrian disturbance.
Dunlin	Wintering	High	42.2m	163m in response to pedestrian disturbance (Smit & Visser, 1993);
Bar-tailed Godwit	Wintering	High	42.2m	219m in response to pedestrian disturbance (Smit & Visser, 1993); 22.1m in response to pedestrian disturbance (Blumstein et al., 2003)
Curlew	Wintering	Very high	42.2m	90m in response to dog disturbance, 188m in response to car disturbance and 213m in response to pedestrian disturbance (Smit & Visser, 1993)
Redshank	Wintering	Very high	42.2m	29.71m in response to pedestrian disturbance (Møller, 2008b) (Møller & Erritzøe, 2010)
Turnstone	Wintering	High	42.2m	13.8m in response to pedestrian disturbance (Blumstein et al., 2005), 29.66m (Glover et al., 2011). 47m in response to pedestrian disturbance (Smit and Visser, 1993)
Black-headed Gull	Wintering	High	42.2m	41.20m (Møller and Erritzøe, 2010)
Sandwich Tern	Reproducing	Not recorded	22.3m (nesting) 42.2m	
Common Tern	Reproducing	Not recorded	22.3m (nesting) 42.2m	20.5m in response to pedestrian disturbance (Weston et al., 2012)

As the Greenland white-fronted goose population for Cregganna Marsh SPA also utilise Rahasane Turlough SPA, disturbance to the Greenland white-fronted goose population for both SPAs were considered. During the dedicated bird surveys undertaken from November 2018 - February 2019, there were no observations of Greenland white-fronted goose, listed as a SCI for Cregganna Marsh SPA and Rahasane Turlough SPA, either within the proposed development site or within Cregganna Marsh SPA during the winter surveys.

Cregganna Marsh SPA is located 260m from the proposed development site and the SPA is buffered from the development by urban infrastructure, roads, housing and agricultural fields. There is no potential for the development to cause disturbance to the Greenland white-fronted goose population listed as an SCI for Cregganna Marsh.

Disturbance to local fauna within and surrounding the site

Short Term Slight Negative Effect at Local Level

The construction period for this development will be short term. The construction phase is likely to result in some disturbance to faunal species resulting from noise and increased anthropogenic activities.

Although no signs of significant mammal activity were recorded on site during the field surveys, it is likely that mammals including fox and other species such as pygmy shrew are likely to utilise the site on occasion. These species have widespread and favourable ranges in Ireland and alternative suitable habitats are widespread in the area. Bat activity was low within the proposed development site during the bat survey carried out in April 2019. Bats used the hedgerows and treelines along the site boundary for foraging and commuting. No bat roosting opportunities were identified within or adjacent to the proposed development site.

The site and surrounding area provide habitat and structural diversity for a wide range of common bird, small mammal and invertebrate species and provide biodiversity in the local context. This assemblage of species is assigned Local Importance (Higher Value).

The proposed development is not likely to affect the long-term presence or viability of these species locally. Disturbance to fauna due to the proposal is considered to be a **short-term slight negative effect at the local level**, in the absence of mitigation/compensation.

Mitigation

All works associated with the construction phase of the proposed development will occur during daylight hours and there will be no requirement for artificial lighting on site at night during the construction phase. All works will be confined to within the development boundary, thereby avoiding potential disturbance to faunal species outside the site. Therefore, potential impacts on bats and other faunal species are not anticipated.

Residual Effect

No significant residual impacts on faunal species are anticipated as a result of disturbance.

5.13.2.3 Habitat loss for faunal species

Permanent slight negative effect at a local level

The site of the proposed development does not provide significant habitat for any rare or protected species. The habitats on site do not provide suitable roosting or foraging

habitat for bird species listed as SCIs of nearby SPAs given the amount of scrub cover and dry nature of the grassland habitats. It does however, provide suitable habitat for a range of common bird species and is likely to provide habitats for a range of small mammal species. In addition, it has a high biodiversity value in the local context. The loss of these faunal habitats is slight as similar habitats are available in the wider area and none of the faunal populations on the site are of county, national or international significance.

