

6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects that the proposed development may have on Biodiversity, Flora and Fauna during construction and operation (decommissioning is not anticipated). The aim of the Biodiversity assessment undertaken in this chapter is to ensure that elements of the proposed project that may potentially affect biodiversity, protected sites, habitats or species are adequately assessed. This assessment quantifies any potential effects relating to biodiversity, flora or fauna and identifies the design measures or mitigation required to avoid, reduce and mitigate likely significant effects. Where potential for effect was identified at an early stage in the project, alterations to the project layout have been incorporated. Where potential for residual effect remains, mitigation has been derived following a collaborative approach working with a multi-disciplinary team including project engineers, ecologists and hydrologists. Residual impacts on flora and fauna are assessed.

The proposed strategic housing development (SHD) that is the subject of this EIAR consists of 121 no. dwelling houses together with a crèche facility, associated outdoor play areas and car parking; a footpath connectivity link along the L-1321; shared communal and private open space; car and bicycle parking; site landscaping and public lighting; decommissioning of the existing wastewater treatment plant and provision of all services; access from the L-1321 via the Cnoc Fraoigh development and all associated site development works; and a public linear park along the Trusky Stream. The proposed development is located at Trusky East, Bearna, Co. Galway.

This Biodiversity chapter of the EIAR includes a comprehensive description of the baseline ecological environment, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. Thereafter, there is a thorough appraisal of the impacts of the proposed development on Biodiversity. Where likely ecological effects are identified, measures are prescribed to avoid or minimise such effects.

6.1.1 Statement of Authority

A baseline ecological survey was undertaken on the 31st May 2018, the 30th August 2019 and 19th September 2019 by Pat Roberts (BSc, MCIEEM) of MKO. An additional site visit was conducted on the 29th of November 2019 by Pat Roberts and Sara Fissolo (BSc) of MKO, to carry out kick sampling on the Trusky stream and to obtain aerial imagery of the proposed development site using drone footage. An additional ecological walkover of the site was undertaken on the 19th May 2020, this confirmed the results of the surveys that were previously undertaken. Dedicated bat surveys were also undertaken by Pat Roberts on the 31st May 2018 and 30th August 2019 with static detectors deployed for a period of 10 days in September 2019. This report has been prepared by Sara Fissolo. The report has been reviewed by Sarah Mullen (BSc, PhD) and by Pat Roberts (BSc, MCIEEM) who has over 14 years' experience in ecological assessment. The CVs of all ecological surveyors are provided in Appendix 1.

6.1.2 Relevant Guidance

In addition, the guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) (amended 2019).
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013)

- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Draft Revised guidelines on the information to be contained in Environmental Impact Statements (EPA, 2017).
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA 2015)
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment. Department of the Environment, Community and Local Government DoEHLG (2013).
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (Environmental Protection Agency (EPA), 2003).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002).
- European Commission Guidance on the preparation of the Environmental Impact Assessment Report (2017)
- Environmental Protection Agency (EPA) ‘Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (August 2017)

Description of Proposed Development

The full description of the proposed development is provided in Chapter 3 of this EIAR and a short description is provided below. The proposed development will consist of the following:

- 1) Demolition of existing outbuildings
- 2) Construction of 121 no. residential units comprising
 - 52 no. houses (37 no. three-beds, 15 no. four-beds)
 - 4 no. duplex units in Duplex Block D1 (2 no. two-beds (ground floor units) and 2 no. three-beds (2 storey units))
 - 8 no. duplex units in Duplex Block D2 (4 no. two-beds (ground floor units) and 4 no. three-beds (2 storey units))
 - 6 no. duplex units in Duplex Block D3 (3 no. two-beds (ground floor units) and 3 no. three-beds (2 storey units))
 - 14 no. duplex units in Duplex Block D4 (7 no. two-beds (ground floor units) and 7 no. three-beds (2 storey units))
 - 4 no. duplex units in Terrace Block T5 (2 no. two-beds (ground floor units) and 2 no. three-beds (2 storey units))
 - 14 no. Apartments in Apartment Block A1 (5 no. one-beds, 9 no. two-beds)
 - 13 no. Apartments in Apartment Block A2 (4 no. one-beds, 9 no. two-beds and a Multipurpose Room)
 - 2 no. Apartments in Apartment Block A3 (2 no. two-beds)
 - 4 no. Apartments in Apartment Block A4 (4 no. two-beds)
- 3) Development of a crèche facility (224.80 sqm), associated outdoor play areas and parking
- 4) Provision of a footpath connectivity link along the L-1321
- 5) Provision of shared communal and private open space, car and bicycle parking, site landscaping and public lighting, decommissioning of the existing wastewater treatment plant and provision of all services, access from the L-1321 via the Cnoc Fraoigh development and all associated site development works
- 6) Provision of a public linear park along the Trusky Stream.

The proposed site layout (excluding the footpath and services that are proposed in the public road network to the west and assessed as part of this report) is provided in Figure 4-1 in Chapter 4.

A landscaping plan has been prepared for the development and is included as Appendix 4-4 to this EIAR. The landscape plan allows for the planting of woodland, treeline, hedgerow and wildflower meadows consisting of a mix of native and naturalised species, as well as pollinator friendly species. A hedgerow consisting of a mix of native and naturalised species will be planted along the southern and eastern boundaries of the site, separating the development from the Trusky stream.

6.3 Methodology

The following sections describe the methodologies which have been followed to establish the baseline ecological condition of the proposed development site and surrounding area. 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 existing in the absence of proposed activities (CIEEM 2018).

6.3.1 Desk Study

A comprehensive desk study was undertaken to inform this Biodiversity chapter. This study includes a thorough review of available information that is relevant to the ecology of the site of the proposed development. This information provides valuable existing data and also helps in the assessing the requirement for additional ecological surveys.

The following list describes the sources of data consulted:

- Review of documentation from previous planning applications on the site
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA)
- NPWS records (data request)
- Review of the publicly available National Biodiversity Data Centre web-mapper
- Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads which overlap with the study area
- Natura Impact Statement and fisheries assessment undertaken for the N6 Galway City Transport Project (GCTP)
- Review of the Galway County Development Plan 2015-2021 and all associated Environmental Reports.
- Review of Variation 2(a) of the Galway County Development Plan 2015-2021 and all associated Environmental Reports.
- Review of the Natura Impact Statement that was prepared for the N6 Galway City Ring Road (Arup 2018)]
- Review of the Galway Transport Strategy (2016)

6.3.2 Scoping and Consultation

The Development Applications Unit (DAU) of the Department of Culture, Heritage & The Gaeltacht was consulted on the 16th October 2019. A response was received on the 11th December 2019. No observations or recommendations with regard to the ecology of the site were included in the response.

Further scoping in respect of this EIAR was undertaken on the 22nd July 2020 and with particular reference to Biodiversity, the Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht and Inland Fisheries Ireland were contacted at this time. No responses from these organisations to this scoping exercise have been received to date.

In addition, the submission of the Department of Culture, Heritage and the Gaeltacht from the 3rd September 2018, in relation to a previous development on this site was reviewed and has been taken into account in the assessment undertaken. The full submission is provided as appendix 6-2.

The following points were raised:

The proposed development is approximately 950m west of the European site, Galway Bay Complex SAC (site code 00268) and Inner Galway Bay SPA (site code 004031). It is recommended that the Board would consider if the the proposed development would have

indirect or cumulative effects on these European sites, including as a result of increased amenity and recreational pressures near the margins of Galway City; the growing infrastructural needs, including roads and cycleways; and the wastewater from the site which will be treated in and discharge to Galway Bay and to the SAC and SPA.

These issues have been fully addressed in this chapter. The proposed development has been designed in full compliance with the Galway County Development Plan and its amendments (including 2(a), which applies specifically to Bearna). These plans have all been the subject of Appropriate Assessment. This ensures that the infrastructural needs (including recreational and amenity needs) associated with development in the Bearna area have been assessed at the plan level. The currently proposed project provides for on-site recreation, amenity and open space, has been assessed cumulatively with other plans and projects (see section 6.7.2 of this chapter) and is in full compliance with all the relevant plans.

With regard to wastewater, as stated above, a letter from Irish Water confirming the capacity of the network to accept the additional waste generated by the proposed development is included in Appendix 6-3 of this report. The foul loadings for the sewers have been evaluated in accordance with the Irish Water Code of Practice for Wastewater Supply.

The application area (approximately 7.2ha) comprises a network of small fields of grassland, with encroachment by bracken and scrub, and a small area of dry heath. The Trusky Stream, a minor watercourse, passes through the site and a total of seven new bridges are proposed; three for vehicular access and four pedestrian bridges. Almost all areas of natural/semi-natural habitat will be lost or modified as a result of the proposed development. The likely effects of bridge or culvert construction on the watercourse, taking design into account, are not assessed in Ecological Impact Assessment and it is unclear whether areas of 'riparian habitat' can be retained in the final development.

The development now proposed covers an area of 5.38ha and avoids crossing the Trusky Stream at any point. In addition, the design of the project and specific measures are proposed to avoid any significant effect on the Trusky Stream during either construction or operation. Whilst, the proposed development will result in the loss of grassland and scrub habitat on the site, a comprehensive landscape plan has been proposed, which provides for the planting of native and naturalised species along with the promotion of pollinator friendly planting. No dry heath habitat will be lost and the riparian areas will be fully protected and retained.

A bat survey was undertaken on 31/05/18, and established that Soprano and Common Pipistrelle Bats utilise the site. While it appears that there are no bat roosts on the site, all bats are strictly protected (Annex IV of the Habitats Directive) by the European Communities (Birds and Natural Habitats) Regulations, 2011. The Board should consider any potential adverse effects of the proposed development on bats, nesting birds, and any other protected species.

Subsequent bat surveys were undertaken in 2019 and included both walked transect surveys and fixed point detector surveys. Following the completion of dedicated bat surveys in both 2018 and 2019, a comprehensive assessment of the impacts of the proposed development on bat species has been provided in this chapter.

A full list of all scoping correspondence is provided in Chapter 2 of EIAR.

6.3.3 Field Surveys

6.3.3.1 Multi-disciplinary ecological walkover surveys

An initial multidisciplinary walkover survey was conducted on the 29th May 2018 by Pat Roberts (BSc, MCIEEM) of MKO in line with NRA (2009) guidelines (Ecological Surveying Techniques for Protected

Flora and Fauna during the Planning of National Road Schemes). The site was revisited on the 30th August and 19th September 2019 by Pat Roberts. The ecological surveys were undertaken within the optimal time of year to undertake a habitat and flora survey (Smith et. al 2011).

The site was revisited again by Pat Roberts and Sara Fissolo on the 29th of November 2019. During this visit, kick sampling was undertaken in the Trusky stream in order to assess aquatic macroinvertebrate diversity and obtain a Q-value for the stream. During this visit aerial imagery of the site was also obtained using drone footage to complement the multi-disciplinary walkover survey results.

An additional multi-disciplinary survey was undertaken on the 19th May 2020 to verify the results from the previous surveys.

Following the ecological multi-disciplinary surveys undertaken, there is no requirement for further detailed ecological surveys, other than those that are described below. For example, the site of the proposed development does not provide significant habitat for protected bird species such as those that are among the Special Conservation Interests of nearby SPAs and no requirement for dedicated bird surveys was identified.

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). During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

The walkover surveys were designed to detect the presence, or likely presence, of a range of protected habitats and species. Seasonal factors that affect distribution patterns and habits of species were considered when conducting the surveys. A thorough and comprehensive ecological assessment was achieved.

6.3.3.2 Otter Survey

An Otter survey of the Trusky stream was conducted as per NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*) on the 31st May 2018 and was repeated on the 29th November 2019 in order to determine the presence or absence of Otter signs within the areas identified as having potential to support the species. This involved a search for all Otter signs e.g. spraints, scat, prints, slides, trails, couches and holts, along the Trusky stream both upstream and downstream of proposed development site. In addition to the riverbank, a 10m riparian buffer was considered to comprise part of the Otter habitat (NPWS 2009, *Threat Response Plan: Otter (2009-2011)*).

6.3.3.3 Badger Survey

A Badger survey was conducted as per NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*) on the 29th May 2018 in order to determine the presence or absence of Badger signs within the areas identified as having potential to support the species. This involved a search for all Badger signs e.g. latrines, prints, trails and setts within the development site.

6.3.3.4 Bat Survey

A bat walkover survey was conducted within the proposed development site on the 31st of May 2018, by Pat Roberts (BSc) of MKO. During this survey, potential roosting sites were identified. This was followed by a detailed inspection of a building that was identified as having potential to support a population of roosting bats. The aim was to compile information on potential access points and roosting

locations in advance of a dusk emergence survey. This was done by searching for evidence of bats including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises.

The exterior of the building was inspected first from ground level. The search included the ground, accessible windowsills, walls, roof slates and gutters. A systematic search of the interior of the building was also undertaken. Searches were carried out with the aid of torches and a ladder and focused on walls, floors, roof beams and windowsills.

A dusk emergence survey was also undertaken on the evening of the 31st May 2018. The purpose was to observe and record any bats exiting or entering potential roost sites identified during daytime inspections. In addition, any bats using the site for foraging or commuting were noted.

One surveyor, equipped with a Batlogger M bat detector (Elekon AG, Lucerne, Switzerland), was positioned at the building. Particular regard was given to potential access points and roost locations noted during the roost inspections. The emergence survey commenced 30 minutes before sunset and finished one hour after sunset. Conditions were highly suitable for bat survey; dry, but overcast with a light breeze (2 metres per second). The temperature at the beginning of the survey was 21 °C and dropped to 18 °C by the end of the survey.

A second bat survey was conducted on the 30th August 2019 employing a similar methodology to the survey undertaken in May 2018. Weather conditions were dry and warm with little breeze during the entire survey.

Mature trees and the derelict buildings to be demolished within the development site were visually assessed for their suitability to support bats. Suitability was assessed according to Collins (2016) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories are divided into *High*, *Moderate*, *Low* and *Negligible*. The survey of the buildings on site comprised a detailed inspection of the exterior and where possible, the interior to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes and fur oil staining and noises (Collins, 2016). The walkover survey was followed by a dusk emergence survey at the buildings to be demolished, and a dusk bat activity survey of the development site, which were designed to assess the presence of foraging and commuting bats within the study area.

Two static bat detectors (Song Meter SM4BAT Ultrasonic Recorder, Wildlife Acoustics) were also deployed to the north and south of the proposed development for a period of 10 days in September 2019.

