



Enviroguide
CONSULTING

NATURA IMPACT STATEMENT

FOR

PROPOSED SOCIAL &
TRAVELLER HOUSING

AT

HEADFORD ROAD,
BALLINFOYLE, CO. GALWAY

ON BEHALF OF



Comhairle Cathrach na Gaillimhe
Galway City Council

Prepared by
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1 INTRODUCTION

1.1 Project Scope

Enviroguide Consulting was commissioned by O'Briain Beary Architects acting on behalf of Galway City Council to carry out a review of an Appropriate Assessment Screening Report and subsequently prepare a Natura Impact Statement, for a Proposed Social and Traveller Housing Scheme at Headford Road, Ballinfoyle, Co. Galway.

1.2 Legislative Context

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community.

Member States are required to designate SACs and SPAs under the EU Habitats and Birds Directives, respectively. SACs and SPAs are collectively known as "Natura 2000" or "European" sites. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

An 'Appropriate Assessment' (AA) is a required assessment to determine the likelihood of significant effects, based on best scientific knowledge, of any plans or projects on European sites.

An Appropriate Assessment is required under Article 6 of the Habitats Directive where a project or plan may give rise to significant effects upon a Natura 2000 site. Paragraph 3 states that:

"6(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site, in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

These obligations in relation to Appropriate Assessment have been implemented in Ireland under Part XAB of the Planning and Development Act 2000, as amended ("the 2000 Act"), and in particular Section 177U and Section 177V thereof. The relevant provisions of Section 177U in relation to AA screening have been set out below:

“177U.— (1) *A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site.*

(2)...

(3)...

(4) *The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.*

(5) *The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is not required if it can be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.”*

1.3 Stages of AA

The AA process is a four-stage process, with issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

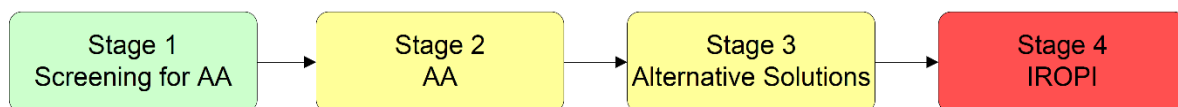


FIGURE 1. THE FOUR STAGES OF THE APPROPRIATE ASSESSMENT PROCESS (DEHLG, 2010 REVISION).

The four stages of an AA can be summarised as follows:

- **Stage 1: Screening.** The first stage of the AA process is to determine the likelihood of significant effects of the proposal.
- **Stage 2: *Natura Impact Statement (NIS)*.** The second stage of the AA process assesses the effect of the proposal (either alone or in combination with other projects or plans) on the integrity of the European site, with respect to the conservation objectives of the site and its ecological structure and function. A Natura Impact Statement containing a scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.
- **Stage 3: *Assessment of alternative solutions*.** If the outcome of Stage 2 is negative, i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned. This stage examines alternative solutions to the proposal.

- *Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain.* The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a European site, where no less damaging solution exists.

The Habitats Directive promotes a hierarchy of avoidance, mitigation, and compensatory measures. First the project should aim to avoid any negative effects on European sites by identifying possible effects early in the planning stage and designing the project to avoid such effects. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, a refusal for planning permission may be recommended. In this case, the project will generally only be considered where no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test), or, in the case of priority habitats, considerations of health or safety, or beneficial consequences of primary importance for the environment or to other imperative reasons of overriding public interest. Then compensation measures are required for any remaining adverse effects.

1.4 Guidance

This NIS has been undertaken in accordance with the following guidance:

- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.* (Department of Environment, Heritage and Local Government, 2010 revision);
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPW 1/10 & PSSP 2/10;
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2001);
- *Communication from the Commission on the precautionary principle* (European Commission, 2000); and,
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (European Commission, 2019).

2 STAGE 1: APPROPRIATE ASSESSMENT SCREENING

An Appropriate Assessment (AA) Screening Report was prepared for the Proposed Development by Ecofact Environmental Consultants.

It is noted in the AA Screening Report that the Proposed Development Site is located outside the Natura 2000 network. No direct impacts were identified due to the separation from the site and the Natura 2000 network.

However, the AA Screening report concluded that indirect impacts on European sites could not be ruled out, and as such the Proposed Development requires an Appropriate Assessment (Natura Impact Statement - NIS). The author lists two reasons for why a NIS is required, namely the identification of potential pathways for significant effects via surface water run-off and groundwater impacts, affecting the Lough Corrib SAC and the following habitats: Semi-natural dry grasslands and scrubland facies on calcareous substrates, Molinia meadows and Limestone pavement, and via Galway Wastewater Treatment Plant (WwTP), and uncertainty surrounding the effectiveness of treatment at the WwTP.

The AA Screening Report states that *"Using the Source-pathway-receptor model, one pathway for significant indirect and cumulative impacts was identified via the Galway WwTP, which discharges directly into the Galway Bay Complex SAC and the Inner Galway Bay SPA. Another pathway is identified regarding surface water run-off and groundwater impacts, affecting the Lough Corrib SAC which is c. 220m north-west, and the following habitats: Semi-natural dry grasslands and scrubland facies on calcareous substrates, Molinia meadows and Limestone pavement."*

Foul water treatment is considered to be a mitigation measure by the authors of the report. The report states that *"Mitigation is also required to ensure no significant impacts occur - as demonstrated in case C-323/17 People Over Wind and Peter Sweetman v Coillte, mitigation measures are not be taken into account at the screening stage of Appropriate Assessment. This includes for mitigation by a third party, which in this case would be foul water treatment by the Mutton Island plant. A full assessment and detailed examination of the Galway WwTP, expected discharge from the site, and calculations, is required. This cannot be carried out at the pre-assessment Screening stage."*

Having reviewed the AA Screening Report, Enviroguide Consulting is in agreement with Ecofact Environmental Consultants that there is a potential pathway via groundwater flow which could affect the Lough Corrib SAC, which is located c. 290m north-west of the Proposed Development Site. In addition, several habitats associated with this SAC are in close proximity to the Proposed Development Site (e.g. Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] and Limestone pavements [8240]). Although these Annex I habitats are located outside the boundary of the European Site, impacts to these habitats could impact on the structure and function of Lough Corrib SAC, and therefore an NIS is required. Given the proximity of the Site to Annex I habitats associated with Lough Corrib SAC, there is potential for significant effects on these habitats and potentially also the SAC due to dust deposition.

It is deemed that there is no pathway to European Sites via overland surface water flows. The Proposed Development is located downgradient of Lough Corrib SAC. Based on the topographical survey carried out (Figure 2), surface water run-off from the Site would flow south-east towards the Headford Road, in the opposite direction of Lough Corrib SAC. Site levels fall from c. 30.0 m OD at the west of the Site and c. 20m OD at the north of the Site, to c. 17m OD to the south of the Site. There are no surface water sewers on the Headford Road adjacent to the Site which could convey surface water run-off to a nearby waterbody or European Site. According to the Engineering Services Report (DBFL, 2022), at present, “all pluvial storm water that falls onto the site currently soaks away to ground or flows as sheet flow overland toward Headford Road. It then flows south along Headford Road and discharges to an existing marsh area. The marsh area is 150m south of the site on Headford Road, on the east side of Headford Road”¹.

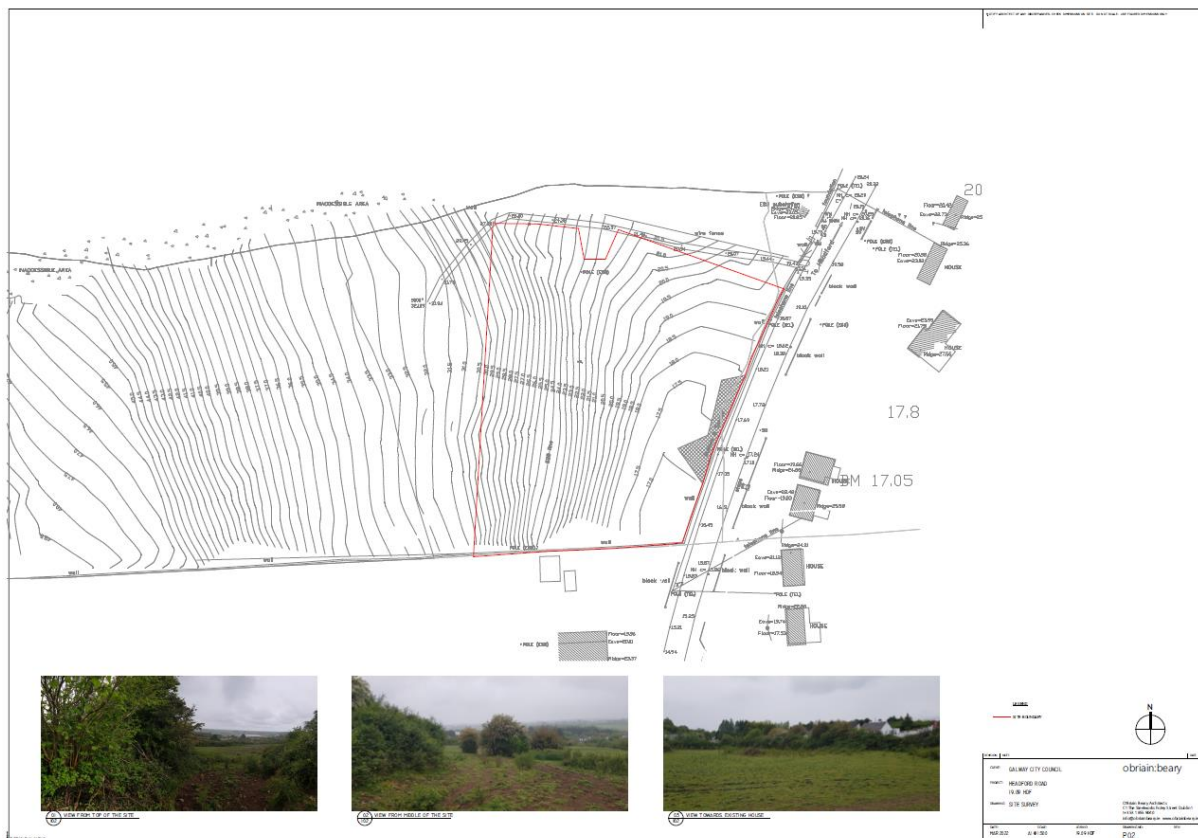


FIGURE 2. SITE SURVEY OF MAIN SITE AREA (O'BRIAN BEARY, 2022).

¹ Note this marsh area is north of the Turlough indicated in Figure 4.



FIGURE 3. PLUVIAL STORMWATER DISCHARGE POINT FROM MAIN SITE AREA (DBFL, 2022).