The site and surrounding area provide habitat and structural diversity for a wide range of common bird, small mammal and invertebrate species and provide biodiversity in the local context. This assemblage of species is assigned Local Importance (Higher Value).

Bat activity was low within the proposed development site during the Bat survey carried out in April 2019. Bats used the hedgerows and treelines along the site boundary for foraging and commuting. No bat roosting opportunities were identified within or adjacent to the proposed development site

The proposed development is not likely to affect the long-term presence or viability of these species locally. Habitat loss for faunal species due to the proposal is considered to be a **permanent slight negative effect at the local level**, in the absence of mitigation/ compensation.

Mitigation

The project has been specifically designed to avoid the loss of the hedgerow and tree line that forms the western boundary of the site. Similarly, the hedgerow along the southern boundary of the site will be retained and protected in full.

Hedgerow and treeline features will be retained where possible, with additional supplementary hedgerows and treeline planting also prescribed in the landscape management plan (see drawing 18223-3-100, Landscape Master Plan). This will ensure that connectivity is maintained for commuting and feeding faunal species including birds, bats and invertebrates. This is described in Section 5.5.2.1.2 above and shown on Figure 5.7. In addition to this, 0.7ha of semi-natural grassland habitat will be managed and maintained on site for biodiversity as shown in the Landscaping Plan.

All clearance of scrub and woody vegetation will take place outside the bird nesting season, which runs from 1st March to 31st August or will be undertaken under the supervision of a suitably qualified ecologist to ensure that no birds' nests are disturbed or destroyed during construction.

Residual Effect

No significant residual impacts on faunal species are anticipated as a result of habitat loss.

5.13.2.4 Impacts on Water Quality and Fen Habitat

Short – Term Slight Negative Effect at an International Level

The construction of the development will involve earth moving and levelling operations which create the potential for pollution in various forms to run off the site. Whilst there are no watercourses within or adjacent to the development site which could act as potential conduits for pollution, wet grassland and fen habitats are located adjacent to the development site at its western extent. There are drainage ditches in the fen area but not within or adjacent to the site of the proposed development itself. As there is no direct conduit for pollution, there is low potential for effect. The fen habitat outside of

the site boundary to the west of the site is within the boundary of Galway Bay Complex SAC and is a designated qualifying interest of the SAC. Although degraded it corresponds to Annex I 'Alkaline Fen' habitat and is of ***International Importance***.

There is a full assessment of all potential effects on the fen both during construction and during operation in the Water chapter of this EIAR (Chapter 7). No deep excavations are proposed that could affect groundwater during construction and it is unlikely that significant dewatering or water management will be required. In addition, there will be no changes in recharge of waters to the fen during construction

Mitigation

Standard best practice environmental control measures will be implemented during the construction phase of the development. These will include the construction of a solid fence along the border between the site and the adjacent wet grasslands and fen within the SAC, appropriate treatment of any waters that arise on site during construction within the site, appropriate storage and use of materials and machinery to avoid potential pollution events. All such measures are provided in Section 7.4.2 of the Hydrology chapter. In summary this states that the following measures will be implemented for the avoidance of impact on the water quality:

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas. These will be embedded into the local soils to ensure all site water (should any arise) is captured and filtered;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- No pumped construction water will be discharged directly into any local watercourse;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses;
- Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

Further measures are prescribed in detail in Section 7.4.2 of the EIAR. In addition, standard best practice environmental control measures have also been incorporated in the Construction Environmental Management Plan (CEMP), see section 4.6. The CEMP is provided in Appendix 3-2 of the EIAR.

Residual Effect

No adverse residual impacts on water quality or fen habitat are anticipated following the implementation of the best practice described in Chapter 7 and summarised above.

5.13.3 Impacts During Operation Phase

5.13.3.1 Disturbance to faunal species

No Effect Predicted at an International Level

It is acknowledged that the wider area (including the Galway Bay Complex SAC, Inner Galway Bay Complex SPA and Cregganna Marsh SPA) support significant populations of faunal species that are important at the International scale.