6.3.3.5 Freshwater Macro-Invertebrate Survey

A freshwater macroinvertebrate survey was conducted to assess the water quality of the Trusky stream. Sampling was carried out at two sites along the Trusky stream on the 29th of November 2019. The method used was the same as that used by the EPA for their national water sampling regime (Toner *et al.* 2003) and is described below. The survey sites were selected to be upstream and downstream of an existing wastewater treatment discharge point, which serves the surrounding housing estates, to investigate whether any differences in macroinvertebrate communities occur.

A three-minute kick sample was collected from a stream bed area of approximately one square metre with a standard handnet (250 mm x 250 mm, with a 300 mm bag depth and a 1 mm mesh size). One minute was spent prior to the kick sampling to hand search large objects such as rocks and tree branches. The kick sampling time was then divided proportionally among the habitats present in the area, such as fast-moving riffles, shallow water, and silted banks. Samples were sorted on site to assign a Q-value to the sampling site.

Specimens were identified using the FBA Guide to Freshwater Invertebrates (Dobson *et al.*, 2012).

6.3.3.6 Aerial Survey

A drone survey was conducted on the 29th of November 2019 to complement the findings of the multidisciplinary walkover surveys. The drone used for the survey is a Phantom 4 Pro V2.0 (DJI, IAA Reg: IE125023).

The drone survey was undertaken in accordance with the provisions of S.I. No. 563 of 2015) as well as Aeronautical Notice AN U 01 (Drone Registration). A third-party software, DroneDeploy, was used for the duration of the flight, which involves automated flight over the study area to ensure that the correct amount of photographs can be taken to allow stitching of an orthomosaic map. The flight was undertaken in an uncontrolled airspace (Class G) and therefore did not require a Specific Operating Permission, as the flight was in compliance with S.I. No. 563 of 2015. NOTAMs and weather conditions were checked prior to flying. Windspeeds were suitable for flying (i.e. less than 20 knots), no precipitation occurred and there were no notices to airmen or temporary restricted areas (TRAs) within the survey area.

6.3.4 Methodology for Assessment of Potential Impacts

This section of the EIAR sets out the methods by which the assessment of the potential effects of the proposed development on Biological Diversity 'Biodiversity' were undertaken.

Biological Diversity is defined as follows in Article 2 of the Convention on Biological Diversity:

'Biological diversity' means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.'

The assessment of impacts on Biodiversity was guided by the principles that are set out in the European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EC 2013).

In accordance with the above guidelines, the assessment of biodiversity was considered at an early stage in the design process and a site-specific identification of key ecological receptors and assessment of potential ecological constraints was undertaken.

Following on from this, the entire project team including, engineers, architects, hydrologists, landscape architects and the client were consulted and the protection of biodiversity was considered as a key element in the design process from the outset.

As the design progressed, the potential effects on biodiversity continued to be assessed, taking into account not only the effects that the design may have on the biodiversity of the area in and of itself, but also any potential for cumulative effects when all the aspects and EIA issues associated with the proposed development are considered cumulatively. The assessment also took account of any potential significant effects that may occur in combination with other plan and projects.

The precautionary principle has been employed throughout the assessment process, with a long-term view taken on potential effects, and a worst-case scenario considered where appropriate. The proposed development has been designed to maximise biodiversity and environmental protection, through appropriate design, particularly in the landscaping of the open spaces and in the engineering design of the treatment of surface and foul waters.

The proposed development has been specifically and carefully designed to ensure that there will be no significant effects on Key Ecological Receptors, no net loss of ecologically sensitive habitats and no potential for significant cumulative effects on biodiversity. This has been achieved through the

implementation of an ongoing, collaborative process involving the entire design team from the very start of the design to the final proposed scheme.

The following sections detail the methodologies followed in order to quantify and assess any potential effects on biodiversity.

6.3.4.1 Determining Importance of Ecological Receptors

As per Section 4.7 of the 'Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018), the importance of the identified ecological receptors is considered and assessed within a defined geographical context.

This was undertaken following a methodology and framework that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). 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 guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

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

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either 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. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of Local Importance (Higher Value), County, National or International importance following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

6.3.4.2 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland (2018). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development result in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** 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** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

6.3.4.3 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of ecological assessment, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed
- There will be an effect on the nature, extent, structure and function of important ecological features
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 6.1 below.

Table 6.1 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

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.

Effect Magnitude	Definition
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:

1. 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)
2. A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2019)

Integrity

In the context of ecological assessment, '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 (2019) 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).

6.4 Desk Study

6.4.1 Designated Sites

The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Biodiversity Chapter.

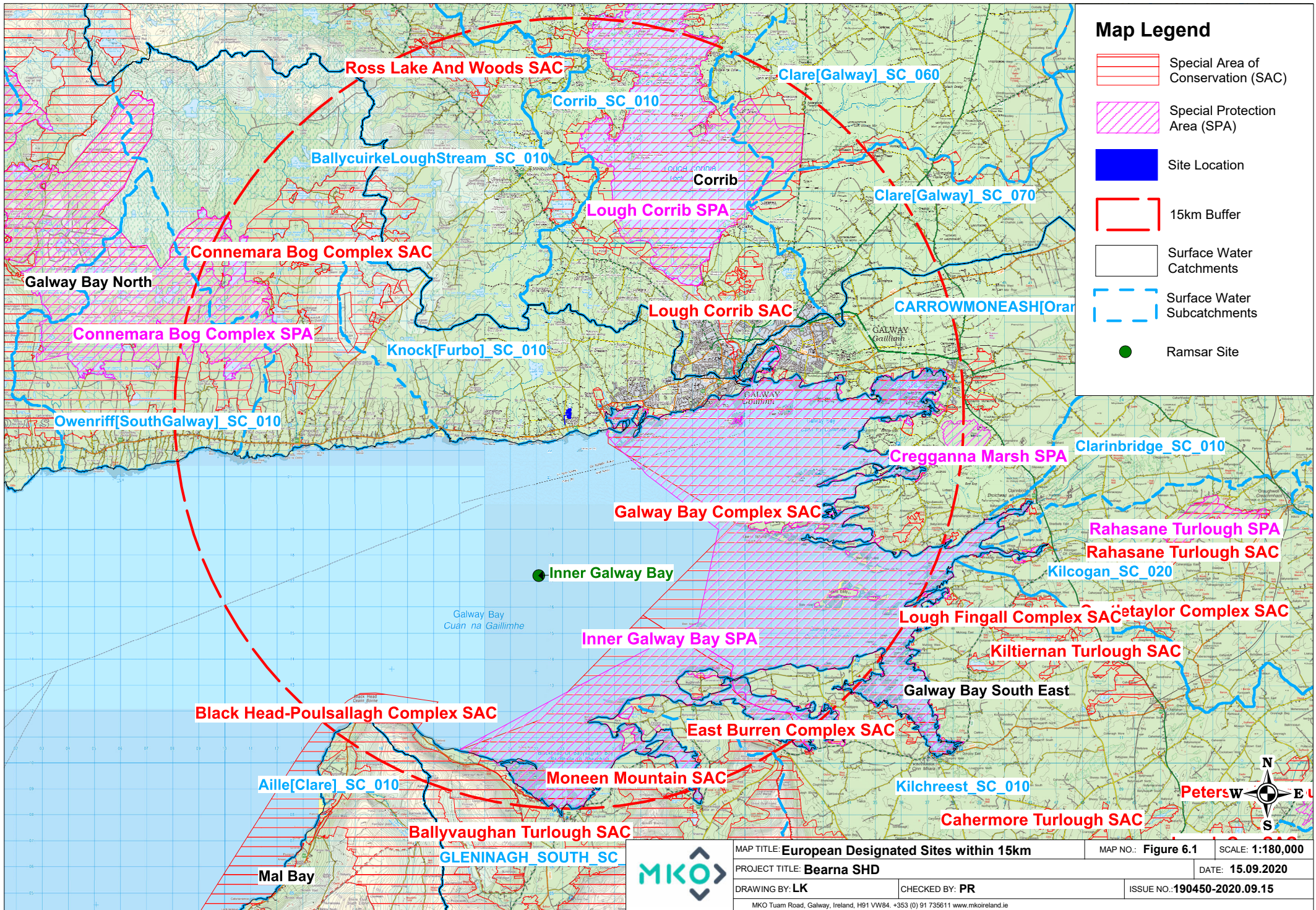
Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under EU Habitats Directive and, together with candidate SACs and proposed SPAs, are collectively designated as 'European Sites' under Irish legislation. The full assessment of these sites is provided in the AA Screening Document and Natura Impact Statement that accompany this application and summarized in this chapter.

In addition, Natural Heritage Areas (NHAs) are designated under the Wildlife Acts and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this EIAR.

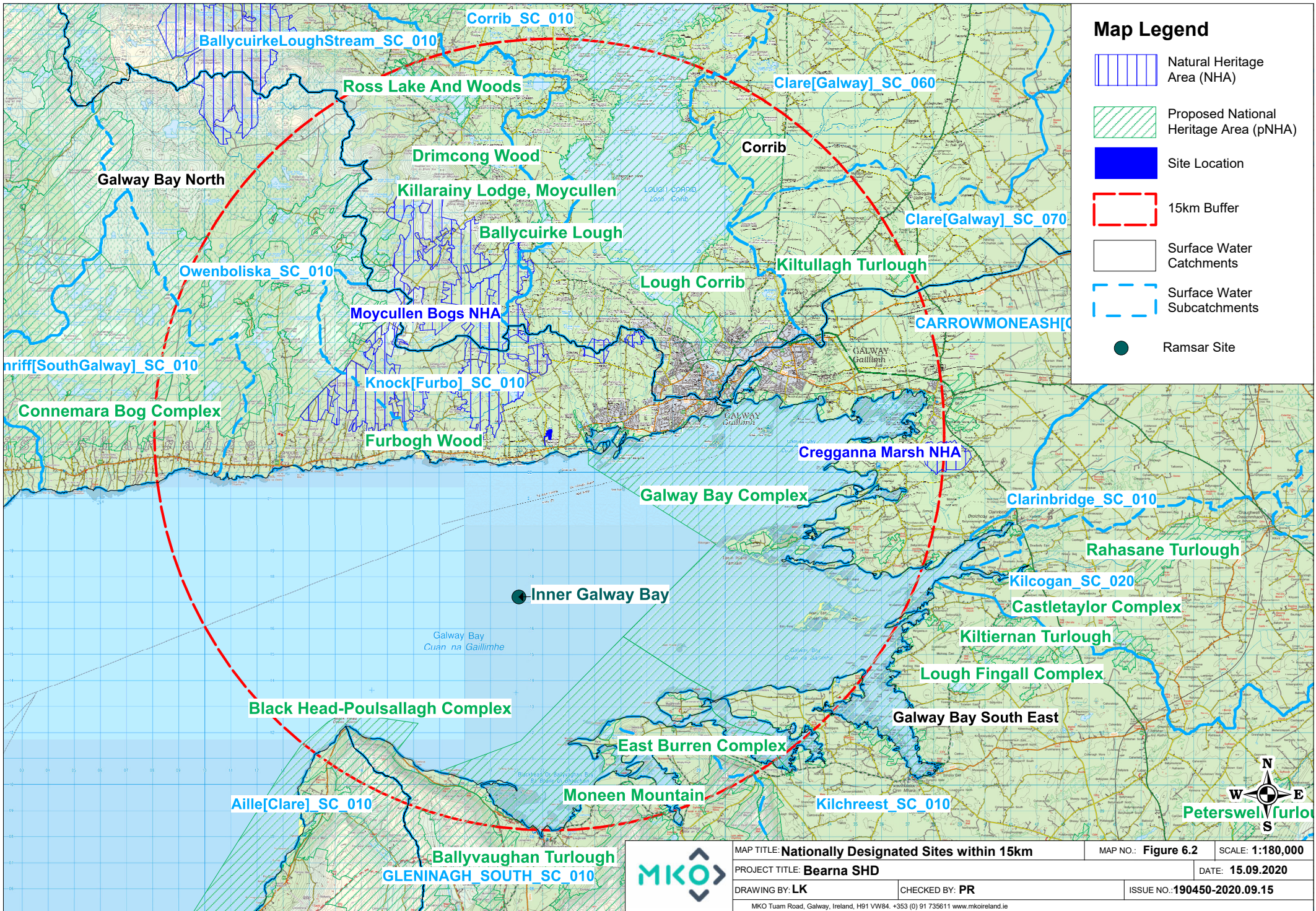
Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. In any event, the potential for effects on these designated sites is fully considered in this EIAR.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the proposed development:

1. Initially the most up to date GIS spatial datasets for designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on 9th October 2020. The datasets were utilized to identify designated sites which could potentially be affected by the proposed development.
2. All European Sites within a distance of 15km surrounding the development site were identified and are shown on Figure 6.1. All Nationally Designated Sites within a distance of 15km surrounding the development site are shown on Figure 6.2.
3. There is no potential connectivity between the proposed development site and any terrestrially-based designated site located at a distance of greater than 15km. No potential habitat connectivity, hydrological connectivity or any other connection that could result in likely significant effects on these sites was identified.
4. In addition, for the reasons set out in detail below, whilst the potential for significant effects on marine-based designated sites within Galway Bay located over 15km from the site of the proposed development was considered, likely significant effects may be excluded on the basis of the assimilative capacity of Galway Bay.
5. The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any European Sites. The hydrological catchments are also shown in Figures 6.1. & 6.2.
6. In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, 'Assessing Connectivity with Special Protection Areas (SPA)' (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
7. The results of the assessment of European Sites is included in table 3.1 of the AA Screening document and summarised below.



MAP TITLE: European Designated Sites within 15km		MAP NO.: Figure 6.1	SCALE: 1:180,000
PROJECT TITLE: Bearna SHD			DATE: 15.09.2020
DRAWING BY: LK	CHECKED BY: PR		ISSUE NO.: 190450-2020.09.15
MKO Tuam Road, Galway, Ireland, H91 VW84. +353 (0) 91 735611 www.mkoireland.ie			



8. Table 6.2, provides details of all relevant Nationally Designated Sites as identified in the preceding steps, and determines, which are within the likely Zone of Impact. The assessment considers any potential for any direct or indirect impacts of the proposed development, both alone and in combination with other plans and projects, on Nationally Designated Sites by virtue of the following criteria: size and scale, land-take, distance from the Nationally Designated Sites or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this screening assessment
9. The site synopses and conservation objectives (where available) of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of finalising this report in October 2020.
10. Figure 6 in the Galway Bay Assimilative Capacity Assessment Report is submitted as Appendix 6-4 to this EIAR shows the location of the proposed development in relation to all other European Sites within Galway Bay along with the mapped pollutant distribution from the assimilative capacity study.
11. Where potential for any pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and is further considered as part of the Stage One screening assessment.