What is not considered in the AA Screening report is the potential for significant effects on Lough Corrib SPA, Galway Bay Complex SAC and the Inner Galway Bay SPA as a result of the Proposed Development due to hydrogeological pathways. It is understood that bulk excavation is required as part of the Proposed Development. Given the karst bedrock aquifer underlying the Site and the “marsh area” to the south of the Site, there is a likelihood that groundwater within the Clare-Corrib groundwater body (which the Site is in) could interact with Lough Corrib, River Corrib and Terryland River, which are ultimately linked with Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and the Inner Galway Bay SPA (Figure 6). Typically, there is strong interconnection between surface water and groundwater in karstified bedrock aquifers (GSI, 2017). In addition, there is potential for *ex-situ* sites linked with Lough Corrib SPA and/or Inner Galway Bay SPA to be affected. The requirement to consider the potential use of habitat areas outside of an SPA by SCI bird species is set out in the Inner Galway Bay Special Protection Area Conservation Objectives Supporting Document, Version 1 (NPWS, 2013c). These areas, referred to as ‘*ex-situ*’ sites and are defined as habitat situated within the immediate hinterland of the SPA, or in areas ecologically connected to it, which support SCI bird species. Wintering bird surveys were carried out at 60 potential *ex-situ* sites as part of the ecological surveys carried out for the N6 Galway City Ring Road EIAR/NIS. The closest *ex-situ* sites which were surveyed as part of the EIAR/NIS to the Proposed Development are Ballindoooley Lough (WB02) and the Lackagh Quarry (WB16) (indicated in

Volume 3 of the NIS - Figure 9). These are located c. 200m north-east and c. 220m west of the Proposed Development respectively. In an extreme scenario, with a pollution event of sufficient magnitude, these European sites/ex-situ sites could be affected via discharges of pollutants to ground during the Construction Phase. As groundwater vulnerability in the main development area of the Site is classed as *X- rock at or near the surface*, it is considered that there is potential for pollutants to migrate through the aquifer and surface waterbodies into the aforementioned European sites/ex-situ sites. It is noted that it is unlikely that a pollution event of such a magnitude would occur during construction. The Proposed Development is small in scale, and it would be anticipated that any pollution events that could occur would be relatively minor in comparison to the diluting capacity of a coastal water body the size of Galway Bay, or a lake water body the size of Lough Corrib, or to be any more than temporary in nature. Nevertheless, following the precautionary principle, impacts on habitats and species associated with Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and the Inner Galway Bay SPA due to hydrogeological pathways should be considered further. In addition, there is potential for birds utilising the ex-situ sites listed above to be disturbed as a result of noise pollution during the Construction Phase.

However, it is the considered opinion of Enviroguide Consulting that the treatment of wastewater at the Galway WwTP during the Operational Phase does not constitute a mitigation measure in the context of the Appropriate Assessment Screening report, and that there is no possibility for significant effects on Galway Bay Complex SAC and the Inner Galway Bay SPA via foul waters generated at the Site. This conclusion is based on the following:

- The increase of a maximum load of **97** Population Equivalent (PE) at the Galway WwTP as a result of the Proposed Development, assuming each PE unit was not previously supported by the WwTP, is considered to be an insignificant increase in terms of the overall scale of the facility. This potential maximum increased load does not have the capacity to alter the effluent released from the WwTP to such an extent as to result in likely significant effects on the SACs and SPAs connected hydrologically with Galway WwTP.
- The Galway WwTP was upgraded in 2017 to 170,000 P.E. The most recent available Annual Environmental Report (AER) of Galway WwTP indicates that discharge from the facility at the time (2021) was compliant, and the annual mean and maximum hydraulic loading is less than the peak Treatment Plant Capacity. The remaining capacity of the plant is given as 66744 PE for 2021 and the AER notes that the capacity will not be exceeded in the next three years. The AER also notes upgrades planned at the plant to completed with many noted to be at the planning stage (Irish Water, 2021).
- Surface water from the Proposed Development will be managed as per the above requirements of the Galway City Development Plan (i.e. surface water will drain to ground at the Site via SuDS measures and will not enter the combined sewer network).
- Finally, the following measures incorporated into the design of the WwTP are highlighted as having “a *high certainty of effectiveness*” for protected intertidal and subtidal marine communities and the waters of Galway Bay during the operational phase of the WwTP in the Marine Ecology chapter of the EIAR for Galway WwTP²:

² Galway City Council (2006) Mutton Island WWTP Upgrade. Environmental Impact Statement

- Continued use of existing diffuser comprising 10 ports below 10m CD will dissipate energy of the flow and facilitate effective dispersion of the treated effluent.
- Water quality standards will be maintained through compliance with the UWWTR standards and effective dilution and dispersion to maintain low levels of suspended sediment.
- Design of the sewage treatment processes to achieve the UWWTR quality standards will prevent any significant adverse effects on the water quality of the receiving water. Standards are designed to be environmentally protective and to comply with the relevant legislation.

As such, this NIS will focus on the potential impacts of the Proposed Development on **Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC** and the **Inner Galway Bay SPA** due to the potential for significant effects via air and groundwater pathways. A summary of impact sources and pathways to the relevant European Sites is provided in Table 1 below.

TABLE 1. SUMMARY OF POLLUTANT LINKAGES BETWEEN THE PROPOSED DEVELOPMENT SITE AND EUROPEAN SITES.

Receptor	Location relative to Site	Source of Impact	Pathway
Lough Corrib SAC	c. 290m to north-west at closest point.	Construction Phase: Dust emissions Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle. Discharge to ground of runoff water with: • high pH from cement process • hydrocarbons from construction vehicles • high concentration of suspended solids Operational Phase: Discharge to ground of hydrocarbons from car leak	Air Karstic bedrock aquifer
Lough Corrib SPA	c. 2.5 km to north-west at closest point. Ex-situ sites located c. 200m north-east and c. 220m west of the Proposed Development	Construction Phase: Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle. Discharge to ground of runoff water with: • high pH from cement process • hydrocarbons from construction vehicles	Air Karstic bedrock aquifer

Receptor	Location relative to Site	Source of Impact	Pathway
		high concentration of suspended solids Noise disturbance Operational Phase: Discharge to ground of hydrocarbons from car leak	
Galway Bay Complex SAC	c. 1.8 km to south at closest point.	Construction Phase: Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle. Discharge to ground of runoff water with: - high pH from cement process - hydrocarbons from construction vehicles - high concentration of suspended solids Operational Phase: Discharge to ground of hydrocarbons from car leak	Karstic bedrock aquifer
Inner Galway Bay SPA	c. 1.8 km to south at closest point. Ex-situ sites located c. 200m north-east and c. 220m west of the Proposed Development	Construction Phase: Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle. Discharge to ground of runoff water with: - high pH from cement process - hydrocarbons from construction vehicles - high concentration of suspended solids Noise disturbance Operational Phase: Discharge to ground of hydrocarbons from car leak	Air Karstic bedrock aquifer

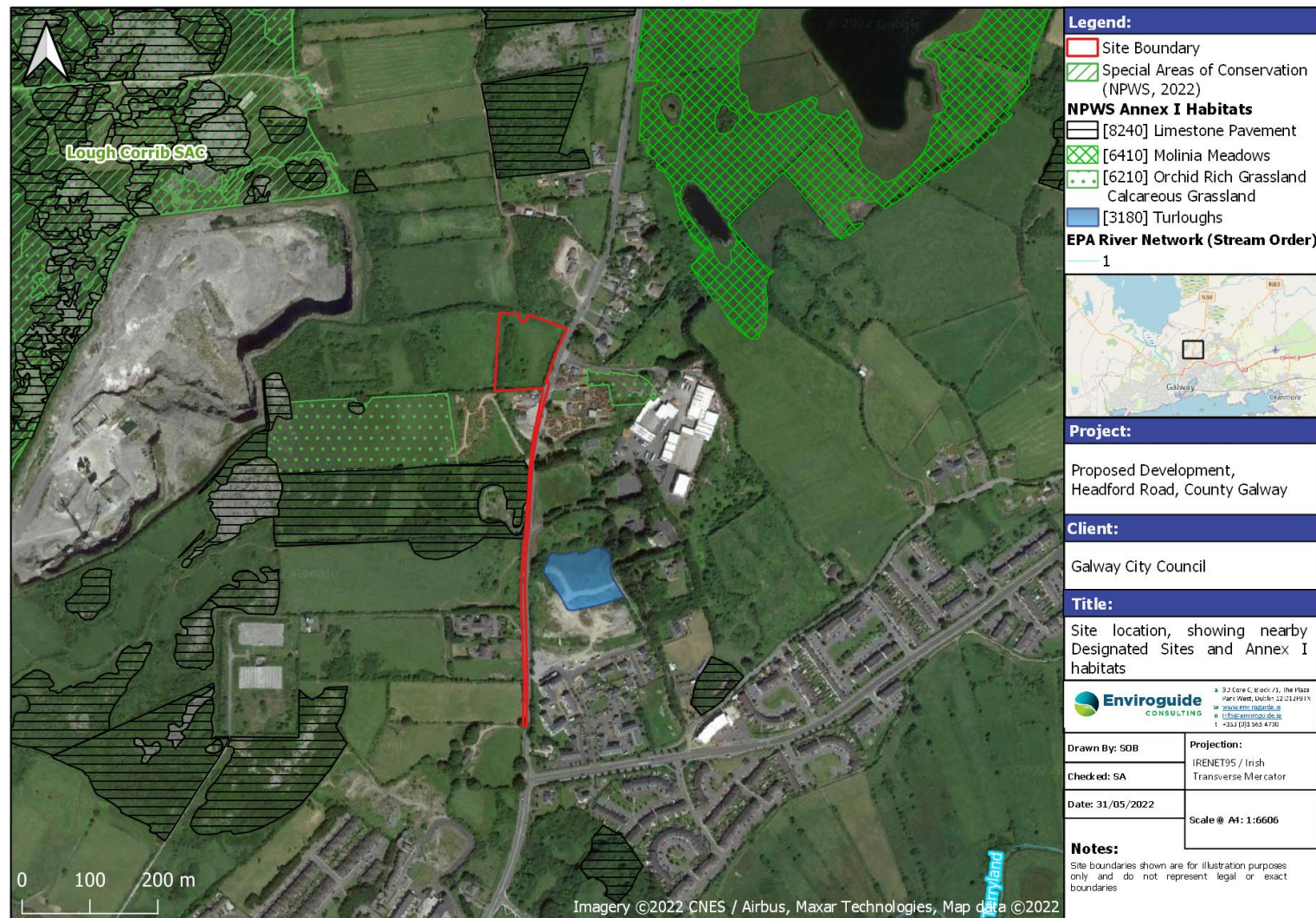


Figure 4. Annex I habitats and designated sites adjacent to the Proposed Development.

3 DESCRIPTION OF THE PROJECT

3.1 Description of the Development

3.1.1 Location and Size

The Site is located 3.2km north of Galway city centre by road. It is beyond the current edge of denser suburban estate development, the nearest such development being approximately 200m to the south, in an area characterised by low density one-off housing. Access is provided from the N84, a national trunk road. The Galway City Ring Road is planned to pass immediately to the north of the site. The GCRR road level will be elevated at approximately the median height of the sloping site, with the N84 passing below as an underpass.

3.1.2 Description

The Proposed Development entails the construction of a social housing development of 24 no residential units, comprising:

- *Provision of a 3.no. storey apartment block comprising –
 - 3 no. 1-bedroom units, 14 no. 2-bedroom units, 4 no. 3-bedroom units*
- *Provision of 3 no. 2-storey, 4-bedroom TAA (Traveller Appropriate Accommodation) units.*
- *Provision of roof mounted Solar PV panels on proposed apartment block.*
- *Provision of a foul water pumping station, carparking and bicycle parking, landscaping, children's play area, multi-use games area, connections to existing services and all ancillary/enabling site development works.*

Construction Phase

It is predicted that the entire development will be undertaken in one phase. The sequencing will be decided by the contractor, but it is envisaged that the houses and apartment block will progress at the same time, following a considerable site clearance. The anticipated construction stage duration will be 17 months.

It will be necessary to connect the proposed pumping station to the existing mains sewer on Headford Road, approximately 560m south of the Proposed Development. The installation of the rising main proposed in the N84 roads reserve will entail excavation in the N84 road reserve (within the sidewalk) for 560m and laying and testing of the new 80mmØ rising main to the indicated tie in point.

Traffic management along the N84 south of the site for 560m all the way to the tie in will be provided.

All existing pavement layer works thicknesses and types will be reinstated and as per existing and tested as per testing schedule, all layers will be keyed in where the trench intrudes onto the N84. All pipe and road pavement layer works (as per testing schedule) will be done and approved by the engineer.