Direct Disturbance

The surveys undertaken have identified that the site of the proposed development and the surrounding area does not provide significant habitat for the QI/SCI species of the nearby SAC and SPAs. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 5.5.2.2.1. This assessment is not repeated here but the conclusion that there will be no effects on the SCI and QI species of any European Sites is the same.

Indirect Disturbance

The proposed development provides 212 residential housing units in the Oranmore area. Whilst the direct effects of disturbance associated with population increase on the area within and surrounding the site have been assessed above, the potential for the increased population to result in disturbance elsewhere in the Oranmore area is assessed below.

Firstly, the site of the proposed development is located on lands that are zoned 'R1' – Residential (Phase 1) and 'OS' – Open Space/Recreation and Amenity, within the current *Oranmore Local Area Plan 2012-2022*. Lands identified as 'R1' are allocated for short term-medium term growth.

The *Oranmore Local Area Plan 2012-2022* (LAP) in which the zonings were assigned was the subject of Appropriate Assessment. The Natura Impact Report that accompanied the LAP identified the development of lands at Oranhill and Moneyduff as having the most risk to Natura 2000 sites. This identified risk was associated with direct disturbance issues that have been comprehensively addressed in this EIAR through detailed desk and field surveys. The NIR accepts the zoning of the lands at Moneyduff and the LAP has been adopted.

The NIR accepts that all individual developments will have to be subject to individual assessment at the planning stage but finds that the zoning of lands for high density residential is acceptable.

The development does not in any way provide any access to any SAC or SPA that are outside the site boundary and does not encourage such access. No impact on any faunal populations of more than local significance is anticipated. It designed in

accordance with the Oranmore LAP, which has itself been the subject of Appropriate Assessment.

Furthermore, the proposed development ensures the provision of a network of recreational greenspaces located within the development site, including a looped walk, playground, wildflower meadow, communal garden and public parkland open space. Recreational and amenity space within the development site is above the minimum 15% set out in the Oranmore Local Area Plan 2012-2022 (LAP). This is in accordance with good planning, which ensures that the eventual residents of the estate have their recreational requirements considered in the design of the scheme and are not entirely dependent on recreational facilities outside the site. This is in accordance with the extant Oranmore LAP, which has been the subject of its own Appropriate Assessment. This amenity space is clearly shown on the site layout and on the landscaping plan (see drawing 18223-3-100, Landscape Master Plan).

In conclusion, the proposed development has been designed in full accordance with the Oranmore Local Area Plan and is located on lands that are zoned as residential. The potential for the development to result in direct disturbance to species that are among the QIs and SCIs of the nearby SAC and SPAs has been fully considered in this EIAR and has been the subject of the ecological desk studies and surveys that are provided in this chapter. The potential for the increase in population in the Oranmore area to result in adverse effects on these receptors through indirect disturbance has been fully considered in the Natura Impact Report that accompanied the LAP. This NIR was reviewed in the compilation of this chapter.

Permanent not significant negative effect at the local level

Direct Disturbance

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 5.5.2.2.1. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Indirect Disturbance

As discussed above in relation to the potential for indirect effects of disturbance on European Sites, the site of the proposed development is on appropriately zoned land and is designed in accordance with the Oranmore LAP, which has been the subject of Appropriate Assessment prior to its adoption. Any indirect effects of population increase on ecological receptors were considered in that assessment, which was reviewed and accepted in the preparation of this EIAR.

5.13.3.2 Impacts on Surface Water Quality and downstream aquatic habitats

The impacts of the proposed development on hydrology and surface water quality have been fully assessed in Chapter 7 of this EIAR but are also discussed here as they relate to the ecological receptors.