6.4.1.1 Galway Bay Assimilative Capacity Assessment

In order to support the assessments carried out in the Environmental Impact Assessment Report, MSN_HYDRO was commissioned to undertake an Assimilative Capacity Study of Galway Bay. The purpose of this study was to assess the capacity of Galway Bay to assimilate a potential pollutant discharge from the proposed development to the Trusky Stream which drains the proposed SHD lands. The Galway Bay Assimilative Capacity Assessment Report is submitted as Appendix 6-4 to this EIAR.

As set out in the Assimilative Capacity Assessment Report, a hydrodynamic module was used to calculate water circulation patterns (currents) throughout Galway Bay, based on tidal dynamics and River Corrib flows. Using these currents, the pollutant transport module calculated the transport of pollutants around the Bay based on a scenario where pollutant loads from an extreme event are introduced into Galway Bay from the proposed development site, via the Trusky Stream. The Galway Bay model is highly resolved both spatially and temporally. The model resolves all parameters on a 100m x 100m grid throughout the bay at every 40 seconds. The model contains 176 grid points north-south and 290 grid points east-west, giving a total of 51,040 computational cells in the model. Adopting a precautionary approach, a pollutant discharge scenario was devised for the highly unlikely event of a diesel spill into the Trusky Stream. In this scenario, a potential pollution event was modelled, in the absence of any mitigation measures, involving 300l of diesel, containing 250mg/l of active pollutant, being accidentally spilled and entering the stream during an extreme flood event. The peak of a large flow event will bring the pollutant load to Galway Bay in the shortest time and hence in a highly concentrated mass; this is a conservative approach to specifying the pollutant load.

In order to ensure a robust appraisal of the assimilative capacity of Galway Bay, it was conservatively assumed that the pollutant is not diluted along the stream as it travels from the site to the confluence with Galway Bay. Moreover, conservative pollutant and hydraulic loads were specified to the model and the model was run for 2 full 14-day spring-neap tidal cycles. The results are then analysed and assimilative capacity was assessed.

Time series were included at 10 analysis points in Galway Bay; including the nearest points of three European sites to the discharge location of the Trusky Stream into Galway Bay and other locations in relation to other European sites that are located further west in Galway Bay.

As appears from the conclusions of the Assimilative Capacity Study Report, the study focused on analysing concentrations and dilution factors at 10 points, including:

1. Inner Galway Bay SPA (E124675 N 222655)
2. Galway Bay Complex cSAC (E124755 N222784)
3. Black Head-Poulsallagh Complex cSAC

Other points analysed included the discharge location of the Trusky Stream into Galway Bay (at Bearna Pier) and points plotted to demonstrate where the concentration and dilution of the pollutant are reduced to trace levels to the west of the entry point into Galway Bay. Figure 6 in the Report demonstrated the extent of the spill in the context of the European sites that are located further west in Galway Bay.

The synoptic maps of concentration contours throughout Galway Bay referenced in the Report show:

- The pollutant plume tends to spread out along the northern side of Galway Bay and is not transported widely throughout the domain
- Either no pollutant or very low levels of pollutant are observed in large parts of Galway Bay
- Concentrations reduce rapidly with distance from the discharge location
- Concentrations reduce rapidly with time.

The main conclusions from this analysis are:

- (i) the highest concentration calculated is at the outfall site (at Bearna Pier). At this point the peak concentration is $5\mu\text{g/l}$ once the diesel has mixed within the grid cell where it enters Galway Bay. This is a low value, and after this peak the concentrations fall off rapidly. The dilution factor just after the time of peak concentration is around 2000; dilution rapidly increases to around 17,000 over time.
- (ii) at the nearest point of Inner Galway Bay SPA, peak concentration was approximately $0.0016\mu\text{g/l}$, with dilution factors soon after of 15,000. The dilution factors vary with tidal volume and transport of the pollutant plume.
- (iii) at the nearest point of Galway Bay Complex cSAC, results are very similar to results at the nearest point of Inner Galway Bay SPA, with peak concentration of approximately $0.0016\mu\text{g/l}$, with dilution factors soon after of 15,000. The dilution factors vary with tidal volume and transport of the pollutant plume.
- (iv) the model results confirmed that the pollutant does not get transported to the location of Black Head-Poulsallagh Complex cSAC;
- (v) all other points show concentrations less than at Bearna Pier, and the nearest points of the nearest point of Inner Galway Bay SPA and Galway Bay Complex cSAC; and
- (vi) based on the above analysis, in the absence of any mitigation, Galway Bay has adequate capacity to assimilate the modelled extreme pollution event.

Accordingly, any potential for significant effects on marine-based European and Nationally Designated Sites located over 15km from the site of the proposed development within Galway Bay may be excluded on the basis of the conclusions of the Assimilative Capacity Modelling Study, which is included as Appendix 6-4. The Report has clearly demonstrated that the assimilative capacity of Galway Bay is such that there is no potential for any pollution event associated with the proposed development to result in significant effects on any marine-based European or Nationally Designated Site located at a distance of greater than 15km from the proposed development

6.4.1.2 Determination of the Designated Sites that are within the Likely Zone of Impact

Having excluded the potential for the proposed development to result in significant effects on any European Sites at a distance of greater than 15km from the site of the proposed development, the potential for significant effects on European Sites within 15km of the proposed development was considered in the AA Screening Report that accompanies this application. The results of that assessment are summarised below:

Adopting a precautionary approach, in the absence of any mitigation measures, best practice/construction measures or any other measures which have no relation to avoiding impacts on European sites, a potential pathway for indirect effect in the form of surface water pollution was identified in relation to the following aquatic QIs associated with Galway Bay Complex cSAC and Inner Galway Bay SPA:

Galway Bay Complex cSAC

- > [1140] Mudflats and sandflats not covered by seawater at low tide
- > [1150] Coastal lagoons*
- > [1160] Large shallow inlets and bays
- > [1170] Reefs
- > [1310] *Salicornia* and other annuals colonising mud and sand
- > [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritima*)
- > [1410] Mediterranean salt meadows (*Juncetalia maritimi*)
- > [1355] Otter (*Lutra lutra*)
- > [1365] Harbour seal (*Phoca vitulina*)

Inner Galway Bay SPA

- > [A999] Wetlands and Waterbirds

Following an extremely precautionary approach, these sites were considered to require further assessment regarding potential for significant impacts thereon was undertaken within the NIS that accompanies this application.

Table 6.2 below, identifies all nationally designated sites within 15km of the site of the proposed development, describes their individual features of interest where they are available and provides a determination as to whether they are in the Likely Zone of Impact of the proposed development.

Table 6.2 Identification of Nationally Designated sites within the Likely Zone of Impact

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
Natural Heritage Area (NHA)		
Moycullen Bogs NHA [002364] Distance: 1.6km	> Peatlands [4]	There will be no direct effects as the proposed development is located entirely outside, and 1.6 km from the designated site. There is no connectivity exists between the proposed development and the designated site, which is located over 1.5km away with no identifiable habitat, surface or groundwater connection. No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Cregganna Marsh NHA [000253] Distance: 14.1km	> Birds [12]	There will be no direct effects as the proposed development is located entirely outside, and over 14km from, the designated site. No connectivity exists between the proposed development and the designated site, which is separated from the proposed development by Galway Bay with no identifiable habitat, surface or groundwater connection. No pathway for effect was identified and the site is not within the Likely Zone of Impact.
Proposed Natural Heritage Area (pNHA)		
Galway Bay Complex	> N/A	There will be no direct effects as the project footprint is located entirely outside, and 0.9km from, the designated site.

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
Distance: 0.9km		<p>The Trusky Stream is located within the site boundary and the development involves the discharge of surface water to the stream. This also involves the installation of two precast headwalls within the banks of the stream at the location of the two surface water outfalls from the proposed development. The stream discharges to Galway Bay approximately 1.5km to the west of the pNHA. Therefore, taking a precautionary approach, a potential pathway for indirect effects the pNHA has been identified in the form of deterioration of surface water quality resulting from pollution associated with the construction and operational phases of the development.</p> <p>A potential for effect has been identified through surface water pollution.</p>
Furbogh Wood Distance: 4.2km	> N/A	<p>There will be no direct effects as the development footprint is located entirely outside, and 4.2km from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 4km away with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
Lough Corrib Distance: 6.2km	> N/A	<p>There will be no direct effects as the project footprint is located entirely outside, and 6.2km from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 6.2km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
Ballycurke Lough Distance: 7.1km	> N/A	<p>There will be no direct effects as the project footprint is located entirely outside, and 7.1 km from, the designated site. No connectivity exists between the proposed development and the</p>

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
		<p>designated site, which is located over 7km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Connemara Bog Complex</p> <p>Distance: 7.4km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 7.4km from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 7km away and with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Killarainy Lodge, Moycullen</p> <p>Distance: 9.1km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 9.1km from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 9km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Drimcong Wood</p> <p>Distance: 10.0km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 10km from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 10km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Black Head-Poulsallagh Complex</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 11km from, the designated site.</p>

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
<p>Distance: 11.7km</p>		<p>The Trusky Stream is located within the proposed development site boundary. The stream discharges to Galway Bay approximately 11km to the north east of the designated site and the potential for significant effects on these has been excluded following a review of the Assimilative Capacity Modelling Study that is provided as Appendix 6-4. This report shows that no pollutants emanating from the proposed development site are capable of reaching the vicinity of this pNHA. There is no potential for significant effects on this site and any such effects can be excluded.</p> <p>No pathway for significant effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Ross Lake and Woods</p> <p>Distance: 12.1km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 12.1km away from, the designated site. No connectivity exists between the proposed development and the designated site, which is located over 12km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>East Burren Complex</p> <p>Distance: 13.1km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 13.1km from the designated site. No surface or groundwater connectivity exists between the proposed development and this terrestrial designated site, which is located over 13km away on the opposite side of Galway Bay.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
<p>Moneen Mountain</p> <p>Distance: 13.3km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 13.3km from the designated site. No surface or groundwater connectivity exists between the proposed development and this terrestrial designated site, which is located over 13km away on the opposite side of Galway Bay.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Kiltullagh Turlough</p> <p>Distance: 14.2km</p>	<p>➤ N/A</p>	<p>There will be no direct effects as the project footprint is located entirely outside, and 14.2km from the designated site. No connectivity exists between the proposed development and the designated site, which is located over 14km away, in a separate hydrological catchment with no identifiable habitat, surface or groundwater connection.</p> <p>No pathway for effect was identified and the site is not within the Likely Zone of Impact.</p>
<p>Ramsar Site</p>		
<p>Inner Galway Bay</p> <p>Site number: 838</p>	<p>The shallow sheltered part of a large sea bay with numerous intertidal inlets and small low islands composed of glacial deposits. The area provides important habitat for marine life along Ireland's west coast. The site supports the richest seaweed flora on the Irish Coast (500+ species) and 65% of the Irish marine algal flora occur in the area. The site supports internationally and nationally important numbers of numerous species of waterbirds. There is a large</p>	<p>The Trusky Stream is located within the site boundary and the development involves the discharge of surface water to the stream. The stream discharges to Galway Bay approximately 1.5km to the west of Inner Galway Bay. Therefore, taking a precautionary approach, a potential pathway for indirect effects the Ramsar Site has been identified in the form of deterioration of surface water quality resulting from pollution associated with the construction and operational phases of the development.</p> <p>A potential for effect has been identified through surface water pollution. Further assessment is required.</p>

Designated Sites and distance from proposed development	Features of Interest	Likely Zone of Impact Determination
	cormorant colony on Teer Island. Human activities include aquaculture.	

6.4.2 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al., 2002) to investigate whether any rare or unusual plant species listed as Annex II of the Habitats Directive which are listed as rare on the Red Data List (Curtis and McGough 1988) or protected under the Flora (Protection) Order, 2015 had been recorded in the relevant 10km squares in which the study site is situated (M22), during the 1987-1999 atlas survey.

Table 6.3 Records of species listed under the Flora Protection Order 2015 or the Irish Red Data Book for Vascular Plants [NPWS Records

Common Name	Scientific Name	Status
Autumn gentian	<i>Gentianella amarella</i>	RL (Near Threatened)
Brackish water-crowfoot	<i>Ranunculus baudotii</i>	RL (Near Threatened)
Common gromwell	<i>Lithospermum officinale</i>	RL (Near Threatened)
Corn marigold	<i>Chrysanthemum segetum</i>	RL (Near Threatened)
Dense-flowered orchid	<i>Neotinea maculata</i>	RL (Near Threatened)
Field gentian	<i>Gentianella campestris</i>	RL (Near Threatened)
Frog orchid	<i>Coeloglossum viride</i>	RL (Near Threatened)
Greater knapweed	<i>Centaurea scabiosa</i>	RL (Near Threatened)
Green field-speedwell	<i>Veronica agrestis</i>	RL (Near Threatened)
Henbane	<i>Hyoscyamus niger</i>	RL (Near Threatened)
Hoary rockrose	<i>Helianthemum oelandicum</i>	RL (Near Threatened)
Least bur-reed	<i>Sparganium natans</i>	RL (Near Threatened)
Pipewort	<i>Eriocaulon aquaticum</i>	RL (Near Threatened)
Sea kale	<i>Crambe maritima</i>	RL (Near Threatened)
Slender cottongrass	<i>Eriophorum gracile</i>	RL (Near Threatened), FPO
Small white orchid	<i>Pseudorchis albida</i>	RL (Vulnerable), FPO
Spiked sedge	<i>Carex spicata</i>	RL (Near Threatened)
Spring gentian	<i>Gentiana verna</i>	RL (Near Threatened)

Tubular Water Dropwort	<i>Oenanthe fistulosa</i>	RL (Near Threatened)
Water Awlwort	<i>Subularia aquatica</i>	RL (Vulnerable)
Yellow Hornpoppy	<i>Glaucium flavum</i>	RL (Near Threatened)

NPWS online records were searched on 08/10/2020 for records of any rare or protected species of flora or fauna within in the 10-kilometre grid square, M22, in which the study area lies. A data request was also sent to the NPWS and data received in relation to the grid square on the 16/10/2019. Table 6.4 lists the rare and protected species records obtained from the NPWS during this study.

Table 6.4 Records for rare and protected species, NPWS.