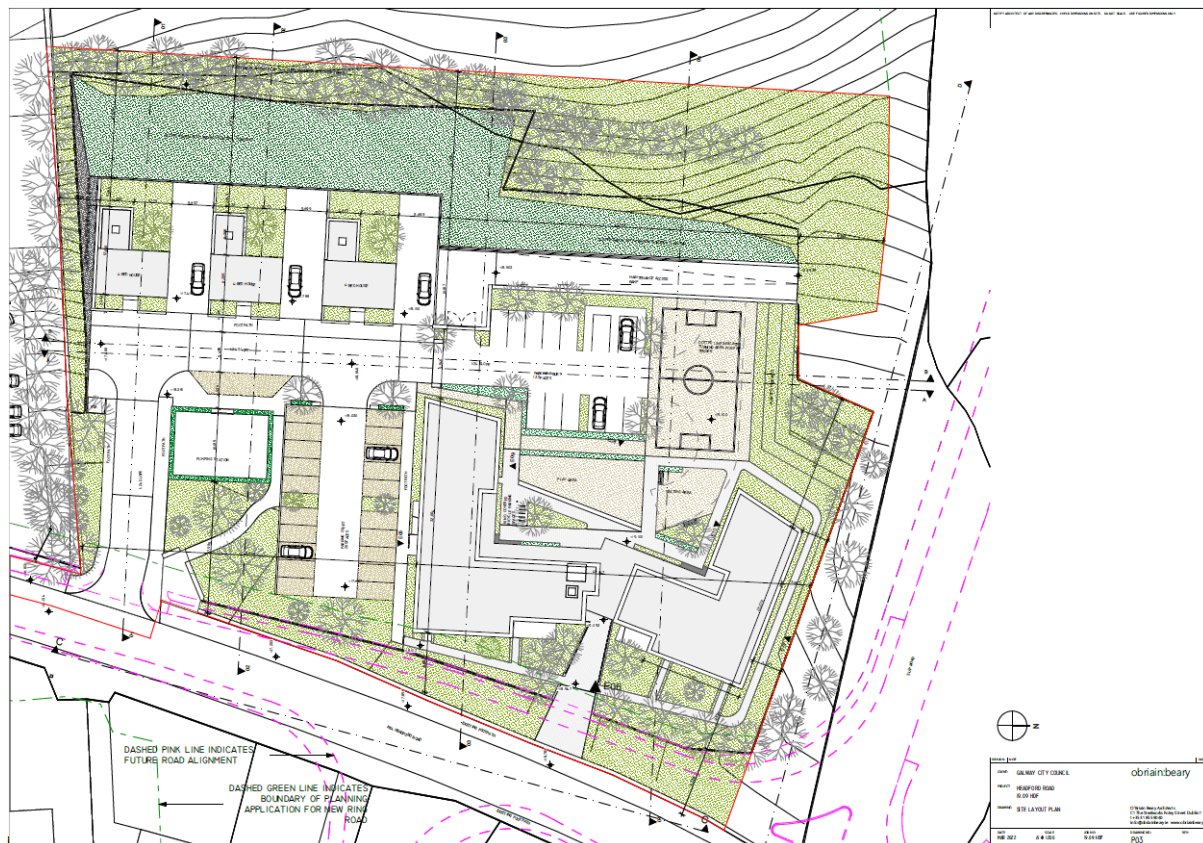


Figure 5. Site Layout Plan (O'Briain Beary Architects, 2022).

3.2 Existing Environment

The Site of the Proposed Development is within the Corrib catchment and the Corrib_SC_010 subcatchment. A small unnamed lake is located c. 240m to the north-east of the Site, and Ballindooly Lough is located c. 540m to the north-east of the Site. The closest river waterbody to the Site is the Terryland stream (EPA Code: 30T01), located approximately 700m to the south of the Proposed Development Site. This stream flows into the Corrib River, just north of the N6 bridge over the Corrib River. There is no hydrological connection between the Site and this stream.

The status of the Inner Galway Bay North coastal waterbody was classified as “unpolluted” during the 2018-2020 reporting period and has a WFD status of *Good* (EPA, 2021). The status of the Corrib Estuary transitional waterbody was also classified as “unpolluted” during the 2018-2020 reporting period and has a WFD status of *Good* (EPA, 2021). These waterbodies are *Not At Risk* of not achieving their status objectives under the Water Framework Directive (EPA, 2021).

The Site of the Proposed Development is situated on the Clare-Corrib groundwater body, which has *Good* status, but is *At Risk* of not meeting its WFD objectives. The Site is on a *Regionally Important Aquifer - Karstified (conduit)*. The groundwater rock units underlying the aquifer are classified as *Dinantian Pure Bedded Limestones*. The subsoils at the Site are classified as *Karstified bedrock outcrop or subcrop*, with *Limestone till (Carboniferous)* present within the southmost 180m of Headford Road included within the Site boundary. Groundwater

vulnerability in the area is predominantly classified as *X- Rock at or Near Surface*, with an area of *Extreme* within the southmost 180m of Headford Road.

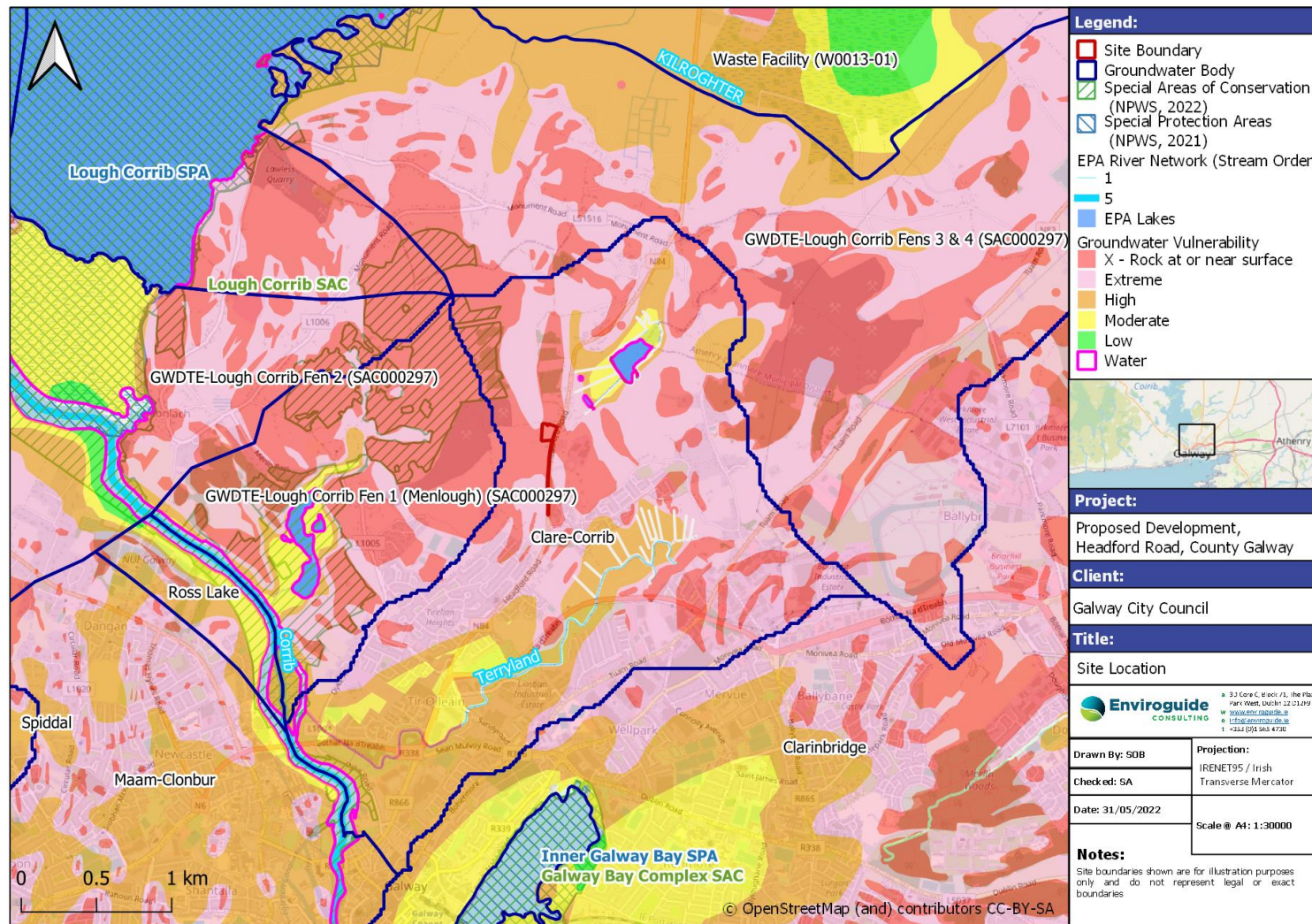
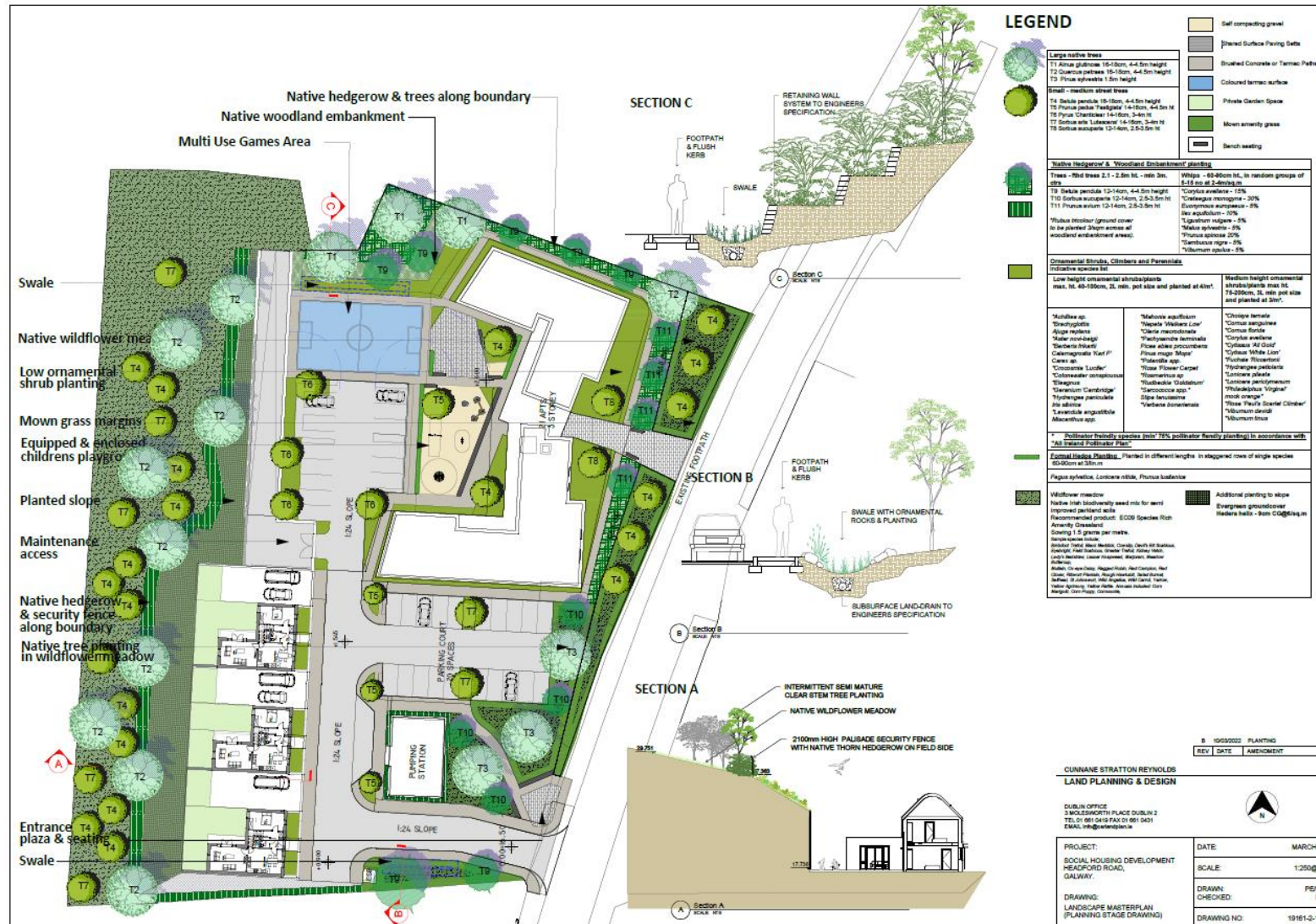


Figure 6. Site location.