5.13.3.2.1 Production of Foul Sewage

Long Term Significant Negative Effect at an International Level

The proposed development will result in the production of foul sewage during its operational phase. If released untreated into the environment, this foul sewage has the potential to result in pollution of the downstream receptors including the adjacent

alkaline fen and indirectly, via the drainage ditches within the fen to the wider area within Galway Bay. As all the downstream lands, including the fen that is adjacent to the site are designated for conservation as the Galway Bay Complex SAC with the lands to the north of the Maree Road also designated as the Inner Galway Bay SPA, these receptors have been assigned International importance.

Mitigation

As described in the Report on Civil Works (Tobin, 2018), the sewer layout provides for the gravity sewer network falling to a pumping station located centrally in the open space on the western area of the site. The foul waste will then discharge from the pumping station via pumped rising main which will run out through the adjacent lands and along the side of the main road (N18) to reach the next available foul sewer as identified by Irish Water. The existing public foul sewer is shown on drawing. no. 10402-2000 (Proposed Drainage and Watermain Key Plan). This plan is provided in the Civil Works Design Report (Tobin, 2019) and included in Chapter 3 of this EIAR. There is full agreement with Irish Water that there is adequate capacity and capability to fully treat all sewage generated by the proposed development in the public sewage treatment system. The proposed development, as assessed for the confirmation of feasibility, is a standard connection, requiring no network or treatment plant upgrades or water or wastewater by either the customer or Irish Water.

Residual Effect

No residual impacts on water quality as a result of the production of foul sewage as the proposed development will be connected to the public system, which has adequate capacity and capability to effectively treat all sewage arisings from the development.

5.13.3.2 Run off of Surface Waters from the site

Long Term Moderate Negative Effect at an International Level

In addition to foul sewage, the proposed development will result in the production of storm-water run-off from hard standings. This has the potential to be polluted with hydrocarbons from trafficked surfaces and also to run off the site at an increased rate into the fen and downstream aquatic habitats within Galway Bay.

Mitigation

The storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. The stormwater will soak away through the soil. Details of the soakaways are shown in Appendix C of the Report on Civil Works (Tobin, 2018). The surface water treatment and discharge has been designed to avoid any change in the discharge of waters from the site in terms of either volume or discharge rate. A flood risk has been carried out and demonstrates that the proposed management of water on the site poses no risk of any flooding and mimics existing conditions on the site.

Residual Impact

Given the proposed treatment of stormwater on the site, adverse effects on water quality and/or the fen habitat and other downstream receptors are not anticipated and there will be no residual impacts.

5.13.3.3 Effects on Groundwater

The potential for the proposed development to result in effects on groundwater has been fully assessed in Chapter 7 of this EIAR and summarized below where they apply to ecological receptors.

5.13.3.3.1 Changes to Hydrogeological regime

No Effect

The proposed development will not effect the hydrological regime within the area. As fully described in Section 7 of this EIAR. The proposed development will not involve any change to the recharge to groundwater with all roof water being discharged to soakaways after first passing through hydrocarbon interceptors. No large scale excavations are proposed that would have the potential to significantly, disrupt any groundwater flow in the area. No new drainage channels are proposed. The hydrogeological regime in the area will remain largely unchanged. As stated in Chapter 7, there is no potential for the proposed development to result in effects on the downgradient fen to the north and west or on the wetlands that are located in the wider area to the east of the N18 or to the south in Cregganna Marsh.

5.13.3.3.2 Pollution of Groundwaters

Potential Moderate Negative Effect on receptors of International Importance

The proposed development has the potential to result in pollution of groundwaters during operation in the form of the discharge of polluting material to ground within the soakaways on the site. This could take the form of hydrocarbons from the trafficked areas within the development during operation.

Mitigation

The storm water drainage design has been designed to cater for all surface water runoff from all hard surfaces in the proposed development including roadways, roofs etc. All stormwater generated on site from roadways and roofs will discharge via Oil/Petrol Interceptor to one of 5 no. proposed soakaways which are situated in the centre and west of the site. This stormwater system will prevent any potential pollution effect on groundwaters.

Residual Impact

Given the proposed treatment of stormwater on the site, adverse effects on ground waters and other downstream receptors are not anticipated and there will be no residual impacts.