Common Name	Scientific Name	Status
Barn owl	<i>Tyto alba</i>	Annex I
Common frog	<i>Rana temporaria</i>	Annex V, WA 1976-2017
Common porpoise	<i>Phocoena phocoena</i>	Annex II, Annex IV, WA 1976-2017
Common seal	<i>Phoca vitulina</i>	Annex II, Annex IV, WA 1976-2017
Irish hare	<i>Lepus timidus subsp. hibernicus</i>	Annex V, WA 1976-2017
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	Annex II, Annex IV, WA 1976-2017
Otter	<i>Lutra lutra</i>	Annex II, Annex IV, WA 1976-2017
Sea lamprey	<i>Petromyzon marinus</i>	Annex II

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2018), Red Data List (Curtis and McGough 1988), BoCCI Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets), AEWA -Agreement on the Conservation of African-Eurasian Migratory Waterbirds [1999].

6.4.3 Biodiversity Ireland Database

The National Biodiversity Data centre database was accessed on 08/10/2020 and the following information was obtained.

Table 6.5 lists the protected faunal species (excluding birds) recorded within the hectad which pertains to the current study area. The database was also searched for records of Third Schedule non-native invasive species within the hectad. Table 6.6 lists the non-native invasive species recorded within the hectad. Table 6.7 lists all the protected bird species recorded within the hectad which pertains to the current study area.

Table 6.5 NBDC records for protected fauna records (excl. birds).

Common Name	Scientific Name	Status	Hectad
Badger	<i>Meles meles</i>	WA 1976/2017	M22

Common Name	Scientific Name	Status	Hectad
Bottle-nosed dolphin	<i>Tursiops truncatus</i>	Annex II & IV and WA 1976/2017	M22
Brown long-eared bat	<i>Plecotus auritus</i>	Annex IV and WA 1976/2017	M22
Common dolphin	<i>Delphinus delphis</i>	Annex IV and WA 1976/2017	M22
Common frog	<i>Rana temporaria</i>	Annex V and WA 1976/2017	M22
Common lizard	<i>Zootoca vivipara</i>	WA 1976/2017	M22
Common porpoise	<i>Phocoena phocoena</i>	Annex II & IV and WA 1976/2017	M22
Common seal	<i>Phoca vitulina</i>	Annex II & V and WA 1976/2017	M22
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Annex IV and WA 1976/2017	M22
Daubenton's bat	<i>Myotis daubentonii</i>	Annex IV and WA 1976/2017	M22
Grey seal	<i>Halichoerus grypus</i>	Annex II & V and WA	M22
Leatherback turtle	<i>Dermochelys coriacea</i>	Annex IV and WA 1976/2017	M22
Leisler's bat	<i>Nyctalus leisleri</i>	Annex IV and WA 1976/2017	M22
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	Annex II and WA 1976/2017	M22
Long-finned pilot whale	<i>Globicephala melas</i>	Annex IV and WA 1976/2017	M22
Marsh fritillary	<i>Euphydryas aurinia</i>	Annex II	M22
Minke whale *(1998)	<i>Balaenoptera acutorostrata</i>	Annex IV and WA 1976/2017	M22
Natterer's bat	<i>Myotis nattereri</i>	Annex IV and WA 1976/2017	M22
Otter	<i>Lutra lutra</i>	Annex II & IV and WA 1976/2017	M22
Pine marten	<i>Martes martes</i>	Annex V and WA 1976/2000	M22
Pipistrelle spp.	<i>Pipistrellus spp</i>	Annex IV and WA 1976/2017	M22
Pygmy shrew	<i>Sorex minutus</i>	WA 1976/2017	M22
Pygmy sperm whale *(1984)	<i>Kogia breviceps</i>	Annex IV and WA 1976/2017	M22
Red squirrel	<i>Sciurus vulgaris</i>	WA 1976/2017	M22
Sea lamprey *(2001)	<i>Petromyzon marinus</i>	Annex II	M22
Smooth newt	<i>Lissotriton vulgaris</i>	WA 1976/2017	M22

Common Name	Scientific Name	Status	Hectad
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Annex IV and WA 1976/2017	M22
West European hedgehog	<i>Erinaceus europaeus</i>	WA 1976/2017	M22

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017). *(year of last record) if more than 15 years ago.

Table 6.6 NBDC records for Invasive species.

Common Name	Scientific Name	Hectad
American mink	<i>Mustela vison</i>	M22
Brown rat	<i>Rattus norvegicus</i>	M22
Canadian waterweed	<i>Elodea canadensis</i>	M22
Giant knotweed	<i>Fallopia sachalinensis</i>	M22
Giant rhubarb	<i>Gunnera tinctoria</i>	M22
Himalayan knotweed	<i>Persicaria wallichii</i>	M22
Japanese knotweed	<i>Fallopia japonica</i>	M22
Rhododendron	<i>Rhododendron ponticum</i>	M22
Roach	<i>Rutilus rutilus</i>	M22
Ruddy duck	<i>Oxyura jamaicensis</i>	M22
Spanish bluebell	<i>Hyacinthoides hispanica</i>	M22
Three-cornered garlic	<i>Allium triquetrum</i>	M22
Wireweed	<i>Sargassum muticum</i>	M22

Table 6.7 NBDC Records for Birds of Conservation Concern.

Common Name	Scientific Name	Status	Hectad
Arctic tern	<i>Sterna paradisaea</i>	Annex I (Breeding)	M22
Barn owl	<i>Tyto alba</i>	Red List (Breeding)	M22
Bar-tailed godwit	<i>Limosa lapponica</i>	Annex I (Wintering)	M22
Black-headed gull	<i>Larus ridibundus</i>	Red List (Breeding)	M22
Black-throated diver	<i>Gavia arctica</i>	Annex I (Wintering)	M22
Common redshank	<i>Tringa totanus</i>	Red List (Breeding and Wintering)	M22

Common Name	Scientific Name	Status	Hectad
Common scoter	<i>Melanitta nigra</i>	Red List (Breeding)	M22
Common tern	<i>Terna hirundo</i>	Annex I (Breeding)	M22
Corn crake	<i>Crex crex</i>	Annex I, Red List (Breeding)	M22
Dunlin	<i>Calidris alpina schinzii</i>	Annex I (Breeding and Wintering)	M22
Eurasian curlew	<i>Numenius arquata</i>	Red List (Breeding and Wintering)	M22
Golden plover	<i>Pluvialis apricaria</i>	Red List (Breeding and Wintering)	M22
Great northern diver	<i>Gavia immer</i>	Annex I (Wintering)	M22
Greater white-fronted goose	<i>Anser albifrons</i>	Annex I (Wintering)	M22
Grey partridge	<i>Perdix perdix</i>	Red List (Breeding)	M22
Hen harrier	<i>Circus cyaneus</i>	Annex I (Breeding)	M22
Herring gull	<i>Larus argentatus</i>	Red List (Breeding)	M22
Kingfisher	<i>Alcedo atthis</i>	Annex I (Breeding)	M22
Little egret	<i>Egretta garzetta</i>	Annex I	M22
Little gull	<i>Larus minutus</i>	Annex I (Passage)	M22
Little tern	<i>Sternula albifrons</i>	Annex I (Breeding)	M22
Mediterranean gull	<i>Larus melanocephalus</i>	Annex I (Breeding)	M22
Merlin	<i>Falco columbarius</i>	Annex I (Breeding)	M22
Northern lapwing	<i>Vanellus vanellus</i>	Red List (Breeding and Wintering)	M22
Northern pintail	<i>Anas acuta</i>	Red List	M22
Northern shoveler	<i>Anas clypeata</i>	Red List (Wintering)	M22
Peregrine falcon	<i>Falco peregrinus</i>	Annex I	M22
Red grouse	<i>Lagopus lagopus</i>	Red List (Breeding)	M22
Red knot	<i>Calidris canutus</i>	Red List	M22
Red-throated diver	<i>Gavia stellata</i>	Annex I (Breeding)	M22
Sandwich tern	<i>Sterna sandvicensis</i>	Annex I (Breeding)	M22
Snowy owl	<i>Bubo scandiaca</i>	Annex I	M22

Common Name	Scientific Name	Status	Hectad
Twite	<i>Carduelis flavirostris</i>	Red List (Breeding)	M22
Whooper swan	<i>Cygnus cygnus</i>	Annex I (Wintering)	M22
Yellowhammer	<i>Emberiza citrinella</i>	Red List (Breeding)	M22

Annex I – Of EU Birds Directive, Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets).

6.4.4 Bat Records

A review of the National Bat Database of Ireland maintained by Bat Conservation Ireland, undertaken to search for roost records within 1km and 10km of the proposed site [I.G. Ref.: M 23388 23615] respectively. There were no records for bat species within 1km of the proposed site. This database provides details of recorded roosts, records from transect surveys and any other Ad-Hoc records that are available. Details of the results are provided in Table 6.8 below.

Table 6.8: Bat Records within 10 km of proposed development

Common Name	Scientific Name	Roost Records n within 1km: 0 n within 10km: 4	Transect Records n within 1km: 0 n within 10km: 6	Ad-Hoc Records n within 1km: 0 n within 10km: 22
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	3	0	5
Leisler's Bat	<i>Nyctalus leisleri</i>	1	0	8
Daubenton's Bat	<i>Myotis daubentonii</i>	0	6	7
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	0	1	18
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	0	0	14
Myotis spp.	<i>Myotis</i> spp.	0	0	5
Natterer's Bat	<i>Myotis nattereri</i>	0	0	3
Brown Long-eared Bat	<i>Plecotus auratus</i>	0	0	5
Unidentified Bat		0	5	0

6.4.5 Water Quality

6.4.5.1 EPA Water Quality Data

The EPA Envision map viewer was consulted on 08/10/2020 regarding the water quality status of the Trusky stream. The Biotic Index of Water Quality (BIWQ) was developed in Ireland by the Environmental Protection Agency (EPA). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are ranked according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample. No Q value data was available for this waterbody. The stream had an unassigned WFD status 2010-2015.

6.4.5.2 N6 Galway City Ring Road Surveys

The Natura Impact Statement undertaken for the N6 Galway City Ring Road Project (GCRR)(ABP ref. no. PL07 .302885) was also consulted.¹ A fisheries assessment of watercourses along the corridor of the proposed N6 Galway City Ring Road was conducted by Triturus Environmental Services: baseline biological water quality (i.e. Q-values) were collected at each watercourse crossing where suitable habitat existed, also to help relate water quality baselines to fish population data (i.e. clean water salmonid etc.). The Trusky Stream was surveyed at its upper and lower reaches. According to the report (N6 GTP Fisheries Assessment, 2018):

‘The upper reaches of the catchment channels were largely dry with the exception being the tributary at An Chloch Scoilte north of Bearna Village that had shallow flowing water. The kick sample collected here on the Trusky Stream had a very low diversity of macro-invertebrates (n=5), possibly as a consequence of being seasonal (likely dries up in warm years) and also as a result of evident organic enrichment. The species composition was dominated by Aseelus aquaticus and Gammarus duebenii and had no clean water stoneflies, mayflies or cased caddis species present. As such a Q rating of 3 was recorded in the Trusky Stream.’

And

‘a secondary site (2B) was surveyed downstream at Bearna Village, where greater flows of water and a larger channel were present given that the site was below the confluence of three smaller tributaries. This section of channel was tidal (on spring tides) and proved to be an excellent nursery for flounder (Platichthys flesus), European eel and three-spined stickleback (Gasterosteus aculeatus). Small numbers of adult brown trout (Salmo trutta) were also present. The brown trout population was small with only two fish present and given the limited better-quality habitat available upstream the total stream population size must also be comparably small. Some moderate to good quality spawning habitat did exist in the lower 100m of the stream catchment. This area is likely to be the main area for recruitment in the stream given the poor quality upstream salmonid habitat.’

The Fisheries Evaluation of Watercourses for the Trusky stream was regarded as of *Local Importance (higher value)* for salmonids, European eel and as a nursery for flounder. No potential for lamprey to occur was found.

¹ The full suite of application documentation, including fisheries assessment of watercourses along the corridor of the proposed N6 Galway City Ring Road conducted by Triturus Environmental Services (Appendix A.8.17), is available at the application website: <http://www.n6galwacityringroad.ie/>

6.4.6 **N6 Galway City Ring Road Mapping**

Habitat mapping undertaken for the proposed N6 Galway City Ring road was reviewed on the website (www.n6galwaycity.ie) for the project (. The habitats within the site were classified predominantly as scrub, dry/humid acid grassland. No Annex I habitats were identified within the site boundary. A small area of the Annex I habitat European dry heaths [4030] was mapped to the east of the development outside of the site boundary.

6.5 Field Study

6.5.1 Habitats Present on the Site and Surrounding Area

Much of the site is highly modified from its natural condition and is characterised by **Spoil and Bare Ground [ED2]**. The remaining sections primarily consist of a mosaic of **Dry Humid Acid Grassland [GS3]**, **Scrub [WS1]** and **Dense Bracken [HD1]** (Plate 6.1) which showed signs of grazing and trampling from cattle. Typical species in the grasslands included fescues (*Festuca spp.*), sweet vernal grass (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), self heal (*Prunella vulgaris*), tormentil (*Potentilla erecta*). Species indicative of disturbance and improvement such as nettle (*Urtica dioica*), spear thistle (*Cirsium vulgare*) and hogweed (*Heracleum sphondylium*) were also common. The scrub was dominated by bramble (*Rubus fruticosus agg.*) with some blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*) and gorse (*Ulex europeus*).

Other habitats within the development boundary include **Recolonising Bare Ground [ED3]** (Plate 6.2), two derelict sheds at the north-west corner of the site classified as **Buildings and Other Artificial Surfaces [BL3]** and stone walls throughout the site **classified as Stone walls and other stonework (BL1)**. There are some isolated protrusions of granite bedrock within the site with species such as wild thyme (*Thymus praecox*) and English stonecrop (*Sedum anglicum*) present. Where they exist, these features are very small and often associated with old stone walls. Wall pennywort (*Umbilicus rupestris*) was recorded on the old stone walls along with extensive growth of lichens. Typical species in the recolonizing bare ground habitats included coltsfoot (*Tussilago farfara*), ribwort plantain (*Plantago lanceolata*) and black medick (*Medicago lupulina*) with pineapple weed (*Matricaria discoidea*), daisy (*Bellis perennis*) and herb Robert (*Geranium robertianum*).

A large concrete attenuation tank is located at the southern end of the proposed development site, indicating an existing waste water treatment area. A small patch of **Wet Grassland [GS4]** was also recorded in this area. A small, non native **Tree Line (WL2)** (*Pinus sp.*) is located in the south western corner of the site and is adjacent to the existing housing estate and not connected to any other tree line or hedgerow habitat in the wider area.

The connection to the public sewer and all road and footpath improvement works between the proposed residential site and Bearna village are located in existing road and path infrastructure classified as **Buildings and artificial surfaces (BL3)**.