4 METHODOLOGY

4.1 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources relevant for the completion of the Natura Impact Statement. The desktop study, completed in November 2021, and updated in May 2022, relied on the following sources:

- Information on the network of European sites, relevant boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie;
- Information on the status of EU protected habitats and species in Ireland, obtained from the NPWS Article 17 reports;
- Text summaries of the relevant European sites taken from the respective Standard Data Forms and Site Synopses for each site, available at www.npws.ie
- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at www.maps.biodiversityireland.ie;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.gis.epa.ie;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and their design team.
- Baseline ecological data obtained from the N6 Galway City Ring Road EIAR and NIS ([302848](https://www3.eir.ie/302848) | [An Bord Pleanála \(pleanala.ie\)](http://AnBordPleanála.ie))

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 10, References.

4.1.1 N6 Galway City Ring Road EIAR/NIS

The Site occurs within the zone of influence of the proposed N6 Galway City Ring Road (it is located immediately adjacent to the proposed N84 Headford Road Junction), and as such, detailed ecological field surveys have been carried out at the Site and in the general area to support this project. The results of these surveys were used to inform this NIS. Relevant surveys for which information was available included:

- Habitat Surveys (carried out during the following time period as indicated in Table 8.2 of the EIAR report: September to December 2015, July to October 2016, May 2017 to January 2018)
- Protected plant species surveys for:
 - Slender naiad *Najas flexilis* (carried out for the Route Selection process during the following time period as indicated in Table 8.2 of the EIAR report: June to September 2014)

- Varnished hook-moss *Hamatocaulis vernicosus* (carried out for the Route Selection process during the following time period as indicated in Table 8.2 of the EIAR report: September 2014)
- White-clawed crayfish survey. (Surveys carried out during the following time period as indicated in Table 8.2 of the EIAR report: September 2014)
- Molluscan surveys (includes Freshwater pearl mussel and Vertigo snail species surveys). (Surveys carried out during the following time period as indicated in Table 8.2 of the EIAR report: August 2014 and October 2017)
- Wintering bird survey (Surveys carried out during the following time period as indicated in Table 8.2 of the EIAR report: September 2014 to March 2015).

4.2 Field Surveys

A multi-disciplinary field survey was carried out at the Site of the Proposed Development on the 3rd March 2022. Habitats were categorised according to the Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2010) published by the Heritage Council. An android mobile device enabled with built-in GPS and mobile data connectivity and loaded with QField GIS software was used to record data and to navigate the site. Habitat categories, characteristic plant species, invasive species and other ecological features were recorded. The Site was searched for tracks, scat and other signs of mammals. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

4.3 Limitations

General habitat surveys and invasive species surveys were carried out outside the optimum timeframe for general botanical field surveying (i.e., March). It was not possible to undertake breeding bird surveys. No bat activity surveys were undertaken. However, ecological assessments of the Site were carried out previously as part of the N6 Galway City Ring Road Project, and reference was made to these survey results as they provide information on the species recorded at the Site during the summer months.

An extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

5 SUMMARY OF RELEVANT EUROPEAN SITES

The following is extracted from the Natura 2000 - Standard Data Form for Lough Corrib SAC, Lough Corrib SPA, Galway Bay Complex SAC and the Inner Galway Bay SPA.

5.1 Lough Corrib SAC [000297]

Lough Corrib is situated directly north of Galway city and is the second largest lake in Ireland. The lake supports extensive *Chara* beds, many wooded islands and large areas of swamp and fen in the shallow south-east section which lies on limestone. The north-west part is deeper, wider and more oligotrophic. Shore is mainly karst, bog and small areas of callow. The surroundings are farmland and holiday-home areas. Most of the main rivers and their tributaries which flow into the lake are included within the site, including the Abbert, Clare, Cong, Cornamona, Dalgan, Drimeen, Grange, Owenwee, Owenriff and Sinking rivers. The River Corrib flows from the southern point of the lough into the sea at Galway city.

The site is of immense importance for the occurrence of scarce and specialised habitats, as well as animal and plant species. Lough Corrib is the second largest oligotrophic lake in the country and is a superb example of a hardwater system. The site holds 14 Annex I habitats, 6 of these are priority Annex I habitats of the EU Habitats Directive, 5 Red Data Book plant species, also *Drepanocladus vernicosus* and *Lutra lutra*, and a rare chironomid *Corynorera ambigua*, good populations of *Margaritifera margaritifera*, *Austropotamobius pallipes*, *Petromyzon marinus* and *Lampetra planeri*. The site also supports an important population of *Salmo salar*. Important for wintering and breeding birds with *Anser albifrons flavirostris*, *Sterna hirundo* and *Sterna paradisea*.

5.2 Galway Bay Complex SAC [000268]

The Galway Bay Complex is a very large, marine-dominated, site situated on the west coast of Ireland. The inner part of the south bay is protected from exposure to Atlantic swells by the Aran Islands and Black Head. Subsidiary bays and inlets (e.g. Poul-na-clough, Aughinish and Kinvara Bays) add texture to the patterns of water movement and sediment deposition, which lends variety to the marine habitats and communities. The terraced Carboniferous (Visean) limestone platform of the Burren sweeps down to the shore and into the sublittoral. West of Galway city, the bedrock geology is granite. The long shoreline is noted for its diversity, with complex mixtures of bedrock shore, shingle beach, sandy beach and fringing salt marshes. Other habitats which occur in small amounts include lagoon, fen, turlough, dry grassland, wet grassland and deciduous woodland.

The site has very important and good quality examples of large shallow inlets and bays, intertidal mud and sandflats, and reefs. The area has the country's only recorded example of the littoral community characterized by *Fucus serratus* with sponges, ascidians and red seaweeds on tide-swept lower eu-littoral mixed substrata. Sublittorally, the area has Ireland's only reported piddock bed, an extensive maerl bed of *Phymatolithon calcareum*, an oyster bed, and seagrass beds. A host of rare marine organisms occur, including the sea urchin *Paracentrotus lividus*, the sponge *Mycale contarenii*, the red algae *Phyllophora sicula* and *Rhodomenia delicatula*. Lagoons are particularly well represented and varied in type, size and salinity. Of especial importance are the rare karstic rock lagoons, of which the site holds all but one of the examples known from the mainland of Ireland. Good quality salt marshes of

both Atlantic and Mediterranean types are well represented and occur along with perennial vegetation of stony banks. A very good, though limited, example of calcareous grassland rich in orchids occurs, and there are examples of alkaline fen and *Juniperus communis* scrub of moderate quality. Two Red Data Book stoneworts occur, *Chara canescens* and *Lamprothamnium papulosum*, and also two Red Data Book vascular plants - *Crambe maritima* and *Hyoscyamus niger*. The site has one of the largest populations of *Phoca vitulina* in the country and provides optimum habitat for *Lutra lutra*. Galway Bay is a very important ornithological site, with an internationally important wintering population of *Branta bernicla hrota* and regular nationally important populations of a further 16 species, including *Gavia immer*, *Gavia arctica*, *Pluvialis apricaria* and *Limosa lapponica*. Breeding birds of note are *Phalacrocorax carbo*, *Sterna sandvicensis* and *Sterna hirundo*.

5.3 Lough Corrib SPA [004042]

Lough Corrib is the largest lake in the Republic of Ireland. The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones, to the north. The main inflowing rivers are the Black, Clare, Dooghta, Cregg, Owenriff and the channel from Lough Mask. The main outflowing river is the Corrib, which reaches the sea at Galway City. Lough Corrib is classified as a mesotrophic system and overall water quality is considered to be satisfactory. The shallow, lime-rich waters of the southern basin of the lake support one of the most extensive beds of charophytes (*Chara* spp.) in Ireland, which occur mixed with submerged pondweeds (*Potamogeton* spp.). Large areas of reedswamp vegetation, dominated by varying mixtures of *Phragmites australis* and *Scirpus lacustris*, occur around the margins of the lake. Reedswamp usually grades into species-rich marsh vegetation. Of particular note are the extensive beds of *Cladium mariscus* that have developed over the marly peat deposits in sheltered bays. The lake has numerous islands, from rocky islets to larger islands with grassland or woodland. The surrounding lands are mostly pastoral farmland, to the south and east, and bog and heath, to the west and north. Lough Corrib is an internationally renowned salmonid fishery.

The site is of international importance for wintering *Aythya ferina* but also qualifies for international importance because it regularly supports well in excess of 20,000 waterfowl. It is one of the top five sites in the country for wintering waterfowl. Of particular importance is that it is the most important site in the country for *Aythya ferina*, *Aythya fuligula* and *Fulica atra* supporting 21%, 46% and 13% of the respective national totals. It also has nationally important populations of wintering *Cygnus olor*, *Anas strepera*, *Anas clypeata*, *Pluvialis apricaria* and *Vanellus vanellus*. The lake is a traditional site for *Anser albifrons flavirostris*. Small numbers of *Cygnus cygnus* winter. Lough Corrib is a traditional breeding site for gulls and terns. There are nationally important colonies of *Sterna hirundo* and *Sterna paradisaea*, as well as *Larus ridibundus* and *Larus canus*. Considerable higher numbers of gulls bred in the 1970s and 1980s. Whilst only colonised in the 1970s/80s by nesting *Melanitta nigra*, Lough Corrib now supports approximately half of the national population of this rare duck, which is a Red Data Book species. The population has been stable since the mid 1990s. Lough Corrib supports a range of species listed on Annex II of the E.U. Habitats Directive, including *Lutra lutra*, *Salmo salar* and *Najas flexilis*.

5.4 Inner Galway Bay SPA [004031]

Galway Bay SPA is a very large, marine-dominated, site situated on the west coast of Ireland. The inner bay is protected from exposure to Atlantic swells by the Aran Islands and Black Head. Subsidiary bays and inlets (e.g. Poul-na-clough, Aughinish and Kinvarra Bays) add texture to the patterns of water movement and sediment deposition, which lends variety to the marine habitats and communities. The terraced Carboniferous (Viséan) limestone platform of the Burren sweeps down to the shore and into the sublittoral. The long shoreline is noted for its diversity, with complex mixtures of bedrock shore, shingle beach, sandy beach and fringing salt marshes. Intertidal sand and mud flats occur around much of the shoreline, with the largest areas being found on the sheltered eastern coast between Oranmore Bay and Kinvarra Bay. Seagrass beds lie off Finavarra Point. A number of small islands composed of glacial deposits are included, such as Deer Island, along with some rocky islets.

Galway Bay is one of the most important ornithological sites in the western region. It supports internationally important wintering populations of *Gavia immer* and *Branta bernicla hrota* and regularly occurring nationally important populations of an additional 16 species, most notably *Mergus serrator* (6.7% of national total), *Charadrius hiaticula* (3.3% of total), *Anas clypeata* (2.9% of total) and *Limosa lapponica* (2.5% of total). It supports the largest and the most regular population of *Gavia arctica* in the country. The bay is an important wintering site for gulls, and is of national significance for at least *Larus canus*. Breeding birds of note are *Phalacrocorax carbo*, *Sterna sandvicensis* and *Sterna hirundo*. The site provides both feeding and roost sites for most of the species, though some birds commute to areas outside of the site. The birds of Galway Bay have been monitored annually since 1980/81. The site has one of the largest populations of *Phoca vitulina* in the country.