5.13.4 Decommissioning Phase

The proposal is considered to be permanent and thus there will be no decommissioning works associated with the proposal. Any demolition or maintenance works on the site would be likely to have similar impacts in terms of disturbance to those associated with the construction phase of the project as detailed in previous sections.

5.13.5 Impacts on Designated Sites

Potential impacts on European Designated Sites (SACs and SPAs) are assessed within a separate Screening for Appropriate Assessment report and Natura Impact Statement (NIS). The NIS states that:

“It can be concluded, on the basis of objective scientific information, that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site”.

The closest Nationally designated site to the proposal is the Galway Bay Complex pNHA, which lies immediately adjacent to the western boundary of the proposed development site and effects on this site are considered as part of the SAC designation in the Appropriate Assessment Screening Report and NIS. The nearest NHA, Cregganna Marsh NHA, is situated 0.26km to the south of the site. This NHA is also

designated as an SPA and considered in the NIS that accompanies this application. The designated site is separated from the proposal by an existing housing estate and agricultural grassland. There is therefore no connectivity between the proposal and the NHA and no potential for impact.

No connectivity between the site of the proposed development and any nationally designated site that was not also designated as an SAC or SPA was identified. Effects on nationally designated sites that are also SACs or SPAs are fully assessed within the NIS.

5.13.6 Cumulative Impacts

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on European Sites, Nationally designated sites and protected species.

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the proposed development. The material was gathered through a search of the following resources:

- Galway County Council online planning register,
- Reviews of relevant Environmental Report/Ecological Impact Assessment MKO, 2018),
- Engineering Reports documents (Tobin, 2018) and
- Flood Risk Assessment (Hydro-Environmental Services, 2018).

The comprehensive review of the Galway County Council planning register documented relevant general development planning applications within the vicinity of the proposed works, since the designation of Inner Galway Bay SPA in 1994 and Galway Bay Complex in 1997. Most of the developments relate to the provision and/or alteration of dwelling units. The developments assessed in the context of the cumulative assessment are provided in Figure 5.8 and Figure 5.9 and in Appendix 5-4.

It is noted that considerable development has taken place in Moneyduff and the surroundings of the site since the designation of Inner Galway Bay SPA and Galway Bay Complex in 1994 and 1997 respectively. The developments in the wider area of the development site comprise the following; 12 relating to large scale residential/commercial developments and 18 relating to small scale dwelling house construction and alterations. The developments are located within lands zoned for development and are consistent with planning policy. None of these developments have encroached into designated land of the Inner Galway Bay SPA or Galway Bay Complex SAC.













The site of the proposed development was considered in the context of all the other surrounding developments to determine if there were any potential for it to result in the loss of a potential commuting corridor for species between sensitive habitats within the Galway Bay Complex to the west and other areas of ecological sensitivity to the east and south. As shown on Figure 5.8, the proposed development is surrounded to the north, east and south by either existing or permitted developments. No potential commuting corridor was identified. In addition, even in the absence of the permitted development that runs along the eastern boundary, no habitat connectivity (watercourse, hedge, tree line) through the site to the lands to the east was identified.