A section of the Trusky Stream is located within the proposed development site boundary. The stream is separated from the main construction footprint by over 10m at its nearest point. However, the construction works also involve the discharge of surface water from the proposed development, to the Trusky Stream. This involves, the installation of two precast headwalls within the banks of the stream at the location of the two surface water outfalls. There will also be some minor landscaping works including the planting of native species and the construction of a boundary fence along the stream banks. It is classified as an **Upland Eroding River [FW1]**. The watercourse was approximately 1-2 metres wide and was typically less than 0.3m deep throughout most of its length within the proposed development site. The stream is vegetated by species including fool's watercress (*Apium nodiflorum*), watercress (*Nasturtium officinale*) and the aquatic moss *Fontinalis antipyretica*, while gorse (*Ulex europeus*) and bramble (*Rubus fruticosus*) scrub characterised the banks (Plate 6.3) **Wet Grassland [GS4]** habitat grading into **Marsh (GM1)** was identified in small patches along the flood plain of the Trusky stream (Plate 6.4). The species in this habitat are dominated by creeping bent (*Agrostis stolonifera*), floating sweet grass (*Glyceria fluitans*), yellow iris (*Iris pseudacorus*), marsh ragwort (*Senecio aquatica*) and meadowsweet (*Filipendula ulmaria*). The stream discharges to Galway Bay approximately 690m downstream of the proposed development, approximately 1.5km to the west of Galway Bay Complex cSAC and Inner Galway Bay SPA .

No Annex I habitats or Annex II plant species associated with any nearby European Sites were recorded within or adjacent to the proposed development site. No botanical species listed under the

Flora (Protection) Order, 2015, listed in the EU Habitats Directive (92/43/EEC) or the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended were recorded on the site.



Plate 6.1 Scrub, Bracken and Acid Grassland mosaic which characterised the majority of the proposed development site.



Plate 6.2 Spoil and Recolonising Bare Ground at the entrance of the property, together with scrub/bracken/acid grassland mosaic.



Plate 6.3 The Trusky Stream, located at the eastern edge of the proposed development site but outside the development footprint.



Plate 6.4 Wet Grassland/Marsh habitat recorded along the flood plain of the Trusky Stream

6.5.2 Fauna

6.5.2.1 Birds

The bird species recorded during the site visits are listed in Table 6.9. Bird species recorded were typical of the grassland and scrub habitats in the wider area. The site does not provide significant habitat for protected bird species such as those listed on Annex I of the EU Birds Directive or those species that are among the qualifying interests SPAs in the vicinity. No requirement for further dedicated bird surveys was identified following the ecological multi-disciplinary walkover surveys.

Table 6.9 Birds species recorded during the survey and their conservation status

Species	Conservation status (BOCCI 2014-2019)
Blackbird (<i>Turdus merula</i>)	Green
Grey wagtail (<i>Motacilla cinerea</i>)	Red
Magpie (<i>Pica pica</i>)	Green
Pheasant (<i>Phasianus colchicus</i>)	Green
Robin (<i>Erithacus rubecula</i>)	Amber
Wood Pigeon (<i>Columba palumbus</i>)	Green
Swallow (<i>Hirundo rustica</i>)	Green

6.5.2.2 Mammals

6.5.2.2.1 Non-volant mammals

A comprehensive search for all mammals was undertaken during the ecological walkover surveys. Potential habitat for otter and badger was identified during the walkover surveys and dedicated surveys for these species were undertaken. No evidence of other protected non-volant fauna, such as pine marten (*Martes martes*) or fox (*Vulpes vulpes*) was recorded during the site visits, though it is likely that these and other common species use the site on occasion. Evidence of European rabbit (*Oryctolagus cuniculus*) activity was recorded in the form of droppings.

Otter Survey

A dedicated search for otter was undertaken along the length of the Trusky Stream within the site. No otter breeding or resting sites were recorded within the development boundary. However, otter spraint was recorded within the stream and the stream is likely used to some extent by foraging and commuting otter. The location of this spraint is shown in Figure 6.3. No other signs of otter were recorded and there was no evidence that the stream is used extensively by the species.

Badger Survey

A dedicated badger survey was undertaken throughout the entire site. No signs of Badger were recorded.

6.5.2.2.2 Bats

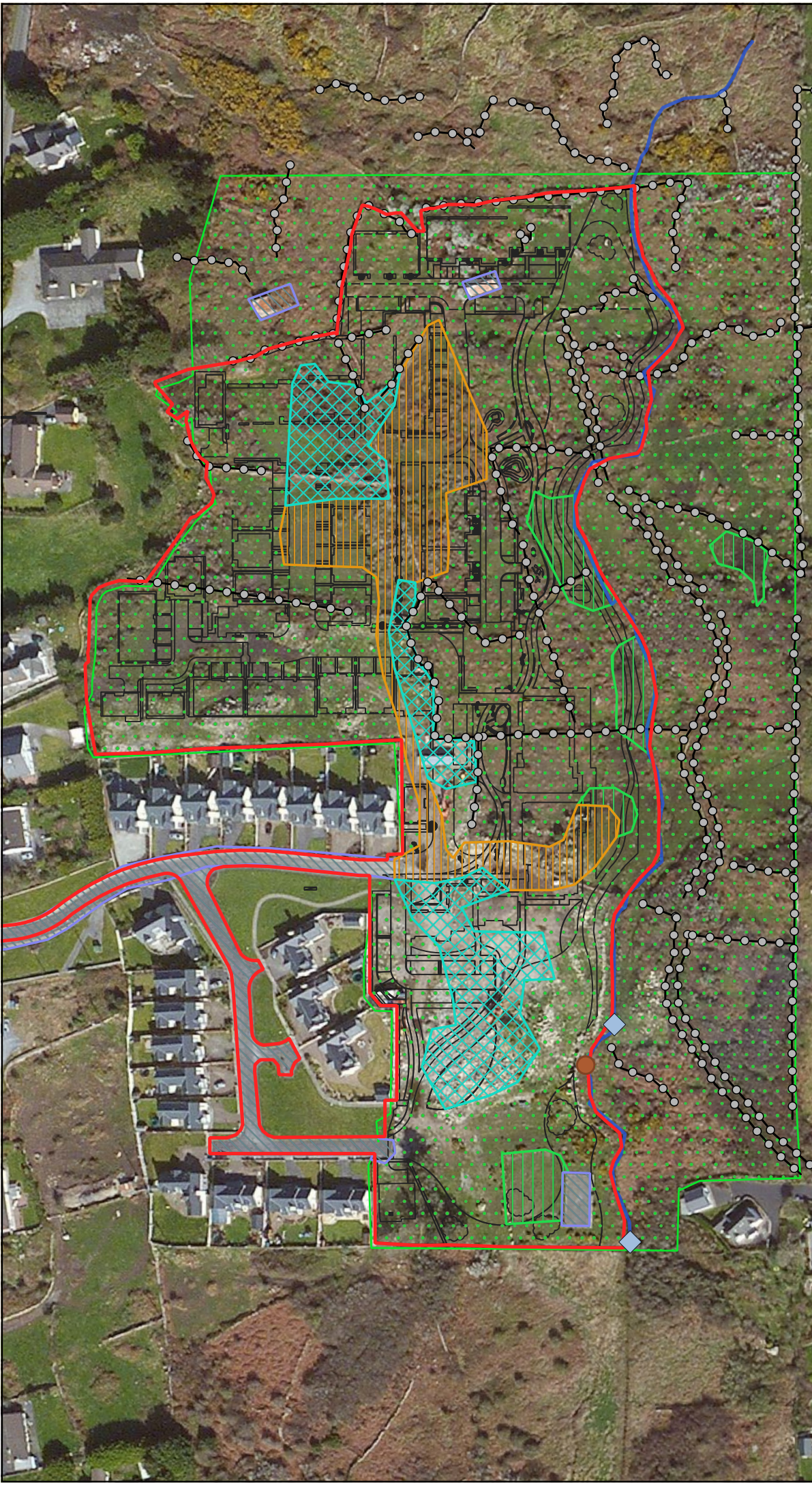
No evidence of roosting bats was recorded within the development site.

A bat survey was conducted within the proposed development site on the 31st of May 2018 as part of a previous ecological assessment, by Pat Roberts (B.Sc.) and Úna Nealon (B.Sc., Ph.D.) of MKO. The survey included an inspection of the roofed shed and a dusk emergence survey. No signs of bats were recorded during the thorough inspection of both the interior and exterior of the building. During the emergence survey, no bats were recorded emerging from the house or entering it at any point. A transect survey of the site was conducted after one hour of emergence survey, and both soprano pipistrelles (*Pipistrellus pygmaeus*) and common pipistrelles (*Pipistrellus pipistrellus*) were recorded occasionally throughout the site. Activity levels were very low with a maximum of two individual bats recorded at any one time and long periods with no activity. The trees assessed within the proposed development site were provided no significant potential to support roosting bats, while the grassland and scrub habitats were assessed as having high potential to provide foraging and commuting habitat.

On the 30th August 2019, the roofed shed was inspected again for signs of bat activity and a dusk survey was performed with a focus on potential emergence from the building. No signs of bat activity were identified and no bats were recorded emerging from the building. The dusk transect survey conducted throughout the development site, once the emergence survey was concluded, recorded primarily common pipistrelles (*Pipistrellus pipistrellus*), together with soprano pipistrelles (*Pipistrellus pygmaeus*) and brown long-eared bats (*Plecotus auritus*). Activity levels were once again, very low. The results of the August 2019 walked transect survey are provided in Figure 6.4.

Two static detectors, one at the northern end and one at the southern end of the site were deployed for 7 days between the 19/09/19 - 25/09/19. (see Figure 6.4). These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings from the detector located to the north were later analysed using bat call analysis software Kaleidoscope Pro v.5.1.9 (Wildlife Acoustics, MA, USA). Bat species were identified using established



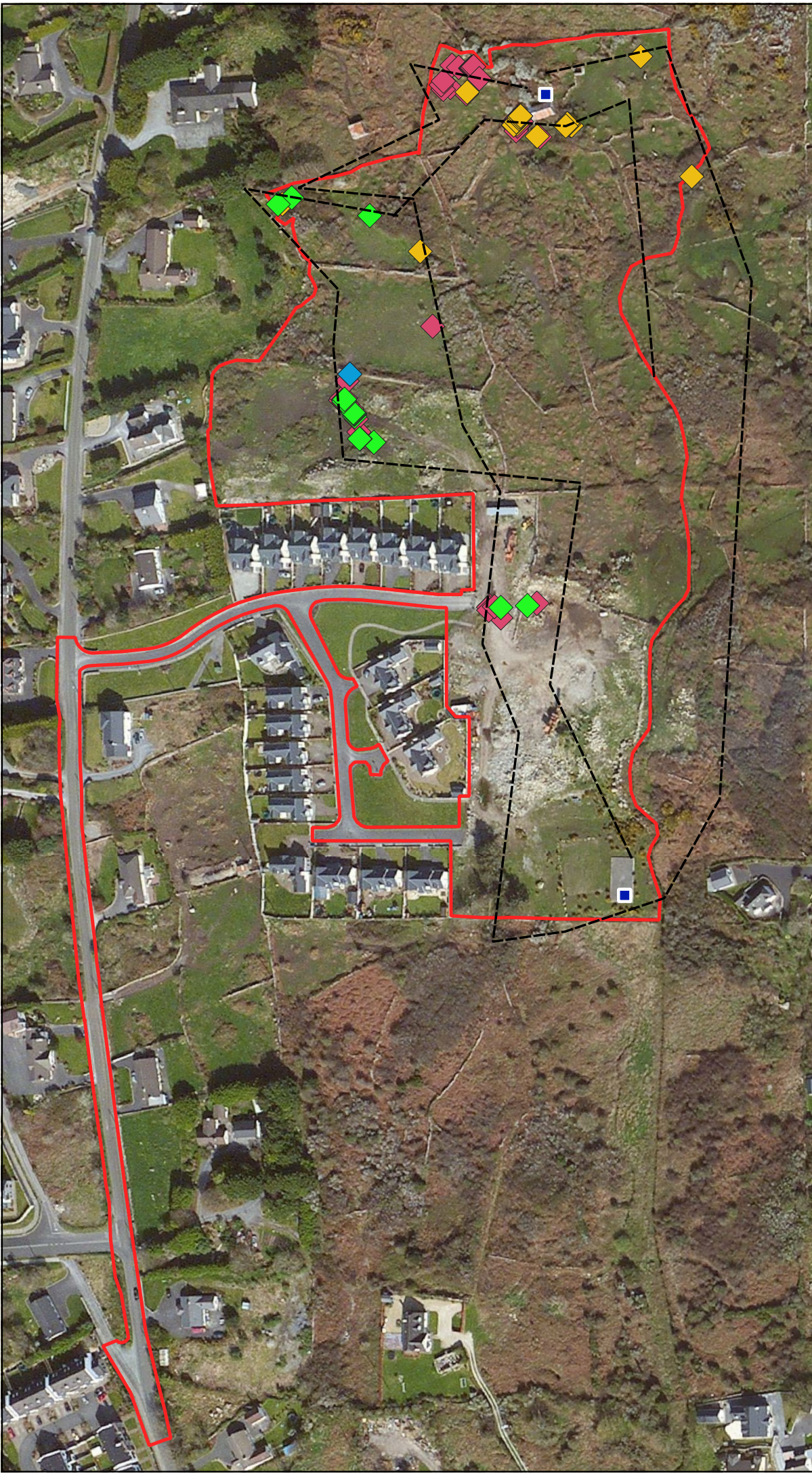
Map Legend

- Buildings and Artificial Surfaces [BL3]
- Spoil and Bare Ground [ED2]
- Recolonising Bare Ground [ED3]
- Wet Grassland [GS4]
- Dry/humid Acid Grassland-Scrub-Dense Bracken Mosaic [GS3-WS1-HD1]
- Stone Walls [BL1]
- Upland Eroding River [FW1]
- Site Boundary
- Kick Sampling Points
- Otter Spraint
- Development Footprint



Microsoft product screen shots reprinted with permission from Microsoft Corporation

Drawing Title Habitat Map with Development Footprint	
Project Title Bearna SHD	
Drawn By LK	Checked By PR
Project No. 190450	Drawing No. Figure 6.3
Scale 1:1900	Date 08.07.2020
MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 WW84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie	



Map Legend

Bat Species

- ◆ Common Pipistrelle
- ◆ Soprano Pipistrelle
- ◆ Pipistrelle Species
- ◆ Brown Long-eared Bat
- Statics Locations
- Walked Transect Route
- ▭ Site Boundary



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Drawing Title

Bat Survey Results

Project Title

Berna SHD

Drawn By

LK

PR

Project No.