TABLE 2. QUALIFYING INTERESTS OF EUROPEAN SITES WITH THE POTENTIAL TO BE AFFECTED BY THE PROPOSED DEVELOPMENT.

Natura 2000 Site	Qualifying Interests	Distance (km)
Lough Corrib SAC (000297)	• Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] • Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] • Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] • Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] • Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the Rhynchosporion [7150] • Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae [7210] • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] • Alkaline fens [7230] • Limestone pavements [8240] • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] • Bog woodland [91D0] • <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] • <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] • <i>Petromyzon marinus</i> (Sea Lamprey) [1095] • <i>Lampetra planeri</i> (Brook Lamprey) [1096] • <i>Salmo salar</i> (Salmon) [1106] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Lutra lutra</i> (Otter) [1355] • <i>Najas flexilis</i> (Slender Naiad) [1833] • <i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]	c. 290m north-west
Galway Bay Complex SAC (000268)	• Mudflats and sandflats not covered by seawater at low tide [1140] • Coastal lagoons [1150] • Large shallow inlets and bays [1160] • Reefs [1170] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (<i>Glaucio-Puccinellietalia maritimae</i>) [1330] • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] • Turloughs [3180] • Juniperus communis formations on heaths or calcareous grasslands [5130]	c. 1.8km south

Natura 2000 Site	Qualifying Interests	Distance (km)
	- Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] - Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] - Alkaline fens [7230] - Limestone pavements [8240] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]	
Inner Galway Bay SPA (004031)	- Black-throated Diver (<i>Gavia arctica</i>) [A002] - Great Northern Diver (<i>Gavia immer</i>) [A003] - Cormorant (<i>Phalacrocorax carbo</i>) [A017] - Grey Heron (<i>Ardea cinerea</i>) [A028] - Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] - Wigeon (<i>Anas penelope</i>) [A050] - Teal (<i>Anas crecca</i>) [A052] - Red-breasted Merganser (<i>Mergus serrator</i>) [A069] - Ringed Plover (<i>Charadrius hiaticula</i>) [A137] - Golden Plover (<i>Pluvialis apricaria</i>) [A140] - Lapwing (<i>Vanellus vanellus</i>) [A142] - Dunlin (<i>Calidris alpina</i>) [A149] - Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] - Curlew (<i>Numenius arquata</i>) [A160] - Redshank (<i>Tringa totanus</i>) [A162] - Turnstone (<i>Arenaria interpres</i>) [A169] - Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] - Common Gull (<i>Larus canus</i>) [A182] - Sandwich Tern (<i>Sterna sandvicensis</i>) [A191] - Common Tern (<i>Sterna hirundo</i>) [A193] - Wetland and Waterbirds [A999]	c. 1.8km south
Lough Corrib SPA (004042)	- Gadwall (<i>Anas strepera</i>) [A051] - Shoveler (<i>Anas clypeata</i>) [A056] - Pochard (<i>Aythya ferina</i>) [A059] - Tufted Duck (<i>Aythya fuligula</i>) [A061] - Common Scoter (<i>Melanitta nigra</i>) [A065] - Hen Harrier (<i>Circus cyaneus</i>) [A082] - Coot (<i>Fulica atra</i>) [A125] - Golden Plover (<i>Pluvialis apricaria</i>) [A140] - Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] - Common Gull (<i>Larus canus</i>) [A182] - Common Tern (<i>Sterna hirundo</i>) [A193] - Arctic Tern (<i>Sterna paradisaea</i>) [A194] - Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] - Wetland and Waterbirds [A999]	c. 2.5km west

6 IMPACT PREDICTION

6.1 Overview of the Site

Agricultural grassland was one of the dominant habitat types recorded at the Site during the field survey carried out in March 2022. It is unclear whether or not the grassland at the Site has been “improved” (i.e., reseeded or fertilised), however, the grassland at the Site has been heavily grazed and poached by livestock. According to Fossitt (2000), low levels of improvement and high levels of grazing can influence sward composition, reduce species diversity and lead to increased representation of ‘agricultural’ herbs. Agricultural herbs were recorded within the grassland at the Site. Given the poached nature of the grassland, and the species recorded within it, it is classified here as (improved) agricultural grassland (as opposed to GS1 dry calcareous and neutral grassland, which is the habitat that was recorded at the Site as part of the N6 Galway City Ring Road habitat surveys). Herb species recorded within the grassland included creeping buttercup *Ranunculus repens*, clover *Trifolium* sp., dock *Rumex* sp., dandelions *Taraxacum vulgaria* and greater plantain *Plantago major*.

Scrub habitat was recorded throughout the Site. The scrub recorded towards the eastern Site boundary was typically immature and was comprised of blackthorn *Prunus spinosa* and bramble *Rubus fruticosus*, which was beginning to colonise the agricultural grassland at the Site. The scrub habitat towards the south, west and centre of the Site was comprised of blackthorn, brambles, hawthorn *Crataegus monogyna*, ivy *Hedera helix*, bracken *Pteridium aquilinum* and hazel *Corylus avellana*. Hazel dominated the scrub habitat within the centre of the Site. The understorey of the hazel scrub was degraded as a result of poaching/trampling of the vegetation by livestock. Herbs recorded within the understorey included herb robert *Geranium robertianum*, ivy, mosses, and *Hypericum* sp.

Hedgerows were recorded along the southern and eastern boundaries of the Proposed Development. Stone walls were recorded along the base of both hedgerows. Blackthorn, hazel, bramble, ivy, hawthorn, bracken, willow *Salix* sp. and box honeysuckle *Lonicera nitida* were recorded within this habitat.

As well as the stone walls recorded along the base of both hedgerows described above, a stone wall was recorded within the scrub habitat along the west Site boundary. Buildings and artificial surfaces habitat exists on Site in the form of Headford Road.

Spoil and bare ground habitat occurred where the agricultural grassland had been heavily poached by livestock to the point that very little vegetation was recorded. The majority of this habitat was recorded towards the centre of the Site.

No invasive species listed in the Third Schedule of *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477 of 2011, as amended) e.g., Japanese Knotweed, were recorded at the Site during the survey.

Two ‘Medium Impact’ plant species were recorded on Site:

- Himalayan Honeysuckle *Leycesteria formosa* was recorded within the south of the Site. There are no documented impacts recorded for this species, although it can form dense thickets that may exclude native vegetation.

- Montbretia *Crocasmia X crocosmiiflora* was observed within the along the southeast boundary of the Site, along Headford Road. This species is an 'Amber-list' species' according to Invasive Species Ireland, which is a Medium Impact species that may pose a risk to conservation goals (Kelly et al., 2013). This species has the ability to dominate the habitat in which it grows, potentially outcompeting native plant species.

No bat surveys were carried out at the Site. Whereas there is commuting and foraging habitat at the Site, roosting habitat appeared to be limited due to the lack of mature trees and buildings on Site.

The bird species recorded on Site during the 3rd of March 2022 survey are recorded in Table 3.

TABLE 3. BIRD SPECIES RECORDED ON SITE IN MARCH 2022.

Species	Conservation Concern
Blackbird <i>Turdus merula</i>	Green
Robin <i>Erithacus rubecula</i>	Green
Great Tit <i>Parus major</i>	Green
Goldcrest <i>Regulus regulus</i>	Amber
Woodpigeon <i>Columba palumbus</i>	Green
Jackdaw <i>Corvus monedula</i>	Green

In addition to carrying out field surveys, the ecological surveys carried out for the N6 Galway City Ring Road EIAR/NIS and Article 17 spatial data available from the NPWS³ were consulted to inform this NIS. According to available data from the NPWS and EIAR/NIS for the N6 Galway City Ring Road, several nearby fields correspond with various Annex I habitats (Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210], Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] and Limestone pavements [8240]). In addition, Petrifying springs with tufa formation [7220] have been identified within the Lackagh Quarry as part of the N6 Ring Road Project. However, the Site itself does not support any Annex I habitats (indicated in Volume 3 of the EIAR - Figure 8.15.8) and this was confirmed via field surveys. In addition, it is noted in the Biodiversity Chapter of the EIAR that “There are no rare or legally protected plant species present within the proposed development boundary or known from areas within the Zol of the proposed road development” (EIAR Volume 2, Chapter 8, p. 353) and “neither the White-clawed crayfish, the Freshwater pearl mussel, nor any other legally protected mollusc species, were recorded within the Zol of the proposed road development” (EIAR Volume 2, Chapter 8, p. 357). Furthermore, regarding Hen Harrier (listed as an SCI species for Lough Corrib SPA), it is noted in the Galway City Ring Road NIS that “None of the winter roost sites are within the construction or operational disturbance Zol and would not therefore displace Hen harrier” (NIS Volume 2, p. 232). During the Hen Harrier surveys carried out for

³ <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17/2019>

the Ring Road project, a single Hen Harrier individual was recorded in the vicinity of Lough Inch in January 2015.

The requirement to consider the potential use of habitat areas outside of an SPA by SCI bird species is set out in the Inner Galway Bay Special Protection Area (Site Code 004031), Conservation Objectives Supporting Document, Version 1 (NPWS, 2013c). These areas, referred to as 'ex-situ' sites and are defined as habitat situated within the immediate hinterland of the SPA, or in areas ecologically connected to it, which support SCI bird species (NPWS, 2013c). Wintering bird surveys were carried out at 60 potential ex-situ sites as part of the ecological surveys carried out for the N6 Galway City Ring Road EIAR/NIS. The closest ex-situ sites which were surveyed as part of the EIAR/NIS to the Proposed Development are Ballindookey Lough (WB02) and the Lackagh Quarry (WB16) (indicated in Volume 3 of the NIS - Figure 9). These are located c. 200m north-east and c. 220m west of the Proposed Development respectively.

6.2 Direct Effects

As noted in the AA Screening prepared by Ecofact Environmental Consultants, there is no potential for direct construction phase or operational phase effects to arise which could affect the conservation objectives of the Natura 2000 network. The Site itself does not contain any Annex I habitats, and it does not provide ex-situ habitat for SCI species associated with Lough Corrib SPA and Inner Galway Bay SPA.

6.3 Indirect Effects

6.3.1 Lough Corrib SAC

There is potential for indirect effects on Lough Corrib SAC. These are discussed further below.

6.3.1.1 Effects due to hydrogeological pathways

The Site of the Proposed Development is located within the Clare-Corrib groundwater body. The underlying aquifer of the main development area of the Site is a regionally important karstified bedrock aquifer. The groundwater body partially underlays Lough Corrib SAC, as well as a number of Annex I habitats, including Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210], Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] and Limestone pavements [8240]. It is noted that the Semi-natural dry grasslands and scrubland facies on calcareous substrates [6210] habitat is not groundwater dependant and as such will not be indirectly affected by the Proposed Development due to groundwater. However, Limestone pavements [8240] and Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] could be negatively impacted due to pollution of groundwater. In addition, Petrifying springs with tufa formation [7220] have been identified within the Lackagh Quarry as part of the N6 Ring Road Project.

6.3.1.2 Effects due to air pathways

Several habitats associated with Lough Corrib SAC are in close proximity to the Proposed Development Site. Although these Annex I habitats are located outside the boundary of the European Site, impacts to these habitats could impact on the structure and function of Lough Corrib SAC. Given the proximity of the Site to Annex I habitats associated with Lough Corrib

SAC, there is potential for significant effects on these habitats and potentially also the SAC due to dust deposition.

6.3.2 Galway Bay Complex SAC

There is potential for indirect effects on Galway Bay Complex SAC. These are discussed further below.