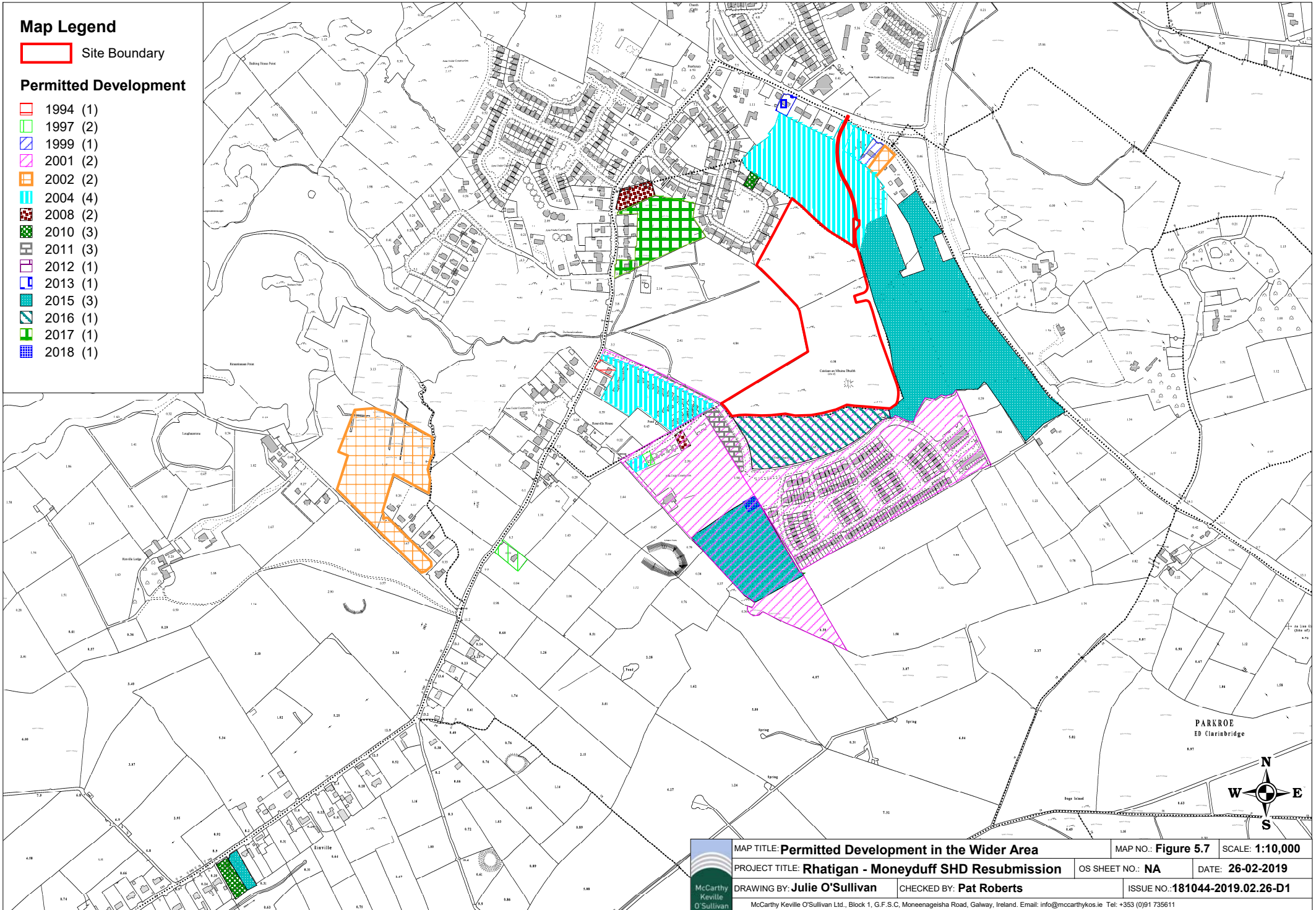
The site of the proposed development does not provide an extension of habitats that are located within the Galway Bay Complex SAC and do not represent any cumulative loss of supporting habitat adjacent to the SAC.


Map Legend

 Site Boundary

Permitted Development

-  1994 (1)
-  1997 (2)
-  1999 (1)
-  2001 (2)
-  2002 (2)
-  2004 (4)
-  2008 (2)
-  2010 (3)
-  2011 (3)
-  2012 (1)
-  2013 (1)
-  2015 (3)
-  2016 (1)
-  2017 (1)
-  2018 (1)