190450

Drawing No.

Figure 6.4

Scale

1:2250

Date

08.07.2020



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call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total 1354 bat passes were recorded.

The detectors recorded similar results to the walked transect surveys with low levels of activity throughout the survey period and the majority of the activity associated with Common pipistrelle (*Pipistrellus pipistrellus*) and Soprano pipistrelle (*Pipistrellus pygmaeus*). The static detectors recorded the following additional species at very low levels: Leisler’s bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), *Myotis* bats and Nathusius’ pipistrelle (*Pipistrellus nathusii*) were less frequent with 3% or less of total bats recorded (Plate 5.5).

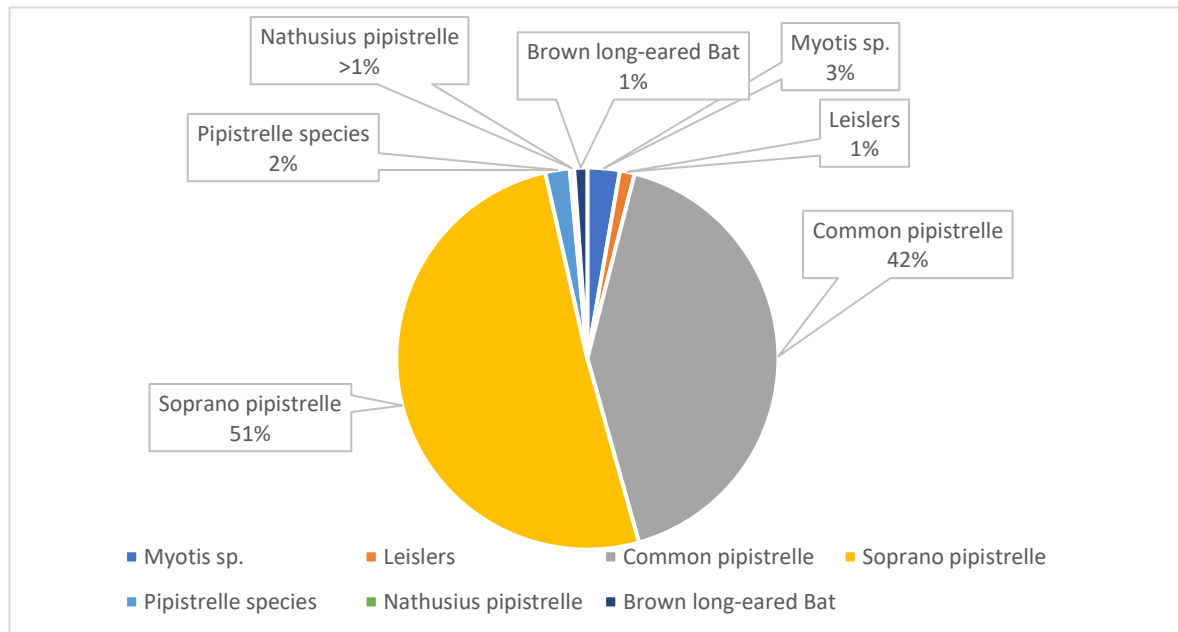


Plate 5.5 Bat Species Composition

Soprano pipistrelle (n=688) were the most frequently recorded species followed by Common pipistrelle (n=592), *Myotis* sp. (n=37), Leisler’s bat (n=17), Brown long-eared bat (n=15) and Nathusius’ pipistrelle (n=5). The surrounding hedgerow and scrub habitats provided suitable commuting and foraging corridors for these bat species.

The number of contacts recorded during both static detector and walked transect surveys for all bat species was low and is typical of an open and exposed site with few roosting features and no identified roosts.

6.5.2.3 Kick-Sampling Survey

The following sections outline the results of the two kick sampling surveys undertaken on the Trusky Stream downstream and to the south east of the proposed development site.

6.5.2.3.1 Upstream Kick Sample Site

This sample site was located upstream of the diffuse discharge point of an existing wastewater treatment plant (IG Ref.: M 23323 23358). This location is shown on Figure 6.3. This section of the watercourse was relatively fast flowing and was characterised by emergent vegetation such as fool’s watercress (*Apium nodiflorum*) and common watercress (*Nasturtium officinale*). Submerged *Fontanalis*

antipyretica was abundant on the waterbed substratum and rocks. The properties of the stream at the sample point are shown in Table 6.10.

Table 6.10 Properties of the watercourse upstream of soakaway discharge

Properties	Record
Bank Width	Approx. 4.0m
Wet Width	Approx. 2.0m
Average Depth	15cm
Dominant Substrates	Boulders, cobble and gravel
Substratum Condition	Loose

There was no sign of filamentous algae, gelatinous complexes or sewage fungus. The flowing water just upstream of the discharge outfall was slightly coloured but clear, with slight siltation. The diversity and density of macro-invertebrates were average in this sample. Few sensitive species were recorded and no very pollution tolerant species were present. Most taxa were among those that are tolerant of pollution, although sensitive taxa were also recorded. The Q rating assigned to this section of stream was Q3-4 on the basis that all species were tolerant to pollution, with few very sensitive species recorded. The results of the kick sampling are summarised in Table 6.11.

Table 6.11 Results of macroinvertebrate sample upstream of discharge

Indicator Group	Taxon	Dominance
Group A – Very Pollution Sensitive	Plecoptera	Few
Group B – Moderately Pollution Sensitive	Cased Trichoptera	Common
Group C – Pollution Tolerant	Caseless Trichoptera	Few
	Gastropoda	Few
	<i>Gammarus</i> sp.	Common
	Diptera (Simuliidae)	Common
	<i>Baetis rhodani</i>	Common
	Diptera (Chironomidae)	Few
	Coleoptera	Few
Group D – Very Pollution Tolerant	<i>Asellus</i> sp.	Common
Group E – Most Pollution Tolerant	None	None

6.5.2.3.2 Downstream Kick Sample Point

This sample site was located downstream of the diffuse discharge point of an existing wastewater treatment plant that is located to the south of the proposed development [IG Ref: M 23329 23276]. This location is shown on Figure 6.3. The banks on both sides were dominated by bramble and gorse scrub, with some common reed on the western margin. *Fontinalis antipyretica*, fool's watercress (*Apium nodiflorum*) and common watercress (*Nasturtium officinale*) were found within the watercourse. The river was fast flowing at the time of the survey and was characterised by cobble and gravel on the substratum, with few boulders present. The properties of the stream at the sample point are shown in Table 6.12.

Table 6.12 Properties of the watercourse downstream of soakaway discharge

Properties	Record
Bank Width	Approx. 4.0m
Wet Width	Approx. 2.5m
Average Depth	20cm
Dominant Substrates	Gravel and cobble
Substratum Condition	Loose

There was no sign of filamentous algae, gelatinous complexes or sewage fungus. The flowing water was highly coloured but clear. The diversity and density of macro-invertebrates was average in this sample.

Few sensitive species were recorded and no very pollution tolerant species were present. Most taxa were among those that are moderately tolerant of pollution, with few sensitive taxa recorded. The Q rating assigned to the channel was Q3-4 on the basis that a lot of species were tolerant to pollution, but few very tolerant species were recorded, and some very sensitive species were found. The results of the kick sampling are summarised in Table 6.13.

Table 6.13 Results of macroinvertebrates sample downstream from soakaway discharge point

Indicator Group	Taxon	Dominance
Group A – Very Pollution Sensitive	Heptageniidae	Few
	Plecoptera	Few
Group B – Moderately Pollution Sensitive	Cased Trichoptera	Few
Group C – Pollution Tolerant	Caseless Trichoptera	Common
	<i>Gammarus</i> sp.	Few
	Diptera (Simuliidae)	Common
	<i>Baetis rhodani</i>	Common
	Coleoptera	Few
Group D – Very Pollution Tolerant	<i>Asellus</i> sp.	Common
Group E – Most Pollution Tolerant	None	None

6.5.2.3.3 Conclusion of Kick Sampling Survey

The Trusky stream was assigned Q3-4 as a result of the above survey. The results of the kick sampling suggested an overall better water quality status than what was found in the surveys undertaken for the N6 project, which are described in Section 4.2.1.3. This could be as a result of numerous factors such as the location that the samples were taken, the time of year or water levels in the stream. The kick sampling undertaken as part of this study provides a baseline against which any changes can be monitored.

6.5.3 Importance of Ecological Receptors

Table 6.14. lists all identified receptors and assigns them an ecological importance in accordance with the ‘Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats and species that are Key Ecological Receptors [KERs].

Table 6.14 Importance of Ecological Receptors

Habitat/Species and Geographic Importance	KER Y/N	Rationale
Galway Bay Complex cSAC <i>International Importance</i>	Y	<i>The Trusky stream discharges to Galway Bay approximately 1.5km west of the cSAC. Taking a precautionary approach there is potential for indirect effects in the form of pollution arising from construction and operational activities associated with the proposed development. The cSAC has therefore been included as a KER.</i>
Inner Galway Bay SPA <i>International Importance</i>	Y	<i>The Trusky stream discharges to Galway Bay approximately 1.5km west of the SPA. Taking a precautionary approach there is potential for indirect effects in the form of pollution arising from construction</i>

		<i>and operational activities associated with the proposed development. The SPA has therefore been included as a KER.</i>
Galway Bay Complex pNHA <i>National Importance</i>	<i>Y</i>	<i>The Trusky stream discharges to Galway Bay approximately 1.5km west of the pNHA. Taking a precautionary approach there is potential for indirect effects in the form of pollution arising from construction and operational activities associated with the proposed development. The pNHA has therefore been included as a KER.</i>
Upland Eroding River (FW1), riparian habitats and associated aquatic faunal species– <i>Local importance (higher value)</i>	<i>Y</i>	<i>The Trusky stream has downstream connectivity with Galway Bay and is essential in maintaining links and ecological corridors between features of higher ecological value. There is potential for direct effects on this habitat when constructing the two surface water outfalls. There is also potential for indirect effects on this habitat in the form of pollution in various forms and for direct effects resulting from the installation of the surface water outfalls as part of the proposed development. Therefore Eroding upland rivers (FW1), riparian habitats and aquatic faunal species are considered to be a KER.</i>
Otter – <i>Local importance (higher value)</i>	<i>Y</i>	<i>Whilst no otter breeding or resting sites were identified within or adjacent to the development, the presence of otter spraint in the Trusky stream suggests that it is utilised by foraging and commuting otter. The proposed development has the potential to result in indirect effects on the receptor (as a result of deterioration in habitat or disturbance during construction) and otter is therefore included as a KER for further assessment.</i>
Bats – (Local importance (higher value))	<i>Y</i>	<i>Although no roosting bats were identified in the development site, scrub habitat is utilised by bats for foraging and commuting. The development has potential to result in indirect effects on the receptor. Bats are therefore identified as a KER.</i>
Birds – <i>Local importance (lower value)</i>	<i>N</i>	<i>Bird species recorded within the site were common species and considered to represent local populations of no greater than local importance. The site does not support significant habitat for protected bird species.</i>
Terrestrial Habitats Scrub [WS1] – <i>Local importance (lower value)</i> Dry/humid acid grassland [GS3] – <i>Local importance (lower value)</i> Wet grassland [GS4] – <i>Local importance (lower value)</i>	<i>Y</i>	<i>These habitats, although some contain small areas of semi-natural habitat that are of some local importance for wildlife. However, they are common and widespread in the local and wider landscape. These habitats are included as KERs.</i>

Dense Bracken (HD1) - <i>Local importance (Lower value)</i>		
Stone Walls [BL1] – Local importance (lower value)	N	<i>These habitats only contain small areas of semi-natural habitat that are of some importance to wildlife and are not included as KERs.</i>
Recolonising bare ground [ED3] – <i>Local Importance (lower value)</i>		
Spoil and bare ground [ED2] - <i>Local importance (Lower value)</i>		
Tree Line (Non-Native)- <i>Local importance (Lower value)</i>		
Buildings and artificial surfaces – <i>Local importance (lower value)</i>		

6.6 Ecological Assessment

6.6.1 Do Nothing Impact

If the proposed development were not to go ahead, the majority of the site would continue to be used as low intensity agricultural lands.

6.6.2 Impacts during Construction

6.6.2.1 Impacts on Terrestrial Habitats

The proposed development will involve the loss of the existing 5.38 hectares of habitats that are within the development site boundary. These habitats include Scrub (WS1), Acid Grassland (GS3), Dense Bracken (HD1), Recolonising Bare Ground (ED3) and Spoil and Bare Ground (ED2). A small area of Wet Grassland (GS4) and non-native Tree Line (WL2) will also be lost to facilitate the development. Whilst these habitats are of some local importance for wildlife, they are common and widespread in the local and wider landscape. The effect of this habitat loss is permanent but covers a small area of highly modified habitats. The loss of these habitats is not a significant ecological impact.

Despite the fact that the loss of habitats on the site of the proposed development is not a significant ecological effect, mitigation is provided to minimise any effect on biodiversity that may occur. This mitigation is described below. The consideration of mitigation measures arises only in the context of the EIA and not in the context of the distinct Stage One Screening AA to be conducted separately by the Board and which is addressed in the AA Screening Report which accompanies the planning application.

Mitigation

- A Construction and Environmental Management Plan [CEMP] has been prepared and submitted with the planning application, which provides the environmental management framework to be adhered to during the pre-commencement, construction and operational phases of the proposed development and it incorporates principles of mitigation to ensure that the proposed works are carried out in a way that minimises the potential for any environmental impacts to occur.
- The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site.
- The proposed development has been designed to maintain connectivity through the site and along the Trusky Stream with no works proposed within over 10 metres of it (with the exception of the construction of two surface water outfalls and some minor landscaping works).
- A landscape plan has been prepared for the development. The landscape plan allows for the planting of woodland, treeline, hedgerow and wildflower meadows consisting of a mix of native and naturalised species, as well as pollinator friendly species. A hedgerow consisting of a mix of native and naturalised species will be planted along the southern and eastern boundaries of the site, separating the development from the Trusky stream.
- The landscape plan also provides for the creation of additional green spaces including herbaceous lawns, which will contribute to the reduction of the ecological footprint of the development.
- Trees within private gardens adjacent to the development site will be protected in accordance with BS: 5837 (Trees in relation to Construction).

Residual Impact

Following the implementation of the above mitigation measures, there will be no ecologically significant habitat loss and the proposed development will not have any significant effects on floral biodiversity. The design of the proposed development is such that the landscaping plan, fully mitigates the loss of habitat through the planting of native and naturalized species along with a strong emphasis on pollinator friendly planting, with a mixture of open grasslands, hedges and groups of trees. No significant residual effect on the Terrestrial KER habitats will occur.