6.3.2.1 Effects due to hydrogeological pathways

The Site of the Proposed Development is located within the Clare-Corrib groundwater body. The underlying aquifer of the main development area of the Site is a regionally important karstified bedrock aquifer. Given the karst bedrock aquifer underlying the Site, there is a likelihood that groundwater within the Clare-Corrib groundwater body could interact with Lough Corrib, River Corrib and Terryland River, which are ultimately linked with Galway Bay Complex SAC. As noted previously, there is strong interconnection between surface water and groundwater in karstified bedrock aquifers (GSI, 2017). An Annex I turlough habitat also occurs approximately 250m to the south of the Proposed Development (Figure 4). It is considered that there is potential for pollutants, although slight, to migrate through the aquifer and surface waterbodies into Galway Bay Complex SAC and the Annex I habitats associated with it. As such, there is potential for groundwater related impacts to arise as a result of the Proposed Development.

6.3.3 Inner Galway Bay SPA

There is potential for indirect effects on Inner Galway Bay SPA. These are discussed further below.

6.3.3.1 Effects due to hydrogeological pathways

The Site of the Proposed Development is located within the Clare-Corrib groundwater body. The underlying aquifer of the main development area of the Site is a regionally important karstified bedrock aquifer. Given the karst bedrock aquifer underlying the Site, there is a likelihood that groundwater within the Clare-Corrib groundwater body could interact with Lough Corrib, River Corrib and Terryland River, which are ultimately linked with Inner Galway Bay SPA. As noted previously, there is strong interconnection between surface water and groundwater in karstified bedrock aquifers (GSI, 2017). It is considered that there is potential, although slight, for pollutants to migrate through the aquifer and surface waterbodies into Inner Galway Bay SPA. As such, there is potential for groundwater related impacts to arise as a result of the Proposed Development.

In addition, there is potential for groundwater related impacts to occur at *ex-situ* sites (e.g. wetland habitats located outside the boundaries of the SPA) due to potential pollutants migrating through the aquifer and entering these habitats. The requirement to consider the potential use of habitat areas outside of an SPA by SCI bird species is set out in the Inner Galway Bay Special Protection Area Conservation Objectives Supporting Document, Version 1 (NPWS, 2013c). These areas are termed 'ex-situ' sites and are defined as *habitat situated within the immediate hinterland of the SPA, or in areas ecologically connected to it, which support SCI bird species* (NPWS, 2013).

6.3.3.2 *Effects due to air pathways*

The Site is located within approximately 200-220m of potential ex-situ habitat for SCI bird species. However, it is deemed that the Proposed Development would not affect SCI bird species utilising these habitats due to construction related disturbance (e.g. noise). The Proposed Development is small in scale, the construction phase will be short-term in duration, and will not restrict the extent of habitat available to any SCI species such that any population level effects would occur.

6.3.4 **Lough Corrib SPA**

There is potential for indirect effects on Lough Corrib SPA. These are discussed further below.

6.3.4.1 *Effects due to hydrogeological pathways*

The Site of the Proposed Development is located within the Clare-Corrib groundwater body. The underlying aquifer of the main development area of the Site is a regionally important karstified bedrock aquifer. Given the karst bedrock aquifer underlying the Site, there is a likelihood that groundwater within the Clare-Corrib groundwater body could interact with Lough Corrib. As noted previously, there is strong interconnection between surface water and groundwater in karstified bedrock aquifers (GSI, 2017). It is considered that there is potential, although slight, for pollutants to migrate through the aquifer and surface waterbodies into Lough Corrib SPA. As such, there is potential for groundwater related impacts to arise as a result of the Proposed Development.

In addition, there is potential for groundwater related impacts to occur at *ex-situ* sites (e.g. wetland habitats located outside the boundaries of the SPA) due to potential pollutants migrating through the aquifer and entering these habitats.

6.3.4.2 *Effects due to air pathways*

The Site is located within approximately 200-220m of potential ex-situ habitat for SCI bird species. However, it is deemed that the Proposed Development would not affect SCI bird species utilising these habitats due to construction related disturbance (e.g. noise). The Proposed Development is small in scale, the construction phase will be short-term in duration, and will not restrict the extent of habitat available to any SCI species such that any population level effects would occur.

6.4 **In-combination Effects**

A search of planning applications located within the vicinity of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie) and Galway City Council's Planning Application Map. Any planning applications listed as granted or decision pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on Lough Corrib SAC. Long-term developments granted outside of this time period were also considered where applicable.

It is noted that the majority of developments within the vicinity of the Site of the Proposed Development are applications granted more than 5 years ago and that have since been completed. **No developments** with the potential to result in likely significant in-combination

effects to any European Site were identified. The larger, more recent applications are detailed below:

App no: 1942. **Location:** Approx. 50m south of the Proposed Development Site. **Planning Status:** Granted (Conditional). **Decision Date:** 17/10/2019

Permission to amend Phase II of planning approval reference 0658, with; (i) the omission of all underground parking; (ii) the omission of 13 no. 4-bedroom Type G3 and G4 houses; (iii) the omission of 15 no. 3-bedroom Type G1 and 4 no. 1-bedroom Type J apartments; (iv) the re-alignment of the internal secondary access road; (v) the re-design of the previously approved 32 no. 2 bedroom and 8 no. 1-bedroom apartments to 26 no. 2 bedroom and 14 no. 1 bed-room enhanced apartments with in-house Care Support facilities; (vi) the provision of 70 no. surface car parking spaces; 9 no. 3 bedroom houses; 18 no. 3-bedroom upper duplex apartments; 16 no. 2-bedroom ground floor apartments; a childrens crèche; a central amenity play area; and all associated site works.

App no: 21340. **Location:** Approx. 50m south of the Proposed Development Site. **Planning Status:** New Application. **Decision Date:** 13/12/2021

Permission for development which will consist of amending planning approval reference 19/42 consisting of: (i) the addition of 4 No. 2 bedroom apartments and 2 no. 1 bedroom apartments to the undercroft of the approved Block H (ii) minor window configuration changes and (iii) additional car parking and associated site works.

App no. ABP-302848-18. **Location:** Immediately north of the Proposed Development Site. **Decision Due Date:** 19/11/2021

The site is located adjacent to the proposed N6 Galway City Ring Road (GCRR) route. The GCRR will link the western side of Galway City to the eastern side from Bearna in the west, to the N6 junction at the Coolagh Roundabout to the east and vice versa through a newly constructed road which will bypass the city centre through a corridor to the north of the city. The GCRR forms part of the Galway Transport Strategy (GTS) which is the current adopted strategy for transport within Galway City. The GCRR is currently at planning stage being reviewed by An Bord Pleanála (APB).

Considering the absence of direct effects on European sites by the Proposed Development, the mitigation measures which are listed below to protect European sites from indirect effects and the mitigation measures which will be in place for the GCRR, there are no means for the Proposed Development to act in-combination with the GCRR that would cause any likely significant effects on any European sites.

Table 4. The potential pathways for significant effects of the Proposed Development on the qualifying interests of Lough Corrib SAC, Galway Bay Complex SAC, Inner Galway Bay SPA and Lough Corrib SPA.

Qualifying Interests	Location in relation to Proposed Development	Potential Pathway for Significant Effects
Lough Corrib SAC (000297)		
Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]	c. 33km north-west of the proposed development site in Lough Corrib, according to conservation objectives map 3 (NPWS, 2017)	No –high likelihood of dilution of any potential contaminants arising due to groundwater flows due to distance and dilution capacity of Lough Corrib.
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]	c. 20km north-west of the proposed development site in Lough Corrib, according to conservation objectives map 3 (NPWS, 2017)	
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]	c. 2.5km north-west of the proposed development site in Lough Corrib, according to conservation objectives map 3 (NPWS, 2017)	Yes – via potential groundwater pathways which could interact with surface water bodies.
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	Not mapped in the conservation objectives but present in rivers in the SAC (NPWS, 2017). According to the NIS submitted with the N6 Galway City Ring Road project, the River Corrib channel in the vicinity of the proposed road development, and further downstream, does not correspond with this Annex I habitat type.	No – this receptor does not occur within the ZOI of the Proposed Development.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	Located within c. 100m of the Site to the north, west and east, according to NPWS data and indicated in Volume 3 of the N6 Galway City Ring Road project EIAR - Figure 8.15.8.	Yes – via potential surface water, groundwater and air pathways.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]	Located c. 200m north-east according to NPWS data.	Yes – via potential groundwater pathways.
Active raised bogs [7110]	The nearest occurrence is Aldergoole Bog c. 4.1km north of the proposed development at its closest point (Map 4 – NPWS, 2017)	No – located remote from the Proposed Development Site.
Degraded raised bogs still capable of natural regeneration [7120]	Map 4 of the conservation objectives shows bog habitats, could be present c. 5km north of the site (NPWS, 2017). Not recorded within the ZOI of the N6 Galway City Ring Road project according to the NIS submitted with it.	
Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Full extent unknown, not recorded within the ZOI of the N6 Galway City Ring Road project according to the NIS submitted with it.	
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	Located c. 550m north-east of the Site according to NPWS data.	Yes – via potential groundwater pathways.
Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]	Located c. 500 m west of the Site as indicated in Volume 3 of the N6 Galway City Ring Road project EIAR - Figure 8.15.8.	

Qualifying Interests	Location in relation to Proposed Development	Potential Pathway for Significant Effects
Alkaline fens [7230]	Located c. 550m north-east of the Site according to NPWS data.	
Limestone pavements [8240]	Located c. 100m south of the proposed development Site and immediately west of Headford Road according to NPWS data.	
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	c. 26.6km north-west of the proposed development at its closest point (Map 8 – NPWS, 2017)	No – no pathway. These are not groundwater dependant habitats.
Bog woodland [91D0]	c. 4.9km north of the proposed development at its closest point (Map 8 – NPWS, 2017)	
<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]	In the Owenriff River further upstream / north in the Lough Corrib catchment and more than 20km from the proposed development site (Map 9 – NPWS, 2017)	No – no significant pathway. High likelihood of dilution of any potential contaminants arising due to groundwater flows due to distance.
<i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]	Map 10 of the conservation objectives shows this species is present in the River Clare north of the site (NPWS, 2017). According to the NIS submitted with the N6 Galway City Ring Road project there were no White-clawed crayfish recorded at any of the survey sites within the scheme study area, including the River Corrib.	No – this receptor does not occur within the ZOI of the Proposed Development.
<i>Petromyzon marinus</i> (Sea Lamprey) [1095]	Full extent unknown but present in rivers in the SAC (NPWS, 2017).	Yes – via potential groundwater pathways which could interact with surface water bodies.
<i>Lampetra planeri</i> (Brook Lamprey) [1096]	Full extent unknown but present in rivers in the SAC (NPWS, 2017).	
<i>Salmo salar</i> (Salmon) [1106]	Full extent unknown but present in rivers in the SAC (NPWS, 2017).	
<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	Potential foraging grounds and extent mapped in Map 11 of the conservation objectives, c. 30km from the site (NPWS, 2017). Recorded in Menlo Castle (2.5 km to the west of the Site) and Coopers Cave (1.2km southeast of the Site) as part of N6 Galway City Ring Road project.	No – According to the NIS submitted with the Galway City Ring Road project, the NPWS have confirmed that the QI population for the Lesser horseshoe bat in Lough Corrib SAC is the maternity roost at Eborhall House (roost 217 in the NPWS database), on the northern shore of Lough Corrib, near Cong, Co. Mayo (ARUP, 2018). This site is remote from the Proposed Development and as such there is no likelihood of significant effects on this QI. Impacts on bats in the local area are addressed in the EcIA accompanying this application.
<i>Lutra lutra</i> (Otter) [1355]	Map 12 of the conservation objectives shows foraging commuting areas around Lough Corrib. c. 2km north-west of the site (NPWS, 2017).	Yes – via potential groundwater pathways which could interact with surface water bodies.
<i>Najas flexilis</i> (Slender Naiad) [1833]	Map 13 of the conservation objectives shows this species extent c. 7km north of the site in	No – these receptors do not occur within the ZOI of the Proposed Development.