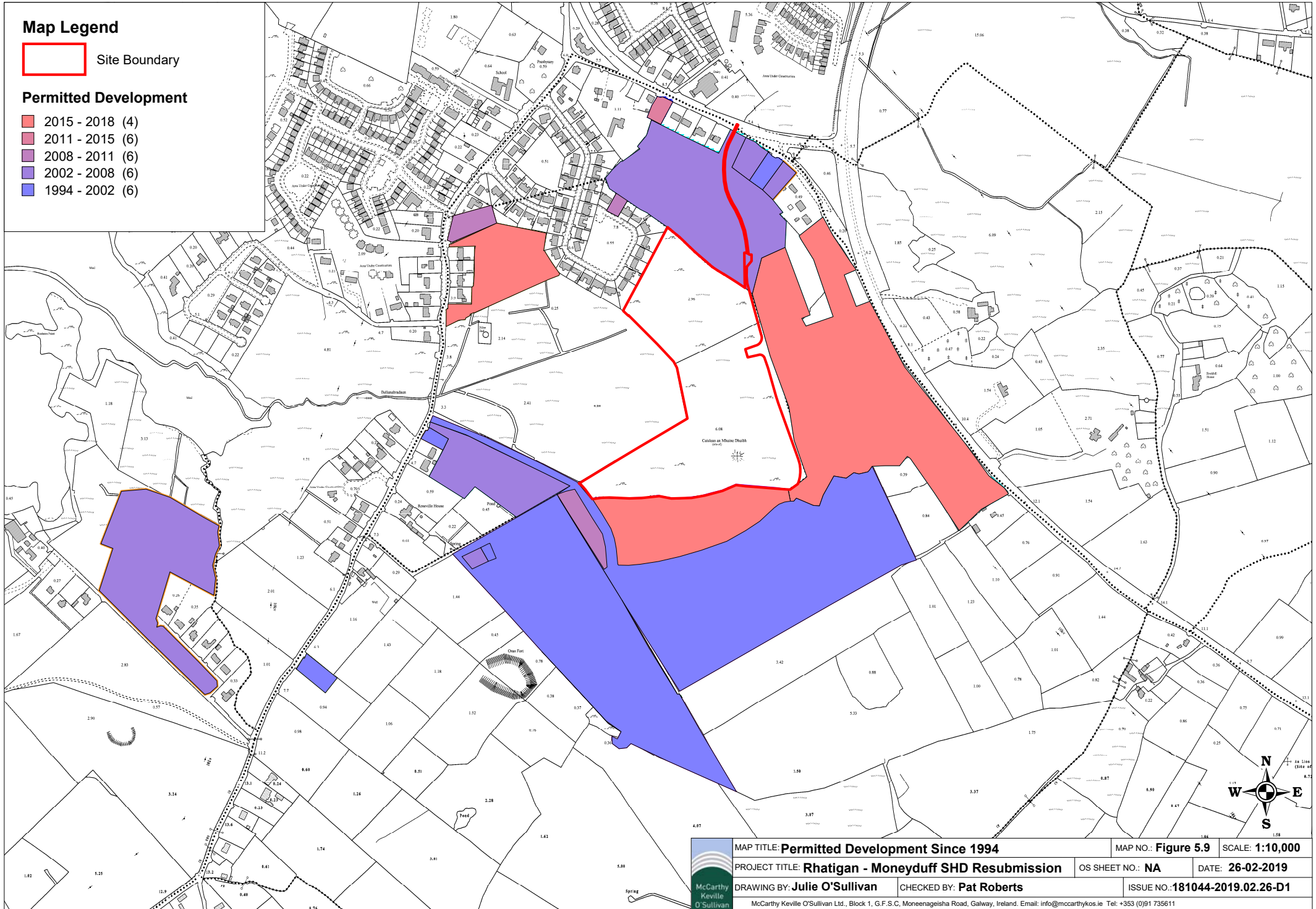
	MAP TITLE: Permitted Development in the Wider Area		MAP NO.: Figure 5.7	SCALE: 1:10,000
	PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission		OS SHEET NO.: NA	DATE: 26-02-2019
	DRAWING BY: Julie O'Sullivan	CHECKED BY: Pat Roberts	ISSUE NO.: 181044-2019.02.26-D1	
	McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611			