6.6.2.2 Impacts on Aquatic and Riparian Habitats (and associated fauna)

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 and enter the surrounding environment. Chemicals used in construction including hydrocarbons and cement-based products could potentially run off the site. The Trusky stream to the east of the construction footprint is not only a receptor in its own right but also has the potential to act as a surface conduit for pollution and run off to reach sensitive habitats downstream such as the marine environment within Galway Bay. The requirement of in-stream works for the construction of storm water outfall headwalls also has the potential to affect the water quality and habitats within the stream and downstream.

The potential for pollution run-off, in the absence of mitigation measures, will constitute a **Short-Term Negative Effect**. The magnitude of any impact will be **moderate** at worst, given the natural vegetation buffer between the majority of the development footprint and the Trusky Stream and the small scale nature works required within and adjacent to the stream. In the absence of mitigation, the proposed has the potential to result in **Significant** effects on the local aquatic environment and following the precautionary principle, the wider aquatic environment.

Mitigation

Full details of the construction measures to be employed to prevent effects resulting from any run off of pollutants from the site to surface or groundwater are provided in the CEMP submitted with the planning application and summarized below.

- A solid boundary fence will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the Trusky stream and its associated riparian habitat. No works will be undertaken outside the confines of this fence with the exception of the installation of the two surface water outfalls, which will be undertaken as a separate element of the development that is described below.
- A silt fence will also be attached to this boundary fence. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will be buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- Whilst significant inundation of surface or ground water is not anticipated, any such arisings that require pumping out during construction will be discharged to ground within the site through a silt bag at a distance of over 30m from the Trusky Stream. There will be no direct discharge of construction waters to any watercourse.

To construct the surface water outfalls, the installation of two small precast concrete headwalls will be required along the Trusky stream. Non-return valves will be positioned at the outfalls. The following

best practice construction measures will be followed to ensure that there are no significant effects on the Trusky Stream as a result of the proposed works:

- Prior to the outset of these works, small defined works areas will be fenced off at the location of each of the storm water outfalls (between the main construction site and the Trusky Stream). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Trusky Stream.
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Trusky Stream will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Short sections of the Trusky Stream will be temporarily dammed with sandbags at times of low water. One dam will be constructed immediately downstream of the outfall point and the other, immediately upstream.
- A submersible pump will be used to overpump any flow within the stream from upstream to downstream of the dammed area.
- Any remaining surface water within the dammed area will be pumped to a discharge point over 30m from the Trusky Stream and within the main construction site. It will pass through a silt bag before discharge to ground.
- Machinery will not enter the water, the construction of the outfall will only occur after the dry working area is created.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt.
- Following this the dams will be removed.
- Each surface water discharge point is likely to take less than one day to install.
- Sondes will be put in place in the Trusky Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified

Residual Effects

With the implementation of the construction phase mitigation measures, there will **not be any significant impacts** on the Trusky Stream its margins or the aquatic life within it as a result of the proposed development. Furthermore, there is no potential for significant effects within any downstream, hydrologically connected habitat. No significant residual effect on the Aquatic KER Habitats and species will occur.

6.6.2.3 Potential Impacts on Fauna

6.6.2.3.1 Loss of Faunal Habitat

As is apparent from the surveys undertaken, the site of the proposed development does not provide significant habitat for protected terrestrial faunal species. The bird species recorded were typical of the habitats present on the site, which are common and widespread in the local area.

Whilst the site was found to be used by low numbers of foraging bats, no roosting habitat was identified and these taxa are not recorded as using the site extensively for foraging or commuting. The taxa were included as a KER on a precautionary basis and any impacts are fully assessed during construction are fully assessed in this section. The proposed development will result in the loss of habitats that are widespread in the local area and surround the site to the north, east and south. There will be no loss of roosting habitat and any loss of foraging habitat will **not be significant**.

The only evidence of a protected non-volant mammal that was recorded was a single otter spraint in the Trusky Stream. This species is included as a KER on a precautionary basis. Any impacts on the aquatic habitat of this species are fully assessed in Section 6.6.2.2 above. The stream is not extensively used by the species and, in any event, the proposed development will be buffered from the stream by a minimum distance of over 10 metres. (with the exception of the construction of the surface water outfalls and some minor landscaping works) **No significant loss** of terrestrial otter habitat is anticipated. The potential effects on the aquatic environment that may impact on otter habitat and the related mitigation are described in the preceding section.

In the absence of mitigation, the impact of the proposed development on faunal habitats of non KER species such as birds and other mammals that may use the site is a **Permanent Negative Effect of Slight Magnitude** as the habitat that will be lost is common and widespread in the local area.

Mitigation

- A Construction and Environmental Management Plan [CEMP] has been prepared and submitted with the planning application, which provides the environmental management framework to be adhered to during the pre-commencement, construction and operational phases of the proposed development and it incorporates principles of mitigation to ensure that the proposed works are carried out in a way that minimises the potential for any environmental impacts to occur.
- The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site.
- The proposed development has been designed to maintain connectivity through the site and along the Trusky Stream with no works proposed within over 10 metres of it (with the exception of the construction of two surface water outfalls and some minor landscaping works).
- A landscape plan has been prepared for the development. The landscape plan prescribes the planting of woodland, treeline, hedgerow and wildflower strips consisting of a mix of native and naturalised species, as well as pollinator friendly species. A hedgerow consisting of a mix of native and naturalised species will be planted along the southern and eastern boundaries of the site, separating the development from the Trusky stream.
- The landscape plan also provides for the creation of additional green spaces including herbaceous lawns, which will contribute to reduce the ecological footprint of the development.

Residual Effects

With the implementation of the construction phase mitigation measures, there will **not be any significant loss** of faunal habitat associated with the site of the proposed development or indirectly on downstream habitats.

6.6.2.3.2 **Potential Disturbance to Fauna**

The proposed works during the construction phase will result in an increase in noise and activity within the study area. No bat roosts were recorded on the site and bat activity was low during all surveys

undertaken, there will be **no likely significant** disturbance of these KER species associated with the construction proposed development.

The KER species, otter are crepuscular in nature and are unlikely to be adversely impacted by the proposed construction works and no evidence of the site (including the Trusky Stream) being used extensively by this species was recorded. The NPWS Threat Response Plan for Otter acknowledges that “Little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure.” It also identifies that otter are known to travel significant distances from streams and lakes in search of new territory and feeding areas.

Songbirds were not included as a KER, due to the common and widespread nature of the species recorded nesting within the scrub habitats on the site. However, the cutting of this habitat during the nesting season could result in disturbance to the local breeding bird population and potential mortality if nests are destroyed

Following the precautionary principle, the proposed development has the potential to result in a **Temporary Negative Effect** on fauna. The magnitude of any such effect would be **Slight** as the site is not used extensively by protected faunal species. There is no potential for the proposed development to result in significant effects on protected faunal species as a result of disturbance. Nonetheless, mitigation to minimise the potential for any disturbance effects is provided below.

Mitigation

To mitigate for the potential disturbance of fauna during construction the applicable mitigation measures set out in the CEMP, including the following measures, will be implemented:

- Plant and machinery will be turned off when not in use.
- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crepuscular or nocturnal species including bat species.
- Vegetation removal will be conducted in line with the provision of the Wildlife Act to avoid nesting songbirds
- The Trusky Stream will be fenced off during construction (with the exception of short term works associated with the construction of the surface water outfalls) with no disturbance to the stream or the riparian area.

Residual Effects

There will be no likely significant effects following implementation of the applicable mitigation measures identified in this report and the CEMP submitted with the planning application.

6.6.3 Operational Phase

6.6.3.1 Habitat Loss

There will be no additional habitat loss associated with the operational phase of the proposed development.

6.6.3.2 Potential Impacts on Aquatic Habitats and Species

The operational phase of the proposed project has the potential to result in deterioration in water quality of the Trusky stream and downstream aquatic receptors as a result of surface water run-off from the hard-standing areas associated with the proposed development. The elements of the proposed

development that are within 10m of the Trusky Stream will involve only the planting of native species and the regular mowing of a grass path. As such, the riparian habitats associated with the Trusky Stream will be retained, enhanced and protected.

The storm water drainage strategy has been designed to cater for all surface water runoff from all hard surfaces in the proposed development and has been designed using Sustainable Drainage Systems (SuDS) principles. The surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Trusky stream. Discharge will be limited to the greenfield equivalent, $Q_{BAR_{RURAL}}$, runoff rate. This will be achieved using a Hydro-Brake flow restrictor prior to discharging to the Trusky stream. Temporary underground attenuation will also be provided at two separate locations in the form of underground cellular storage. Attenuation has been designed to temporarily store the surface water runoff for design rainfall events up to, and including, the 1% AEP with a 20% increase in rainfall intensity. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through petrol interceptors prior to discharging from the site.

In addition to the above, pervious paving is to be provided for in all driveways which will have a layer of drainage stone underneath to attenuate rainfall runoff from each property prior to entering the main surface water drainage network.

Wastewater from the development will discharge to the existing gravity wastewater network at the existing adjacent Cnoc Fraoigh residential estate prior to it exiting the estate. A letter from Irish Water confirming the capacity of the network to accept the additional waste generated by the proposed development is included in Appendix 6-3 to this chapter. The foul loadings for the sewers have been evaluated in accordance with the Irish Water Code of Practice for Wastewater Supply.

No potential exists for likely significant effects on water quality or KER aquatic habitats and species during the operational stage of the proposed development.

6.6.4 Potential Impacts on Fauna

6.6.4.1 Loss of Faunal Habitat

There will be no additional loss of faunal habitat associated with the operation of the proposed development.

6.6.4.2 Potential Disturbance to Fauna

Whilst no significant assemblage of faunal species was recorded at the site of the proposed development, the operation of the proposed development will involve the use of external lighting, which has the potential to result in disturbance to bat species which have been identified as a KER on a precautionary basis. Given the low levels of bat activity and lack of roosts or significant roosting habitat recorded on the site the pre-mitigation potential for disturbance is a **Permanent Slight Negative Effect** on the local bat population and there is **no potential for significant effects** in this regard. Nonetheless, mitigation has been included to minimise any effects on bat species.

Mitigation

To mitigate for any potential disturbance during the operational phase, the following measures will be adopted:

The site lighting has been designed to limit the environmental impact of artificial lighting on existing flora and fauna in the area.

The luminaire specified is an LED pole mounted luminaire with NEMA socket and photocell, this fitting was selected for the following reasons:

- Low level lighting
- Minimal upward light spill
- Low voltage LED light will be in use to reduce impacts on fauna

Residual Effects

With best practice in place, the potential disturbance on bats and additional fauna caused by artificial lighting will be minimised and no likely significant effects are predicted.

6.6.5 Assessment of Biodiversity Gain

The landscaping plan prepared by Radharc Landscape Design for the proposed development will see an overall increase of linear habitats such as treelines and hedgerows, which will consist of native and naturalised species. The landscape plan allows for the planting of a hedgerow consisting of native and naturalised species along the entire eastern boundary of the site, thereby maintaining connectivity between the north and south of the site. The landscape plan also allows for the planting of an area of woodland to the south of the site, as well as to the north-east adjacent to the proposed hedgerow and further treelines and hedgerows along streets throughout the development. Planting throughout the site will incorporate the use of pollinator friendly species to encourage pollinating insect communities and will employ a maintenance regime that minimises herbicide use.

The landscaping plan includes planting of native species along boundary between the site and the Trusky Stream and will retain, enhance and protect the riparian zone associated with the stream.

Overall, the proposed development plan will result in greater tree and hedge cover in an area that was dominated by gorse and bramble dominated scrub, providing foraging and commuting habitat for bats, other small mammals and bird species and foraging resources for pollinating insects. However, whilst the impact of the implementation of the landscaping plan will be positive from an ecological perspective, the impact is not predicted to be significant.

6.6.6 Potential Impacts on Designated Sites

6.6.6.1 Impacts on European Sites

This section provides a summary of the key assessment findings with regard to European sites, in circumstances where the detailed information required by the competent authority to carry out the assessments under the Habitats Directive and Irish legislation is set out in the Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS) submitted with the planning application.

The following European Sites were identified as having the potential to be affected by the proposed development as a result of deterioration in water quality and/or disturbance of otter due to construction/operational activities:

- Galway Bay Complex cSAC
- Inner Galway Bay SPA

The Natura Impact Statement concludes as follows:

'Where the potential for any likely significant effects on any European Site has been identified then, as is apposite when conducting a Stage Two Appropriate Assessment, consideration has been given to the measures which have been identified and which will be implemented in

order to avoid potential water pollution events, in particular. In conclusion, there is no reasonable scientific doubt remaining as to the absence of adverse effects on the constitutive characteristics of the Galway Bay Complex cSAC and Inner Galway Bay SPA.

The measures ensure that the construction and operation phases of the proposed development will not adversely affect the integrity of any European sites.

Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site’.

6.6.6.2 Impacts on Other Designated Sites

6.6.6.2.1 Impacts on NHAs and pNHAs

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. No NHAs were identified as being within the likely zone of impact. Following an extremely precautionary approach, one pNHA was identified as being within the likely zone of impact:

➤ Galway Bay Complex pNHA

The identified pathway for impact on this Nationally designated site was via the Trusky Stream and its hydrological connectivity with Galway Bay (in which the pNHA is partially located). As described extensively above, a suite of measures are in place to prevent any significant effects on the Trusky Stream or any hydrologically connected waterbodies during either construction or operation of the proposed development. Following the implementation of the best practice and mitigation, there will be no significant effects on this nationally designated site.

No likely significant impacts will occur to any nationally designated sites.

6.6.6.2.2 Potential Impacts on Ramsar Sites

Impacts on Ramsar sites are considered in this section of the report. The Ramsar Site, Inner Galway Bay has been identified as being within the likely zone of impact of the proposed development. The identified pathway for impact on this Ramsar Site was via the Trusky Stream and its hydrological connectivity with Galway Bay (in which this designated site is located). As described extensively above, a suite of measures are in place to prevent any significant effects on the Trusky Stream or any hydrologically connected waterbodies during either construction or operation of the proposed development. As such, following the implementation of the best practice and mitigation, there will be no significant residual effects on this internationally designated site.