Qualifying Interests	Location in relation to Proposed Development	Potential Pathway for Significant Effects
	Lough Corrib at its closest point (NPWS, 2017).	
<i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]	c. 12.4km north of the proposed development at its closest point (Map 10 – NPWS, 2017). According to the NIS submitted with the N6 Galway City Ring Road project, the nearest known site for Slender Green Feather-moss is at Gortachalla Lough, north of Moycullen.	
Galway Bay Complex SAC (000268)		
Mudflats and sandflats not covered by seawater at low tide [1140]	Located c. 3 km south of the site.	Yes – via potential groundwater pathways which could interact with surface water bodies.
Large shallow inlets and bays [1160]	Located c. 4.5km south of the site.	No – this receptor does not occur within the ZOI of the Proposed Development.
Reefs [1170]	Located c. 3 km south of the site.	Yes – via potential groundwater pathways which could interact with surface water bodies.
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]	Located c. 1.8km south of the site.	
Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	Located c. 1.8km south of the site.	
<i>Salicornia</i> and other annuals colonising mud and sand [1310]	Located remote from the Site (approximately 4.1km south-east according to NPWS data)	No – this receptor does not occur within the ZOI of the Proposed Development.
<i>Lutra lutra</i> (Otter) [1355]	Communing buffer in Map 11 of the conservation objectives includes the area of the coast c. 1.8km south of the site (NPWS, 2013a).	Yes – via potential groundwater pathways which could interact with surface water bodies.
<i>Phoca vitulina</i> (Harbour Seal) [1365]	Map 12 of the conservation objectives shows general habitat and resting habitat in Lough Atalia c. 2.2km south of the site (NPWS, 2013a).	
Coastal lagoons [1150]	Located at Lough Atalia approx. 1.9 km south of the Proposed Development (NPWS, 2013a).	
Turloughs [3180]	Located c. 27m east of the Proposed Development according to NPWS data.	
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	Located c. 550m north-east of the Site according to NPWS data.	
Alkaline fens [7230]	Located c. 550m north-east of the Site according to NPWS data.	
Perennial vegetation of stony banks [1220]	c. 5.8 km south west of the site according to Map 8 of the conservation objectives (NPWS, 2013a).	No – no potential pathway for impacts – terrestrial habitat with no connection with the Proposed Development Site
<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130]	Located at Rocklands Juniper formations east of Galway city – not located downstream of Proposed Development (NPWS, 2013a)	No – no potential pathway for impacts – terrestrial habitat with no connection with the Proposed Development Site
Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	Located within c. 100m of the Site to the north, west and east, according to NPWS data and indicated in Volume 3 of the N6	Yes – via potential surface water, groundwater and air pathways.

Qualifying Interests	Location in relation to Proposed Development	Potential Pathway for Significant Effects
	Galway City Ring Road project EIAR - Figure 8.15.8.	
Limestone pavements [8240]	Located c. 100m south of the proposed development Site and immediately west of Headford Road according to NPWS data.	Yes – via groundwater pathways
Inner Galway Bay SPA		
[A002] Black-throated Diver (<i>Gavia arctica</i>) [A003] Great Northern Diver (<i>Gavia immer</i>) [A017] Cormorant (<i>Phalacrocorax carbo</i>) [A028] Grey Heron (<i>Ardea cinerea</i>) [A046] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A050] Wigeon (<i>Anas penelope</i>) [A052] Teal (<i>Anas crecca</i>) [A056] Shoveler <i>Anas clypeata</i> [A069] Red-breasted Merganser (<i>Mergus serrator</i>) [A137] Ringed Plover (<i>Charadrius hiaticula</i>) [A140] Golden Plover (<i>Pluvialis apricaria</i>) [A142] Lapwing (<i>Vanellus vanellus</i>) [A149] Dunlin (<i>Calidris alpina</i>) [A157] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A160] Curlew (<i>Numenius arquata</i>) [A162] Redshank (<i>Tringa totanus</i>) [A169] Turnstone (<i>Arenaria interpres</i>) [A179] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A182] Common Gull (<i>Larus canus</i>) [A191] Sandwich Tern (<i>Sterna sandvicensis</i>) [A193] Common Tern (<i>Sterna hirundo</i>)	Potential to forage in wetland habitat associated with the SPA, south of the Proposed Development, and in ex-situ sites. All species are included here as a precautionary measure.	Yes – via potential groundwater pathways which could interact with surface water bodies.
[A999] Wetland and Waterbirds	Located at SPA extent c 1.8 km south of the site (NPWS, 2013a).	
Lough Corrib SPA		
[A051] Gadwall <i>Anas strepera</i> [A056] Shoveler <i>Anas clypeata</i> [A059] Pochard <i>Aythya ferina</i> [A061] Tufted Duck <i>Aythya fuligula</i> [A065] Common Scoter <i>Melanitta nigra</i> [A082] Hen Harrier <i>Circus cyaneus</i> [A125] Coot <i>Fulica atra</i> [A140] Golden Plover <i>Pluvialis apricaria</i> [A179] Black-headed Gull <i>Chroicocephalus ridibundus</i> [A182] Common Gull <i>Larus canus</i> [A193] Common Tern <i>Sterna hirundo</i> [A194] Arctic Tern <i>Sterna paradisaea</i> [A395] Greenland White-fronted Goose <i>Anser albifrons flavirostris</i>	Potential to forage in wetland habitat associated with the SPA, north of the Proposed Development, and in ex-situ sites. All species are included here as a precautionary measure.	Yes – via potential groundwater pathways which could interact with surface water bodies.
[A999] Wetland and Waterbirds	Located at SPA extent c 1.8 km north-west of the site (NPWS, 2013a).	

7 CONSERVATION OBJECTIVES

Section 6 identified the qualifying interests and special conservation interests from the relevant European sites that could be affected by the Proposed Development.

As per the Habitats Directive, the focus of the AA at this second stage should be on the integrity of European sites *in light of their conservation objectives*.

The “favourable conservation status” of a habitat or species is defined by Articles 1(e) and 1(i) of the Habitats Directive as follows:

“The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- *its natural range, and area it covers within that range, are stable or increasing, and*
- *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, and*
- *the conservation status of its typical species is favourable.*

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as ‘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, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.”*

7.1 Lough Corrib SAC

The relevant QIs and the associated conservation objectives of the site are presented in Table 5. The Target and Attributes for the habitats, as described in the Lough Corrib SAC Conservation Objectives supporting documents, were reviewed and considered in this assessment.

TABLE 5. CONSERVATION OBJECTIVES FOR THE RELEVANT QUALIFYING INTERESTS OF LOUGH CORRIB SAC.

Qualifying Interests	Conservation Objective (Version 1, April 2017)
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]	To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. in Lough Corrib SAC.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) in Lough Corrib SAC

Qualifying Interests	Conservation Objective (Version 1, April 2017)
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]	To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) in Lough Corrib SAC.
Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae [7210]	To maintain the favourable conservation condition of Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae in Lough Corrib SAC.
Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]	To maintain the favourable conservation condition of Petrifying springs with tufa formation (<i>Cratoneurion</i>)* in Lough Corrib SAC
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens in Lough Corrib SAC.
Limestone pavements [8240]	To maintain the favourable conservation condition of Limestone pavements* in Lough Corrib SAC
<i>Petromyzon marinus</i> (Sea Lamprey) [1095]	To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC.
<i>Lampetra planeri</i> (Brook Lamprey) [1096]	To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC.
<i>Salmo salar</i> (Salmon) [1106]	To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC.
<i>Lutra lutra</i> (Otter) [1355]	To maintain the favourable conservation condition of Otter in Lough Corrib SAC.

During construction, there is a risk of groundwater pollution from accidental spillages at the Proposed Development Site, as well as from fine sediment/silt being transported and recharging to ground. Groundwater flow through karst areas is extremely complex and difficult to predict. In addition, groundwater flow in highly permeable karstified limestones is of a regional scale, and flow path lengths can be up to a several kilometres (GSI, 2004). As such, all QIs associated with Lough Corrib SAC potentially influenced and/or indirectly affected by groundwater are considered in this assessment. Spillages and runoff have a high risk to groundwater where karst pathways are present, as pollutants can travel significant distances relatively quickly. Mitigation is required to address these potential impacts.

Finally, given the proximity of the Site to Annex I habitats associated with Lough Corrib SAC ([6210] orchid rich calcareous grassland, [8240] limestone pavement), there is potential for dust deposition impacts to arise as a result of the Proposed Development. Dust emissions associated with construction works could affect adjoining habitats (by potentially smothering sensitive habitats or plant species). There will be no direct loss of any Annex I habitats as a result of the Proposed Development.

7.2 Galway Bay Complex SAC

The relevant QIs and the associated conservation objectives of the site are presented in Table 6. The Target and Attributes for the habitats, as described in the Galway Bay Complex SAC Conservation Objectives supporting documents, were reviewed and considered in this assessment.

TABLE 6. CONSERVATION OBJECTIVES FOR THE RELEVANT QUALIFYING INTERESTS OF LOUGH CORRIB SAC.

Qualifying Interests	Conservation Objective (Version 1, April 2013)
Mudflats and sandflats not covered by seawater at low tide [1140]	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Galway Bay Complex SAC.

Qualifying Interests	Conservation Objective (Version 1, April 2013)
Reefs [1170]	To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC
Atlantic salt meadows (Glaucopuccinellietalia maritima) [1330]	To restore the favourable conservation condition of Atlantic salt meadows (Glaucopuccinellietalia maritima) in Galway Bay Complex SAC
Mediterranean salt meadows (Juncetalia maritimi) [1410]	To restore the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Galway Bay Complex SAC.
Lutra lutra (Otter) [1355]	To restore the favourable conservation condition of Otter in Galway Bay Complex SAC
Phoca vitulina (Harbour Seal) [1365]	To maintain the favourable conservation condition of Harbour Seal in Galway Bay Complex SAC.
Coastal lagoons [1150]	To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC
Turloughs [3180]	To maintain the favourable conservation condition of Turloughs in Galway Bay Complex SAC.
Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]	To maintain the favourable conservation condition of Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae in Galway Bay Complex SAC.
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]	To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) in Galway Bay Complex
Limestone pavements [8240]	<i>Not Available.</i>

During construction, there is a risk of groundwater pollution from accidental spillages at the Proposed Development Site, as well as from fine sediment/silt being transported and recharging to ground. Groundwater flow through karst areas is extremely complex and difficult to predict. In addition, groundwater flow in highly permeable karstified limestones is of a regional scale, and flow path lengths can be up to a several kilometres (GSI, 2004). As such, all QIs associated with Galway Bay Complex SAC potentially influenced and/or indirectly affected by groundwater are considered in this assessment. Spillages and runoff have a high risk to groundwater where karst pathways are present, as pollutants can travel significant distances relatively quickly. Mitigation is required to address these potential impacts.

7.3 Lough Corrib SPA

The relevant QIs and the associated conservation objectives of the site are presented in Table 7. The Target and Attributes for the habitats, as described in the Lough Corrib SPA Conservation Objectives supporting documents, were reviewed and considered in this assessment.

TABLE 7. CONSERVATION OBJECTIVES FOR THE RELEVANT QUALIFYING INTERESTS OF LOUGH CORRIB SPA.