Map Legend

 Site Boundary

Permitted Development

-  2015 - 2018 (4)
-  2011 - 2015 (6)
-  2008 - 2011 (6)
-  2002 - 2008 (6)
-  1994 - 2002 (6)



	MAP TITLE: Permitted Development Since 1994	MAP NO.: Figure 5.9	SCALE: 1:10,000
	PROJECT TITLE: Rhatigan - Moneyduff SHD Resubmission	OS SHEET NO.: NA	DATE: 26-02-2019
	DRAWING BY: Julie O'Sullivan	CHECKED BY: Pat Roberts	ISSUE NO.: 181044-2019.02.26-D1
McCarthy Keville O'Sullivan Ltd., Block 1, G.F.S.C. Moneenageisha Road, Galway, Ireland. Email: info@mccarthykos.ie Tel: +353 (0)91 735611			

The proposed development will not contribute to any effect on the hydrological regime in the area or to any water pollution effects.

It will not result in any significant disturbance to any ecologically sensitive receptors. It has been designed and located in full accordance with local and national planning policy which has been the subject of Appropriate Assessment and has considered the ecological impacts of population increase in the Oranmore area.

Following the detailed assessment provided in the preceding sections, it is concluded that, the proposed housing development will not result in any significant residual impacts on sensitive ecological receptors when considered on its own. There is therefore no potential for the proposed development to contribute to any cumulative impacts on ecology when considered in-combination with other plans and projects.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed housing development.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any ecological receptors.

5.14 Conclusion

The proposed development will be situated within habitats dominated by bramble and blackthorn scrub, with some ash, willow, whitebeam and alder trees becoming established across the site. Dry calcareous and neutral grassland (GS1) on thin soils was found to be interspersed throughout the areas of scrub.

A number of fragmented and discontinuous areas of EU Annex I Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco – Brometalia*) habitat were recorded within the site. The proposal will not result in the loss of any 'viable' Annex I semi-natural dry grasslands. The loss of calcareous semi-natural dry grasslands has been mitigated by the creation of an area of semi-natural grassland to the west of the site. This area comprises of 0.7 hectares of semi-natural meadow habitat.

A habitat management plan including both the establishment and maintenance of the grasslands is provided as appendix 5-4 to this EIAR. There is a commitment to the implementation of the measures that are set out in the habitat management plan including both the establishment and maintenance of the grasslands. A commitment is also made to monitor the development of the grasslands on an ongoing basis following construction. These measures are an integral part of the planning permission and as such, confer protection on the habitat where currently none exists.

Habitats that support higher biodiversity value i.e., hedgerows and treelines will be retained where possible and replaced where not possible. The tree line along the western boundary of the site will be retained and enhanced. In addition, the Landscape Master Plan for the site provides for the replacement of the hedge along the eastern boundary along with supplementary planting of native tree and shrub species that will create and enhance hedgerows and treelines.

Taking the above information into consideration and having regard to the precautionary principle, it is considered that the proposed development will not result in a significant loss of habitats and species of high ecological significance and will not have any significant impacts on the ecology of the wider area.

The proposed housing development will not result in any significant residual impacts in terms of disturbance to fauna. Following detailed winter bird surveys of the site and sounding area (including Cregganna Marsh SPA and Inner Galway Bay SPA), the site of the proposed development was shown to not provide suitable supporting habitat for SCI species for which nearby SPAs have been designated. In addition, no SCI species were recorded feeding or roosting within the proposed development site boundary during winter bird surveys undertaken between October and March 2019. No other sensitive fauna (including otter) were recorded on or in the vicinity of the site during any of the surveys undertaken and no impacts thereon are anticipated.

No significant effects on surface water quality, groundwater quality or the hydrological/hydrogeological regime were identified during either construction nor operation.

The potential residual impacts on ecological receptors will not be significant and no potential for the proposed development to contribute to any cumulative impacts on ecology when considered in-combination with other plans and projects was identified.

Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant impacts on ecology are not anticipated.