6.7 Potential Cumulative and in-combination Effects

6.7.1 Cumulative effects resulting from interaction between the various elements of the proposed development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR. The potential for each individual element of the proposed development on its own to result in significant effects on biodiversity was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on biodiversity in the impact assessment presented. The complex interactions between the requirement for site drainage and the requirement to protect the Trusky Stream were taken into account and any impacts avoided through a series of mitigation measures that were fully described. The requirement for public open space was considered cumulatively with the requirement to minimise habitat loss and disturbance to fauna and a landscaping plan which was designed to enhance natural habitats on the site was developed.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

6.7.2 Cumulative effects resulting from interaction in-combination with other plans and projects

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on the ecology of the site was conducted. Where appropriate, the Strategic Environmental Assessment Reports (SEAs), Environmental Impact Assessment Reports, AA Screening Reports and Natura Impact Statements and Natura Impact Reports that were prepared in association with these plans and projects were also reviewed. This assessment focuses on the potential for cumulative in-combination effects on the existing habitats where potential for significant effects was identified. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

6.7.2.1 Plans

The strategic vision for Bearna village is included within the Galway County Development Plan 2015-2021 as Variation No.2 (a) to the Development Plan (“the Bearna Plan”).

The following plans have been reviewed and are taken into consideration as part of this assessment:

- Galway County Development Plan 2015-2021 – Bearna Plan
- The Regional Planning Guidelines for the West 2010-2022,
- National Biodiversity Action Plan 2017-2021
- Galway BAP 2014 - 2020

The review focused on policies and objectives that relate to European Sites and natural heritage (Table 6.15). No potential for cumulative impacts when considered in conjunction with the current proposal were identified.

Table 6.15 Review of plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
<p>Galway County Development Plan 2015-2021</p> <p>Variation No.1 to the County Development Plan 2015 - 2021</p> <p>Variation No.2(a) Galway County Development Plan 2015 – 2021 – Bearna Plan</p> <p>The Environmental Supporting Documents associated with this plan and variation 2(a) were considered. These documents included:</p> <p>CGDP 2015-2021 SEA Statement</p> <p>CGDP 2015-2021 Environmental Report</p> <p>CGDP 2015-2021 Natura Impact Report in Support of the AA</p> <p>CGDP 2015-2021 Strategic Flood Risk Assessment</p> <p>Variation 2(a) SEA Statement</p> <p>Variation 2(a) AA determination</p> <p>Variation 2(a) Environmental Report</p>	<p>Objective DS 6 – Natura 2000 Network and Habitats Directive Assessment</p> <p>Protect European sites that form part of the Natura 2000 network (Including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC), the Planning and Development (Amendment) Act 2010, the European Communities (Birds and Natural Habitats) Regulations 2011(SI No.477 of 2011) (and any subsequent amendments or updated legislation) and having due regard to the guidance in the Appropriate Assessment Guidelines 2010 (and any updated or subsequent guidance). A plan or project (e.g. proposed development) within the plan area will only be authorised after the competent authority (Galway County Council) has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and/or a Habitats Directive Assessment where necessary, that:</p> <p>a) The plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or</p> <p>b) The plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those</p>	<p>The Project will not give rise to any adverse effect on any European site. Accordingly, there is no potential for the Project, in combination with any other plan or project, to give rise to an adverse effect on any European site.</p> <p>In circumstances where the Project will not give rise to any adverse effect on any European site, there is no necessity to agree or undertake any compensatory measures to ensure the protection and overall coherence of the Natura 2000 network.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
<p>Variation 2(a) Natura Impact Report</p> <p>Variation 2(a) NIR Appendix 1</p> <p>Variation 2(a) Strategic Flood Risk Assessment</p>	<p>of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or</p> <p>c) The plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.</p>	
	<p>Objective DS 10 – Impacts of Developments on Protected Sites Have regard to any impacts of development on or near existing and proposed Natural Heritage Areas, Special Protection Areas and Special Areas of Conservation, Nature Reserves, Ramsar Sites, Wildfowl Sanctuaries, Salmonid Waters, Refuges for Flora and Fauna, Conamara National Park, shellfish waters, freshwater pearl mussel catchments and any other designated sites including future designations.</p>	<p>The proposed development will not have any adverse effect on any protected site. This has been assessed and demonstrated in this EIAR and within the AA Screening report and NIS , which accompany this application.</p>
	<p>Objective BNH3 - European Environmental Compliance</p>	<p>The proposed development will be undertaken in strict accordance with all European environmental legislation including the Directives listed in this objective.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>All proposed developments shall be in accordance with the Birds and Habitats Directives, Water Framework Directive and all other relevant EU Directives.</p> <p>There are a number of policies relating to the protection, conservation and restoration natural heritage sites including specific objectives relating to the Natura 2000 network.</p> <p>Policy NHB 1 – It is the policy of Galway County Council to support the protection, conservation and enhancement of natural heritage and biodiversity, <u>including the protection of the integrity of European sites, that form part of the Natura 2000 network</u>, the protection of Natural Heritage Areas, proposed Natural Heritage Areas Ramsar Sites, Nature Reserves, Wild Fowl Sanctuaries and Conamara National Park (and other designated sites including any future designations) and the promotion of the development of a green/ecological network within the plan area, in order to support ecological functioning and connectivity, create opportunities in suitable locations for active and passive recreation and to structure and provide visual relief from the built environment.</p> <p>Policy NHB 6 - It is the policy of the Council to support the implementation of the National Biodiversity Plan and Galway County Biodiversity Plan and Galway County Heritage Plan in partnership with relevant stakeholders subject to available resources.</p> <p>Objective NHB 1 – Support the protection of habitats and species listed in the Annexes to and/or covered by the EU Habitats Directive (92/43/EEC) (as amended) and the Birds Directive (2009/147/EC), and regularly occurring-migratory birds and their</p>	<p>The Development plan and related documents were comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity. The proposed development will be in compliance with all relevant policies and objectives of the Galway County Development Plan 2015 -2021 including Policies NHB 1, NHB 6, Objective NHB 1 and NHB 2.</p> <p>The proposed development will not result in any adverse effects on biodiversity and has been specifically designed to minimise any negative effects on biodiversity. Robust and achievable measures and design features have been put in place to avoid any significant effect on the Trusky Stream, which is the identified conduit by which significant effects on the identified European Sites could potentially occur (following the precautionary principle).</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>habitats and species protected under the Wildlife Acts 1976-2000 and the Flora Protection Order.</p> <p>Objective NHB 2 - Support the protection and enhancement of biodiversity and ecological connectivity within the plan area, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stone walls, geological and geo-morphological systems, other landscape features and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones in the context of Article 10 of the Habitats Directive.</p>	

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>Objective BNH3- European Environmental Compliance (Variation 2(a)) All proposed developments shall be in accordance with the Birds and Habitats Directives, Water Framework Directive and all other relevant EU Directives.</p>	<p>The proposed development will be undertaken in strict accordance with all European environmental legislation including the Directives listed in this objective.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>Objective CCF6-Inappropriate Development on Flood Zones (Variation 2(a))</p> <p>Where a development/land use is proposed within any area subject to this objective the development proposal will need to be accompanied by a detailed hydrological assessment and robust SUDS design which demonstrates the capacity to withstand potential flood events to maintain water quality and avoid potential effects to ecological features.</p> <p>Any development proposals should be considered with caution and will be required to comply with The Planning System and Flood Risk Management Guidelines for Planning Authorities/Circular PL2/2014 & the associated Development Management Justification Test.</p> <p>Climate Change should be duly considered in any development proposal.</p> <p>Protect the riparian zones of watercourse systems throughout the plan area through a general 10 metre protection buffer from rivers within the plan area as measured from the near river bank, (this distance may be increased and decreased on a site by site basis, as appropriate).</p> <p>Any development proposals submitted for this site will require a detailed ecological report (s), carried out by suitably qualified personnel for the purposes of informing Appropriate Assessment Screening by Galway County Council, the competent authority (in accordance with Objective DS 6 of the Galway CDP 2015-21).</p>	<p>The proposed development is accompanied by the relevant technical reporting including (with relevance to this EIAR) detailed ecological reports, carried out by suitably qualified personnel for the purposes of informing Appropriate Assessment Screening.</p> <p>Whilst there will be outfalls of surface water to the Trusky Stream and some minor landscaping works, the main construction footprint will be at closest over 10 metres from the stream and outside the 10 metre protection buffer. The development includes the planting of native species and the provision of a grass path at the boundary between the development and the stream. This will retain, enhance and protect the riparian zone adjacent to the Trusky Stream.</p> <p>The development is compliant with this objective and there is no potential for any cumulative effects to arise in regard of this objective.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>The relevant lands will be outlined and flagged with a symbol on the land use zoning map and on the GIS system of Galway County Council so that staff and the public are aware of the special conditions/constraints attached.</p> <p>A briefing will be provided to relevant staff within Galway County Council on the special conditions and constraints on relevant lands.</p>	
	<p>Galway County Development Plan 2015 - 2020 NIR The NIR and associated appendices assess the plan and all its various policies and objectives in respect of their potential to impact on European Sites. The NIR then describes all the mitigation that is in place to avoid such effects and finds that the mitigation is effective in avoiding the identified potential effects</p>	<p>The proposed development has been designed and will be operated in compliance with the Galway County Development Plan 2015 -2021 and therefore will not result in any cumulative adverse effects on Biodiversity when considered in combination with this plan.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p>Environmental Report and SEA Statement for Variation 2(a) of the Galway City Development Plan 2015 -2021</p> <p>In the absence of mitigation, the Environmental Report and SEA Statement identify the potential significant environmental effects to arise as a result of the proposed variation:</p> <p>Loss of/damage to biodiversity in designated sites (including European Sites and Wildlife Sites) and Annexed habitats and species, listed species, ecological connectivity and non-designated habitats; and disturbance to biodiversity and flora and fauna; Habitat loss, fragmentation and deterioration, including patch size and edge effects; and Disturbance (e.g. due to noise and lighting along transport corridors) and displacement of protected species.</p> <p>It then lists the measures and monitoring that are in place to ensure that any such potential effects are mitigated and monitored. The statement also references the Stage 2 Appropriate Assessment that was carried out in respect of the variation quotes the conclusion of that assessment.</p> <p>Galway County Development Plan variation 2(a) NIR and AA Determination</p> <p>The NIR and associated appendices assess the variation to the plan in respect of its potential to impact on European Sites. The NIR then describes all the mitigation that is in place to avoid such effects and finds that the mitigation is effective in avoiding the identified potential effects</p> <p>The Galway City Council Appropriate Assessment Determination concludes as follows:</p>	<p>The proposed development has been designed and will be operated in compliance with the Variation 2(a) to the Galway County Development Plan 2015 -2021 and therefore will not result in any cumulative adverse effects on Biodiversity when considered in combination with this plan.</p> <p>The proposed development has been designed and will be operated in compliance with the Variation 2(a) to the Galway County Development Plan 2015 -2021 and therefore will not result in any cumulative adverse effects on Biodiversity when considered in combination with this plan.</p>

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<p><i>'It is considered that Variation 2(a) to the Galway County Development Plan 2015 – 2021 will not result in effects on the ecological integrity of any European Site'</i></p>	
<p>The Regional Planning Guidelines for the West 2010-2022</p>	<p>EAP13: To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.</p> <p>EAO18: Support the achievement of favourable conservation status of Annex I habitats, Annex II species, Annex I bird species and other regularly occurring migratory bird species and their habitats in the region.</p>	<p>The proposed development will not result in likely significant effects on habitat and features of ecological importance. The proposed development has been designed to avoid any effect on surface or ground water outside the site.</p> <p>An NIS has been completed and concludes that there will be no adverse effect on the integrity of any European Site.</p>
<p>National Biodiversity Action Plan 2017-2021</p>	<p>Target 6.2 - Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.</p>	<p>The proposed development will not result in likely significant effects on habitat and features of ecological importance. The proposed development has been designed to avoid any effect on surface or ground water outside the site as set out in this chapter. The proposed development will not impact on connectivity within the wider area and will maintain the watercourse adjacent to the development site in good condition.</p>

6.7.2.2 Other Projects

The online planning system for Galway County Council as well as the An Bord Pleanála Website (planning searches), were consulted in October 2020 and a list of the projects considered in this assessment are provided in Chapter 15 of this EIAR. These projects included a number of developments identified in Bearna which had been granted planning permission over the last five years including projects that have been granted permission within the site of the proposed development itself. In addition to these projects, the following developments are also planned within the immediate and wider area and were specifically included in the assessment:

- The proposed N6 Galway City Ring Road Corridor is located north of the application site. The Natura Impact Statement and habitat mapping undertaken for the proposed N6 Galway City Ring Road was also consulted. The NIS concluded that *'following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed road development and with the implementation of the mitigation measures proposed, that the proposed road, development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of any European Site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion'*. In addition, the Biodiversity chapter of the EIAR for that project concluded that there would be no likely significant residual effects on any of the Key Ecological Receptors that could result in significant effects when considered in combination with the currently proposed development.
- Bearna Village SHD is in a prospective SHD scheme in pre-planning stage.
- Permission for development on site accessed from the main street (R336). The proposed development will consist of the following: (1) modifications and improvements to 2 no. existing 2 storey street front houses, new public footpath and access to the houses, on-street car-parking spaces and boundary treatments. Construction of 1 no. new infill 1 bedroomed terraced house between the existing street front houses (2) demolition of existing partially-built garage structure on the site (3) construction of 15 no. new houses provided as follows: 4 no. in a terrace and 2 no. semi-detached Type A houses; 2 storey, 3 bedroomed houses with optional future attic conversion; 5 no. in a terrace Type B houses; 2.5 storey 3-bedroomed houses; 4 no. in a terrace Type C houses; 2.5 storey 3-bedroomed houses arranged around a shared landscaped home zone/village green amenity space (4) connection of all houses to existing drainage and watermain services, provision of new access road and associated carparking spaces (gross floor space proposed 2216sqm; retention 224sqm;demolition 68sqm) [Planning ref.: 16147]
- Permission for the provision of a total of 48 no. dwellings as follows: -30 no. 2 storey detached units, 14 no. 2 storey semi-detached units and 4 no. 2 storey terraced units together with all associated landscaping and site works and connection to existing services. Gross floor space 7044sqm [Planning ref.: 171314] and minor amendments under [Planning Ref: 18/1527]

6.7.2.3 Conclusion of Cumulative Assessment

Following the detailed assessment provided in the preceding sections, it is concluded that, the proposed development will not result in any likely significant effects on biodiversity either within the site of the proposed development or outside it. There is therefore no potential for the proposed development to contribute to any likely significant cumulative effects on biodiversity 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 development.

CONCLUSION

The proposed development has been specifically designed to avoid any likely significant effects on Biodiversity.

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

In circumstances where the proposed development is constructed and operated in accordance with the design described within this application, there will not be any likely significant effects on biodiversity at any geographic scale.