Qualifying Interests	Generic Conservation Objective (Version 8, 2021)
[A051] Gadwall <i>Anas strepera</i> [A056] Shoveler <i>Anas clypeata</i> [A059] Pochard <i>Aythya ferina</i> [A061] Tufted Duck <i>Aythya fuligula</i> [A065] Common Scoter <i>Melanitta nigra</i> [A082] Hen Harrier <i>Circus cyaneus</i> [A125] Coot <i>Fulica atra</i>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

Qualifying Interests	Generic Conservation Objective (Version 8, 2021)
[A140] Golden Plover <i>Pluvialis apricaria</i> [A179] Black-headed Gull <i>Chroicocephalus ridibundus</i> [A182] Common Gull <i>Larus canus</i> [A193] Common Tern <i>Sterna hirundo</i> [A194] Arctic Tern <i>Sterna paradisaea</i> [A395] Greenland White-fronted Goose <i>Anser albifrons flavirostris</i>	
[A999] Wetland and Waterbirds	To maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

During construction, there is a risk of groundwater pollution from accidental spillages at the Proposed Development Site, as well as from fine sediment/silt being transported and recharging to ground. Groundwater flow through karst areas is extremely complex and difficult to predict. In addition, groundwater flow in highly permeable karstified limestones is of a regional scale, and flow path lengths can be up to a several kilometres (GSI, 2004). As such, all SCIs associated with Lough Corrib SPA potentially influenced and/or indirectly affected by groundwater are considered in this assessment. Spillages and runoff have a high risk to groundwater where karst pathways are present, as pollutants can travel significant distances relatively quickly. Mitigation is required to address these potential impacts.

7.4 Inner Galway Bay SPA

The relevant QIs and the associated conservation objectives of the site are presented in Table 8. The Target and Attributes for the habitats, as described in the Inner Galway Bay SPA Conservation Objectives supporting documents, were reviewed and considered in this assessment.

TABLE 8. CONSERVATION OBJECTIVES FOR THE RELEVANT QUALIFYING INTERESTS OF INNER GALWAY BAYSPA.

Qualifying Interests	Generic Conservation Objective (Version 8, 2021)
[A002] Black-throated Diver (<i>Gavia arctica</i>) [A003] Great Northern Diver (<i>Gavia immer</i>) [A017] Cormorant (<i>Phalacrocorax carbo</i>) [A028] Grey Heron (<i>Ardea cinerea</i>) [A046] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A050] Wigeon (<i>Anas penelope</i>) [A052] Teal (<i>Anas crecca</i>) [A056] Shoveler <i>Anas clypeata</i> [A069] Red-breasted Merganser (<i>Mergus serrator</i>) [A137] Ringed Plover (<i>Charadrius hiaticula</i>) [A140] Golden Plover (<i>Pluvialis apricaria</i>) [A142] Lapwing (<i>Vanellus vanellus</i>) [A149] Dunlin (<i>Calidris alpina</i>) [A157] Bar-tailed Godwit (<i>Limosa lapponica</i>)	To maintain the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

Qualifying Interests	Generic Conservation Objective (Version 8, 2021)
[A160] Curlew (<i>Numenius arquata</i>) [A162] Redshank (<i>Tringa totanus</i>) [A169] Turnstone (<i>Arenaria interpres</i>) [A179] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A182] Common Gull (<i>Larus canus</i>) [A191] Sandwich Tern (<i>Sterna sandvicensis</i>) [A193] Common Tern (<i>Sterna hirundo</i>)	
[A999] Wetland and Waterbirds	To maintain the favourable conservation condition of the wetland habitat at Inner Galway Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

During construction, there is a risk of groundwater pollution from accidental spillages at the Proposed Development Site, as well as from fine sediment/silt being transported and recharging to ground. Groundwater flow through karst areas is extremely complex and difficult to predict. In addition, groundwater flow in highly permeable karstified limestones is of a regional scale, and flow path lengths can be up to a several kilometres (GSI, 2004). As such, all SCIs associated with Inner Galway Bay SPA potentially influenced and/or indirectly affected by groundwater are considered in this assessment. Spillages and runoff have a high risk to groundwater where karst pathways are present, as pollutants can travel significant distances relatively quickly. Mitigation is required to address these potential impacts.

8 MITIGATION MEASURES

8.1 Construction Phase

The following mitigation measures will be in place for the duration of the Proposed Development.

8.1.1 Groundwater

The following measures, designed to protect ground water quality, will serve to prevent any negative effects occurring in Lough Corrib SAC, Galway Bay Complex SAC, Lough Corrib SPA and Inner Galway Bay SPA as a result of the Construction Phase:

Dewatering

Groundwater may be encountered during the construction works. Where water must be pumped from the excavations, water will be managed in accordance with best practice standards (i.e., CIRIA – C750) and regulatory consents.

Pollution Prevention

All works carried out as part of the Proposed Development will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990 and the contractor will cooperate fully with the Environment Section of Galway City Council in this regard.

Personnel working on the Site will be trained in the implementation of environmental control and emergency procedures. Procedures and relevant documents produced will be formulated in consideration of standard best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- CIRIA 697, The SUDS Manual, 2007;
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004;
- Construction Industry Research and Information Association CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006);
- CIRIA C648: Control of water pollution from linear construction projects: Site guide (Murnane et al. 2006); and
- Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

The following measures will protect groundwaters during the Construction Phase of the Proposed Development:

- As noted previously, according to the Engineering Services Report (DBFL, 2022) at present “all pluvial storm water that falls onto the site currently soaks away to ground or flows as sheet flow overland toward Headford Road. It then flows south along Headford Road and discharges to an existing marsh area. The marsh area is 150m south of the site on Headford Road, on the east side of Headford Road”. Trenched silt fences will be installed along the southern and eastern boundaries of the Site to prevent run-off of silty water to this marsh area. Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to temporary settling depressions area (e.g. a shallow infiltration basin lined with a geotextile membrane) with over-flows directed to land. Alternatively, silt laden waters will be tankered off site to a licenced facility.
- If karst features are encountered during construction works these will be assessed by a qualified hydrogeologist, and appropriate mitigation measures prepared.
- Any oil and lubricant changes and maintenance will take place offsite;
- Refuelling of plant and machinery on Site shall take place in a designated, impermeable area;
- All containment and treatment facilities will be regularly inspected and maintained.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.

- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site;
- All personnel working on site will be trained in pollution incident control response. Emergency silt control & spillage response procedures contained within the CEMP will ensure that appropriate information will be available on site outlining the spillage response procedures and a contingency plan to contain silt during an incident;
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005);
- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste disposal contractor;
- As this is a greenfield site, it is unlikely contaminated material will exist onsite. However, in the unlikely event material becomes contaminated, by for example a fuel spill onsite or a burst / leaking hydraulic hose, a documented procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on Site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.
- Stockpiling of contaminated material is not permitted.
- No direct untreated point discharge of construction runoff to groundwater will be permitted.
- Where a pollution incident is detected, construction works will be stopped until the source of the construction pollution has been identified and remedied
- Excavations and potentially contaminated stockpiled soils will be constructed/located/sheeted in a manner that ensures water is contained within the site boundary.

8.1.2 Dust

A potential impact from the Proposed Development is from construction dust emissions and the potential for nuisance dust.

The following measures, designed to reduce dust emissions at the source (i.e., from Construction Phase activities at the Site and from Construction vehicles), will serve to prevent any negative effects occurring in Lough Corrib SAC as a result of Construction Phase dust emissions:

The dust minimisation measures detailed below will ensure that fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

8.1.2.1 Dust Minimisation Plan

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control

strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (BRE 2003), (The Scottish Office 1996) (UK Office of Deputy Prime Minister 2002) and the USA (USEPA 1997), (USEPA 1986).

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person accountable for air quality and dust issues on the site boundary.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring and/or visual inspections.

Site Management

- Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- The contractor will undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- The contractor will carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

- The contractor will agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and Maintaining the Site

- The contractor will plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- The contractor will erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- The contractor will fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period.
- The contractor will avoid site runoff of water or mud.
- The contractor will keep site fencing, barriers and scaffolding clean using wet methods.
- The contractor will remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- The contractor will keep stockpiles covered to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- The contractor will ensure all vehicles switch off engines when stationary - no idling vehicles.
- The contractor will avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- The contractor will impose and signpost a maximum-speed-limit of 20 kmph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- The contractor will produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- The contractor will implement a Travel Plan that supports and encourages sustainable travel (e.g. cycling, walking)

Operations

- The contractor will only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.

- The contractor will ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- The contractor will use enclosed chutes and conveyors and covered skips.
- The contractor will minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- The contractor will ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Measures Specific to Earthworks

- The contractor will re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- The contractor will use Hessian or mulches where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- The contractor will only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will be operated to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- The contractor will avoid scabbling (roughening of concrete surfaces) if possible.
- The contractor will ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- The contractor will ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials the contractor will ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions.

- A speed restriction of 15 km/hr will be applied as an effective control measure for dust for on-site vehicles.

- The contractor will use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- The contractor will avoid dry sweeping of large areas.
- The contractor will ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- The contractor will inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- The contractor will record all inspections of haul routes and any subsequent action in a site log book.
- The contractor will install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- The contractor will implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- The contractor will ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates will be located at least 10 m from receptors where possible.

Dust Control – Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures.

- Vehicles delivering material with potential for dust emissions to an off-site location will be enclosed or covered with tarpaulin always to restrict the escape of dust;
- Public roads outside the site will be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.
- If practicable, a wheel wash facility will be employed at the exit of the site so that traffic leaving the site compound will not generate dust or cause the build-up of aggregates and fine material in the public domain.

8.2 Operational Phase

8.2.1 Surface Water Management

There are a number of SuDS features proposed which have been designed in accordance with CIRIA documents C753, C697 and C60, which will serve to protect groundwater quality at the Site, **thereby removing the potential for pollutant sources entering the underlying aquifer and European Sites connected to it during the Operational Phase:**

- Swales (wet): Broad, shallow drainage channels covered in grass which can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the

subgrade is suitable. Swales also can promote biodiversity. These are located adjacent to roads and hard-standing areas.

- **Cellular System:** Proprietary modular block with an inspection manhole for providing underground surface water soakaway infiltration of runoff to the ground where the subgrade is suitable. This will be the primary attenuation system for the site and will be located underneath the parking area.
- **Green roof:** Green roofs provide ecological, aesthetic and amenity benefits and intercept and retain rainfall, at source, reducing the volume of runoff and attenuating peak flows. Green roofs absorb most of the rainfall that they receive during ordinary events although they will only contribute to attenuation of flows for larger events. Additionally, green roofs treat surface water through removal of atmospherically deposited urban pollutants. Finally, green roofs may reduce heating (by adding mass and thermal resistance value) and cooling (by evaporative cooling) loads on a building. An extensive green roof provides an area with low growing, low maintenance plants consisting of selfsustaining mosses, sedums, succulents, herbs or grasses over a drainage layer and waterproofing membrane. Extensive green roofs provide ecological, aesthetic and amenity benefits and intercept, treat and retain rainfall, reducing the volume of runoff and attenuation peak flows. Extensive roofs are usually only accessed for maintenance.
- **Petrol Interceptor:** A proprietary oil/water separator which prevents hazardous chemical and petroleum products from entering watercourses and public sewers. These are proposed at each outfall from the site in addition to a silt trap chamber.
- **Silt Trap Chamber:** A proprietary hydrodynamic vortex separator which removes settleable solids and oils from runoff. These are proposed at outfalls from the site in addition to a petrol interceptor.

9 CONCLUSION

This Natura Impact Statement details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect effects of the Proposed Development at Headford Road, Ballinfoyle, Co. Galway on the following European sites:

- Lough Corrib SAC
- Galway Bay Complex SAC
- Lough Corrib SPA
- Inner Galway Bay SPA

The above sites were identified by a screening exercise that assessed likely significant effects of a range of effects that may arise from the Proposed Development. The Appropriate Assessment investigated the potential direct and indirect impacts of the Proposed Works, both during Construction and Operation on the integrity and qualifying interests of the above European sites alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives.

Where potentially significant effects were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, ensuring the avoidance and mitigation measures are implemented as proposed, the Proposed Development will not have a significant adverse effect on the above European sites.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no adverse effects on the qualifying interests, special conservation interests and on the integrity and extent of Lough Corrib SAC, Galway Bay Complex SAC, Lough Corrib SPA and Inner Galway Bay SPA. Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site.

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